

### 2.2.5.4 Phase 3, Stage B

The remaining improvements on Quebec Street are completed in this Stage. Traffic on Quebec Street is shifted to the outsides to maintain through lanes and turn lanes at the ramp terminals. Improvements at the ramp terminals are completed during overnight lane closures. Pedestrian access is maintained throughout this Stage.



Quebec Street Interchange Phase 3, Stage B

## 2.3 EXISTING AND FUTURE CONDITIONS

The Project improves a major east-west highway for the Denver Metro area that provides a gateway access to employment centers, tourist attractions, local neighborhoods, and the Denver International Airport (DEN). It is one of the most heavily traveled interstate facilities in Colorado, with approximately 211,000 vehicles traveling the busiest section of the corridor each day, creating high peak-hour demand, congestion, and delays (source: Colorado Department of Transportation Online Transportation Information System [CDOT OTIS] website).

The Project's improvements are designed to accommodate 2035 future traffic volumes. The Project improves safety, access, and mobility on I-70 by reconstructing three general-purpose lanes, and adding one new managed lane in each direction between Brighton Boulevard and I-270. The Project also includes widening I-70 from I-270 to Chambers Road to accommodate one managed lane in each direction.

This section of the TMP provides information on existing and future traffic, safety, lighting, and business/community access.

### 2.3.1 AVAILABLE TRAFFIC DATA

KMP obtained existing (2012) traffic information from the Department and the CCD websites. We compared the Department's traffic data with the Department's OTIS website to gain a clear understanding of characteristics present along this segment of I-70.

To understand the potential future conditions for traffic, KMP uses existing traffic data provided by the Department and supplemented by additional traffic counts, as needed, and collaborates with the Department and CCD at the MOT Task Force Kick-Off Meeting. KMP uses calibrated traffic models to estimate vehicle queuing for critical phases of construction. We prepare a traffic memorandum summarizing the methodology, adjustments, and construction-related traffic operations for review by the Department and CCD.

### 2.3.2 EXISTING TRAFFIC AND ROADWAY CHARACTERISTICS

I-70 is a fully access-controlled facility with six lanes on average between I-25 and I-270, and eight lanes on average from I-270 to I-225. There are currently no managed lanes along I-70. Along this portion of I-70, add/drop lanes, and continuous auxiliary lanes for acceleration/deceleration, are provided between several of the interchanges. A lack of shoulders along the viaduct on I-70 hampers disabled vehicles' ability to pull off the road. The posted speed limit along I-70 is 55 mph, and the portion of I-70 between Washington Street and Colorado Boulevard is elevated above the local streets and arterials.

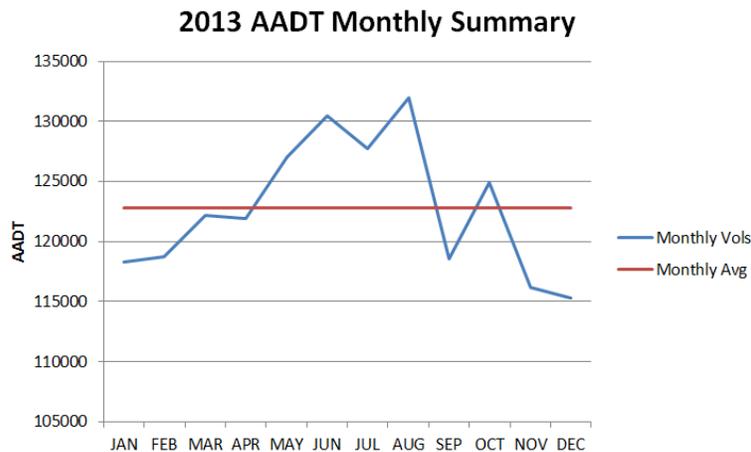
The interchanges between Brighton Boulevard and Peña Boulevard provide full or partial access with I-70, the local arterial network, and regional highways. Interchange spacing varies from 0.3 mile to 1.0 mile. The existing freeway has several locations of substandard or short weaving areas, and interchange entrance and exit ramps with short acceleration/deceleration lanes. These substandard short weaving sections and limited shoulders are contributing factors to roadway congestion.

In 2015, I-70 west of Brighton Boulevard carried 151,000 Annual Average Daily Traffic (AADT) with 15,300 trucks (10.1%), making it the primary east-west truck corridor through Colorado. The daily traffic peaks west of Havana Street at 211,000 AADT (8.4%



trucks), dropping to 171,000 AADT (8.0% trucks) between Havana Street and I-225, and to 112,000 AADT (9.2% trucks) east of Chambers Road.

KMP reviewed the monthly traffic trends to identify areas for reducing traffic impacts to the traveling public, and opportunities for Mainline lane restrictions, closures, or traffic switches. The information is presented in the graph below.



### 2013 AADT Monthly Trends

*During 5 months of the year, daily traffic volumes are above the annual average rate (Source for Traffic Data: CDOT OTIS Website)*

Additional existing traffic and travel characteristics for I-70 include:

- Traffic volumes increased at an annual rate of 1.5% to 2% since 2000
- Traffic on this segment of I-70 is evenly distributed with a directional distribution of 52-55%
- The current traffic volumes on I-70 between the interchanges are approaching roadway capacity (the volume to capacity [v/c] ratio ranges from 0.89 to 1.03)
- While the posted speed limit is 55 mph, both eastbound and westbound average speeds remain slightly above 30 mph for most of the day
- The peak hour travel time westbound from Tower Road to I-25 is approximately 25 minutes, and about 12 minutes during free-flow periods, a 13-minute increase in travel time
- The eastbound travel times range from 12 minutes during free-flow, to between 21 and 27 minutes for morning and afternoon peak periods, requiring 9 to 15 minutes of extra travel time



### Speed Map

The weekday PM traffic congestion within the Project corridor has reoccurring points. The red locations on the map are typical of traffic backups or queued vehicles (Source: Sigalert)

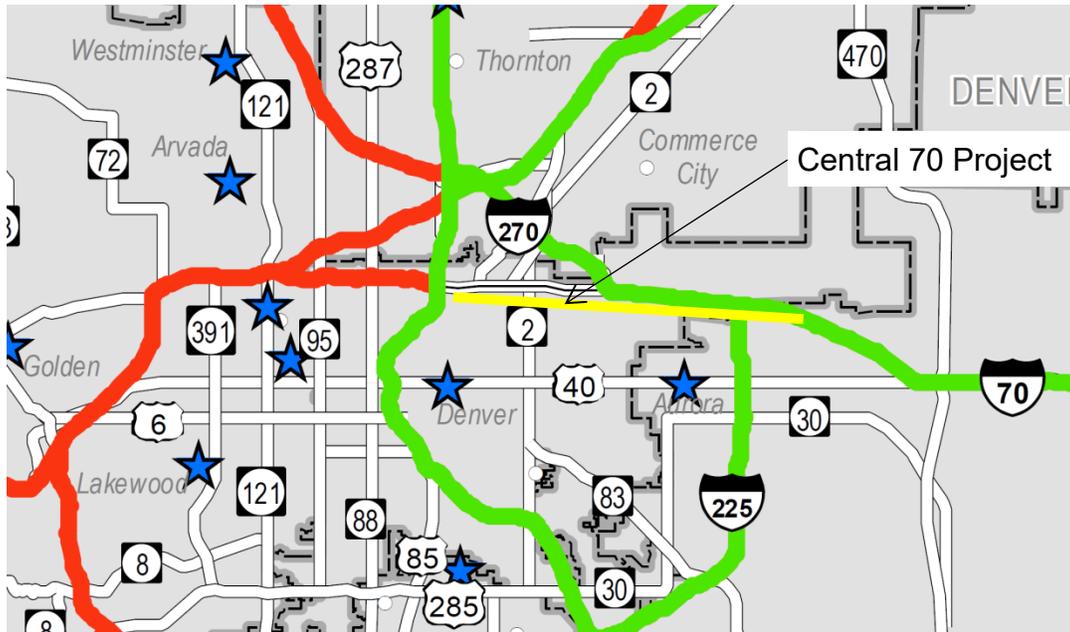
KMP also reviewed the 2012 existing PM Synchro traffic models representing cross-street congestion. The existing traffic operations are acceptable (Level of Service (LOS) D or better) at all cross-streets except for Dahlia Street/Stapleton Drive South intersection (LOS E).

A review of truck restrictions on the Department’s website (see chart) determined the current weight, height, and oversized/overweight restrictions for this segment of I-70. KMP will work with the Department during MOT Task Force meetings to develop truck traffic detour routes required for any temporary I-70 closures.

Location	Restriction Description
Existing 46 <sup>th</sup> Avenue under UPRR	Height restriction, 14’-4” maximum
MP 274.76-Intersection of I-70 and US 6, Hwy 265 (Brighton Blvd) RR and Local Agency Roadways	Weight restriction (22 kips to 60 kips maximum, total load related of axle spacing)
MP 274.76 to MP 276.58 Brighton Blvd to Colorado Blvd both directions (existing viaduct)	No oversized or overweight permitted loads allowed on this portion of I-70
MP 278.92, I-70 Structure E-17-KR (carrying I-270 Eastbound over I-70)	Height restriction, 15’-9” maximum

### Commercial Vehicle Restrictions on I-70

Source: CDOT website



- Designated Nuclear and Hazardous Materials Routes
- Designated Hazardous Materials Route
- Municipalities that require gasoline, diesel, and liquefied petroleum gas to comply with routing requirements

### Hazardous Material Haul Routes in Denver

Source: CDOT

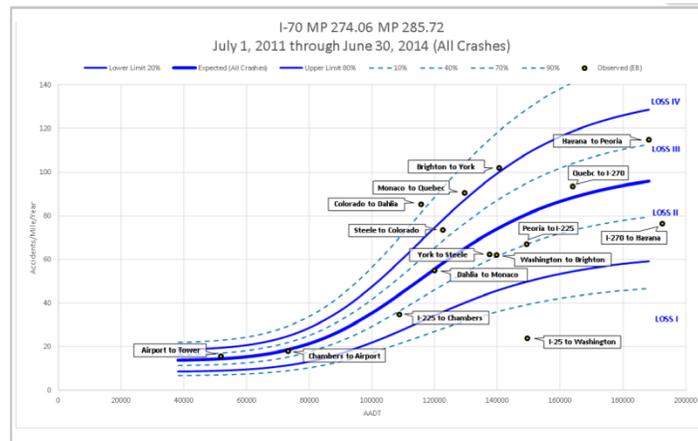
#### 2.3.3 SAFETY AND HISTORICAL CRASH DATA

Existing safety concerns within the Project area were documented in the Department’s *I-70 East Corridor EIS Safety Evaluation* (CDOT, 2004) and *Safety Evaluation Addendum: I-70 Corridor Plan* (CDOT, 2013). During the 3-year study period (July 1, 2011-June 30, 2014) 2,160 Mainline crashes were reported, with 536 of those causing 10 fatalities and numerous injuries.

The majority of crashes were rear-end and sideswipes, suggesting that safety concerns result from corridor-wide congestion, and from auxiliary lanes, tapers, and shoulders that are inadequate for the volume and speed. This large number of crashes equates to 2.0 crashes per day, or 62 crashes per mile per year, over the 11.6-mile study area.

The Project’s 2015 *Interstate Access Request (IAR) Safety Analysis*, identified four interstate segment locations where the crash frequency is well above the expected norm for similar freeways with the same traffic volumes. The four segments with total crash frequencies at the upper limit (top 20%) are: 1) Brighton Boulevard to York Street; 2) Steele Street to Colorado Boulevard; 3) Colorado Boulevard to Dahlia Street; and 4) Monaco Street to Quebec Street. The highest crash frequency occurs near Colorado Boulevard

The KMP TCP strategies include maximizing shoulders, and maintaining or increasing auxiliary lane lengths to reduce the potential for rear-end and same direction sideswipe crashes. KMP’s Incident Management Plan will detail the identification and rapid response plan to clear these types of high-frequency crashes during construction. Further measures to reduce crashes on the Mainline, cross-streets, and at intersections include improved signing, clear and maintained pavement markings, and signal heads over each lane that define clearly the desired travel paths during construction.



**I-70 Existing Crash Frequency Map by Segment**

*KMP monitors crash frequencies throughout the Project, paying careful attention to these high-crash locations (Source: CDOT 2015 Safety Analysis)*

**2.3.4 MAINTAINING EXISTING LIGHTING CONDITIONS**

Existing lighting, located on the outside shoulder within the Project right-of-way (ROW) limits, are maintained at the current level with an operational system. When the Construction Work requires removal of the existing lighting, temporary lighting is provided to meet the Temporary Lighting criteria, as listed in the Project Agreement Schedule 10, Section 2, Table 2-15, for all traffic shifts, detours, emergency pullout locations, merge/diverge locations, and intersections. High-mast lighting from Peoria Street to Chambers Road remains in place, and operational throughout construction. High-mast lighting from Peoria Street to Chambers Road remains in place and operational throughout construction.

### 2.3.5 BUSINESS/COMMUNITY ACCESS

Mixed-use, industrial, and residential areas, including Elyria and Swansea, surround I-70. Currently, heavy truck and vehicle traffic compete for space in narrow roadways to access/exit I-70 to and from these areas. Once the Project is complete, trucks will have better access through frontage roads and less need to use local streets which will greatly improve mobility. Our approach is to complete cross-streets in the area of the Elyria and Swansea neighborhoods, as well as the Stapleton Drive improvements early in the Project to provide improved mobility during construction. Additionally, our Public Information Team will inform the businesses and residents in the Work Area of upcoming activities, in order to limit the overall impacts.

Access for pedestrians and bicyclists will improve with the sidewalks along cross-streets and pedestrian ramps and meet Americans with Disabilities Act (ADA) standards. These local area improvements are completed as early as possible, so the benefits will be recognized early in construction. Also, with the construction of the Cover over the Lowered Section of I-70, community connectivity and access between areas north and south of the interstate increases significantly. Our approach to completing the UPRR Bridge improvements maintains pedestrian access along 46<sup>th</sup> Avenue to limit the impacts to connectivity in the Elyria/Swansea neighborhood, and specifically maintains safe access to Swansea Elementary School.

Additional details on KMP's approach to business and community access and outreach can be found in Appendix J, Draft Strategic Communications Plan.

### 2.4 RAMP CLOSURES

This section provides a description of our proposed treatment of ramps, and our use of closures and detour routes. KMP optimizes 8 of the 16 allowable full ramp closures, significantly limiting the impacts to the traveling public and adjacent residents and businesses. For example, detours have been constructed to eliminate long term ramp closures at the Quebec Street interchange, meaning no significant construction impacts for the shops at Northfield Stapleton (north of I-70) and Quebec Square (south of I-70). The graphic below summarizes our planned approach to ramp closures and the table at the end of this Section provides detail on our approach. Refer to Section 2.9 for temporary road closures.



### Anticipated Ramp Closures

#### 2.4.1 NON-CLOSURES

KMP does not have any planned full time closures at Colorado Boulevard and Quebec Street.

#### 2.4.2 BRIGHTON BOULEVARD WESTBOUND EXIT RAMP CLOSURE AND DETOUR

The Department permits a closure at this location. KMP detours the ramp traffic at this location to the Washington Street interchange westbound exit ramp and uses the interchange to direct traffic back to eastbound I-70, exiting at the eastbound Brighton Boulevard ramp. This detour is used during the closure of the westbound I-70 exit ramp at Brighton Boulevard in Phase 2, Stage B. The U-turning traffic merges with eastbound entrance ramp traffic, and remains in the existing 1,000-ft.-long auxiliary lane until exiting at Brighton Boulevard. The detour is approximately 1.55 miles.

#### 2.4.3 YORK STREET EASTBOUND EXIT RAMP CLOSURE AND DETOUR

The Department permits a closure at this location. KMP closes the eastbound exit ramp at York Street, when the viaduct is demolished in Phase 3 with traffic detoured in advance to the eastbound exit ramp at Brighton Boulevard. KMP detours this traffic north to the new 46<sup>th</sup> Avenue North, and then east to York Street (at a temporary intersection). The detour distance is approximately 0.7 miles.

#### 2.4.4 STEELE STREET/VASQUEZ BOULEVARD WESTBOUND ENTRANCE RAMP CLOSURE AND DETOUR

The Department permits a closure at this location. The proposed closure occurs in Phase 2 when the Lowered Section of I-70 and the proposed ramp in this area are completed. The detour route diverts southbound Vasquez Boulevard traffic east on 48<sup>th</sup> Avenue to Colorado Boulevard, and then south to the temporary left-turn lane connection with the I-70 northbound loop entrance ramp. This detour is approximately 1.38 miles. KMP detours northbound Steele Street/Vasquez Boulevard traffic to eastbound I-70, then departs via the Colorado Boulevard exit ramp to northbound Colorado Boulevard to the I-70 westbound entrance ramp. The detour is approximately 1.4 miles. Temporary improvements are needed at Colorado/48<sup>th</sup> Avenue, Vasquez Boulevard/48<sup>th</sup> Avenue, Colorado Boulevard westbound entrance ramp, and potentially 48<sup>th</sup> Avenue between Vasquez and Colorado prior to implementation of the detour.

#### 2.4.5 STEELE STREET/VASQUEZ BOULEVARD EASTBOUND EXIT RAMP CLOSURE AND DETOUR.

The Department permits a closure at this location. The proposed closure occurs in Phase 3 when the Lowered Section of I-70 and the proposed ramp in this area are completed. The detour route takes eastbound I-70 traffic to the Colorado Boulevard exit ramp, then northbound to 46<sup>th</sup> Avenue North, where traffic can access Steele Street/Vasquez Boulevard. This detour is approximately 1.49 miles.

#### 2.4.6 STEELE STREET/VASQUEZ BOULEVARD EASTBOUND ENTRANCE RAMP CLOSURE AND DETOUR.



# CENTRAL

The Department permits a closure at this location. The proposed closure and detour route divert southbound Vasquez Boulevard at 48<sup>th</sup> Avenue east to Colorado Boulevard then south along Colorado Boulevard to access the eastbound I-70 entrance ramp. This detour is approximately 0.9 miles. KMP detours northbound Steele Street/Vasquez Boulevard traffic east to Colorado Boulevard, then north to the eastbound I-70 entrance ramp, a detour distance of 1 mile. This northbound detour requires advanced signage or Variable Message Signs (VMS) to capture most Steele Street northbound traffic, as well as eastbound 40<sup>th</sup> Avenue traffic, before the Steele Street/40<sup>th</sup> Avenue intersection. We place a second signed detour route at the ramp closure for those drivers trying to access eastbound I-70, who entered Steele Street north of the 40<sup>th</sup> Street detour. KMP detours this traffic north to 48<sup>th</sup> Avenue, then follows the signed detour for southbound Vasquez Boulevard, described above. This detour is approximately 1.2 miles. Temporary improvements are needed at 48<sup>th</sup> Avenue intersections with Colorado and Vasquez Boulevards, Colorado Boulevard westbound entrance ramp, and potentially 48<sup>th</sup> Avenue between Vasquez and Colorado prior to implementation of the detour.

Additional detail on detour routes is provided in Section 2.6.

### Planned Long Term Ramp Closures and Duration

Location	Ramp	Closure Allowed	Department Closure Criteria	Compliant or Optimized	Planned Closure Duration	Enhancement
<b>Brighton Blvd. Interchange</b>	EB exit ramp	No		-	Remain Open	
	WB entrance ramp	No		-	Remain Open	
	WB exit ramp	Yes	6 months or duration of construction	Optimized	Less than 6 mo	Provided alternate traffic movement through utilization of a turnaround at Washington. Phasing is sensitive to the year round nature of the National Western Center and the economic value it brings to CCD.
	EB entrance ramp	No		-	Remain Open	
<b>York Street</b>	EB exit ramp	Yes	Closed as demolition of viaduct begins	Compliant	Permanently closed	
	WB entrance ramp	Yes	Closed after work that impacts UPRR	Optimized	Permanently Closed	No immediate closure, as allowed. It is closed at the end of Phase 1. We optimized the length this ramp can remain open as York Street is a major southbound arterial.

Location	Ramp	Closure Allowed	Department Closure Criteria	Compliant or Optimized	Planned Closure Duration	Enhancement
<b>Steele Street/Vasquez Blvd. Interchange</b>	EB exit ramp	Yes	6 months or duration of construction	Optimized	Less than 6 mo.	Closure will only be required for a short duration at the end of Phase 3 to switch traffic from the temporary ramp to the permanent ramp and Brighton Blvd. and Colorado Blvd. ramps will be available to keep detour routes as short as possible.
	WB entrance ramp	Yes	6 months or duration of construction	Compliant	6 months	
	WB exit ramp	Yes	Closed after 46 <sup>th</sup> Ave. North open from Colorado Blvd.	Compliant	Permanently Closed	
	EB entrance ramp	Yes	Closed as demolition of viaduct begins	Compliant	Permanently Closed	
<b>Colorado Blvd. Interchange</b>	EB exit ramp	No		-	Remain Open	
	WB entrance (loop ramp from northbound Colorado Blvd)	Yes	Closed as work affects existing ramp	Optimized	Permanently Closed	This movement is maintained throughout with various temporary ramp connections in Phase 1 and Phase 2. There will be short duration closures to complete the connections and for the final "plug" in Phase 2, but this WB entrance movement is maintained throughout construction.
	WB exit ramp	Yes	6 months or duration of construction	Optimized	Permanently Closed	This movement is maintained with various temporary connections in Phase 1 and Phase 2. There will be short duration closures to complete the connections and for the final "plug" in Phase 2, but this WB exit movement is maintained throughout construction.



Location	Ramp	Closure Allowed	Department Closure Criteria	Compliant or Optimized	Planned Closure Duration	Enhancement
	EB entrance ramp	No		-	Remain Open	
	EB entrance ramp (loop ramp from southbound Colorado Blvd)	Yes	Closed as work affects existing ramp	Optimized	Permanently closed	While the existing ramp is closed early in the project, we are maintaining the SB to EB traffic movement through a temporary intersection and connection to the existing NB to EB entrance ramp. Completed traffic analysis confirms that appropriate lanes and storage are provided by this detour.
<b>I-70 Slip Ramps to Stapleton Drive</b>	EB exit ramp at Dahlia	Yes	Closed as work affects existing ramp after Holly Ramps are open	Compliant	Permanently closed	
	WB on @ Dahlia	Yes	Closed as work affects existing ramp after Holly Ramps are open	Compliant	Permanently closed	
	WB off @ Monaco	Yes	Closed as work affects existing ramp after Holly Ramps are open	Compliant	Permanently closed	
	EB on @ Monaco	Yes	Closed as work affects existing ramp after Holly Ramps are open	Compliant	Permanently closed	

Location	Ramp	Closure Allowed	Department Closure Criteria	Compliant or Optimized	Planned Closure Duration	Enhancement
<b>Quebec Street Interchange</b>	EB exit ramp	Yes	6 months or duration of construction	Optimized	Less than 6 mo.	<p>Based on our local understanding of the importance of Quebec St. to commerce, we installed a temporary ramp to minimize impacts to this highly used arterial.</p> <p>This temporary ramp also allows work to progress concurrently at Holly Street which eliminates the tie between Colorado, Quebec, and Holly Street. This work is complete in compliance with the Project Agreement and facilitates an optimized schedule.</p>
	WB entrance ramp	Yes	6 months or duration of construction	Optimized	Less than 6 mo.	<p>Based on our local understanding of the importance of Quebec St. to commerce, we installed a temporary ramp to minimize impacts to this highly used arterial.</p> <p>This temporary ramp also allows work to progress concurrently at Holly Street which eliminates the tie between Colorado, Quebec, and Holly Street. This work is complete in compliance with the Project Agreement and facilitates an optimized schedule.</p>
	WB exit ramp	No		-	Remain Open	
	EB entrance ramp	No		-	Remain Open	
<b>Central Park Blvd. Interchange</b>	All existing ramps	No		-	Remain Open	



Location	Ramp	Closure Allowed	Department Closure Criteria	Compliant or Optimized	Planned Closure Duration	Enhancement
<b>Havana Street Interchange</b>	All existing ramps	No		-	Remain Open	
<b>Peoria Street Interchange</b>	All existing ramps	No		-	Remain Open	
<b>Chambers Blvd. Interchange</b>	All existing ramps	No		-	Remain Open	

**2.4.7 DESCRIPTION OF TRAFFIC SHIFTS, DETOURS, AND ID OF DETOUR LIMITS IN EACH CONSTRUCTION PHASE**

Traffic shifts, lane and roadway closures, and long term detours required in each phase are discussed in Section 2.1.

## 2.5 IDENTIFICATION AND COORDINATION WITH OTHER PROJECTS WITHIN VICINITY OF KMP'S PROPOSED DETOUR ROUTES

KMP reviewed the projects that are near the proposed Project area listed in Appendix B to Section 9 of Schedule 10. Specifically, KMP has identified the following critical projects for special coordination:

- **Denver International Airport:** Peña Boulevard Reconstruction Project (near-term project)
- **City and County of Denver (CCD):** Brighton Boulevard Redevelopment—29<sup>th</sup> Avenue to 44<sup>th</sup> Avenue; and Platte to Parkhill Project; Pedestrian Overpass Crossing UPRR
- **National Western Center:** Master plan

Additional outreach will be done at early MOT Task Force meetings to ensure that other projects and important community events are not overlooked.

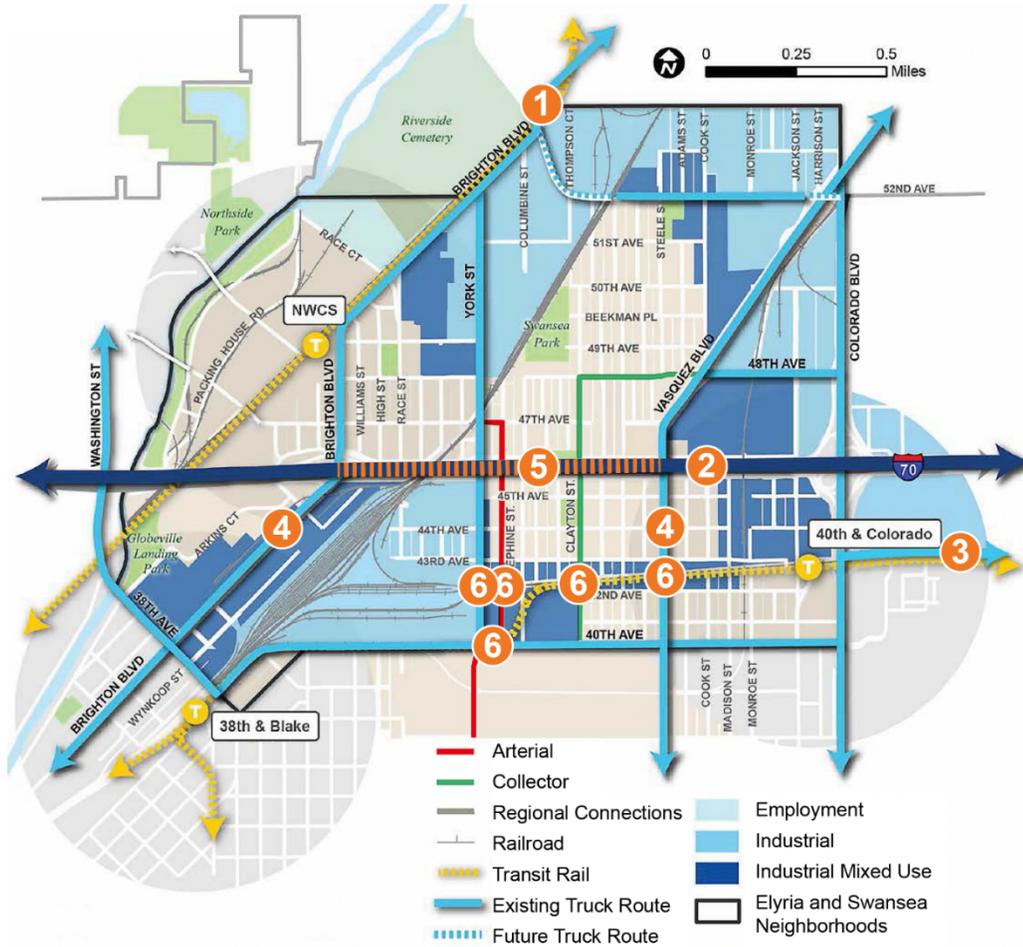
KMP will reach out to the Construction Project Manager for each identified project to discuss the project schedules and coordinate efforts related to construction. We need to identify conflicts between construction phases, detour routes, and closure times. KMP's proactive coordination reduces the risk of scheduling conflicts between projects.

## 2.6 DESCRIPTION OF PROPOSED DETOUR ROUTES

In addition to the detour routes associated with ramp closures described in Section 2.4, some detours are required for short-duration closures of streets. KMP determined proposed detour routes based on Project Agreement requirements, truck routes from the Elyria and Swansea Study, and current truck delivery routes. The graphic on the next page presents a summary of restrictions between Colorado Boulevard and Washington Street which have been incorporated in our detour routes.

**Cross Streets:** Phased closures of cross streets follow the requirements of Table 2.2 in Schedule 10, Section 2. The exception is that Columbine and Clayton Street follow our ATC 57. These streets provide critical access to Swansea Elementary School and to limit the impacts to the school, these cross-streets are completed concurrently during a single summer break (i.e., when school is out of session.) We follow the MOT Variance Process in accordance with Schedule 10 Section 2.3 of the Project Agreement for approval. Vehicular, pedestrian, and bicycle traffic are maintained on a temporary detour along the Thompson Court and Elizabeth Street alignments.

**46<sup>th</sup> Avenue North Detour during Viaduct Demolition:** A temporary connection is required for 46<sup>th</sup> Avenue between Clayton Street and Columbine Street to allow removal of the existing viaduct and construction of two-way 46<sup>th</sup> Avenue. Once all I-70 traffic is switched to the Lowered Section (in Phase 3), the existing viaduct can be demolished. KMP proposes to maintain local street connectivity of new 46<sup>th</sup> Avenue North by using 45<sup>th</sup> Avenue as a local east/west detour route, in conjunction with the closing and opening of Josephine Street, Columbine Street, Clayton Street, and Fillmore Street, which are needed for sequential viaduct demolition. Sequential demolition allows for maintaining most local cross-street connections while each portion of the viaduct is demolished.



### ISSUES

- 1 Low clearance underpass, flooded crossing
- 2 Cook 2 lane collector, after construction
- 3 Smith truck route (Colorado to Quebec)
- 4 Non-hazardous materials delivery routes per PB memo to CCD, dated 9/26/08
- 5 No radioactives, poisons, or A5 explosives
- 6 Railroad crossing - train frequency: RTD A Line 73 times per day (40 sec. delay)

### STREET CLASSIFICATIONS

- 6 LN Principal Art - Colorado
  - 4 LN Art - Brighton, Steele/Vasquez, Quebec, Peoria
  - 2 LN Art - Holly, Monaco
  - 2 LN Minor Art - York, Josephine
  - 2 LN Collector - Clayton, Cook, Monroe, Dahlia
  - Collector - 46th (Brighton - York), Stapleton N & S, (Colorado - Quebec)
  - Local - Columbine, Fillmore, 46th (York - Steele)
- Note:** CDOT - No OS/OW permitted loads on I-70 both directions (Brighton to Colorado)

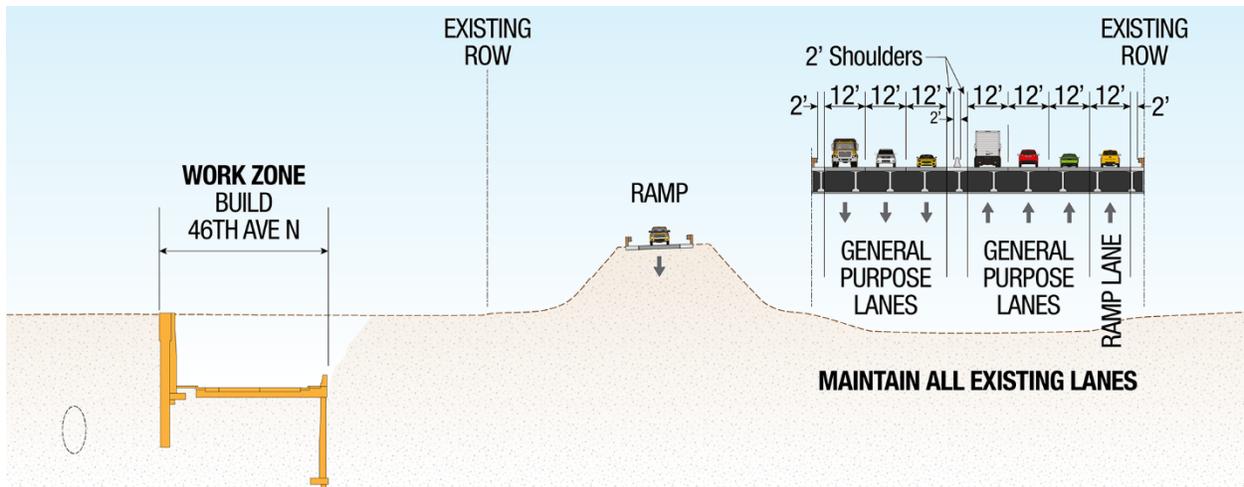
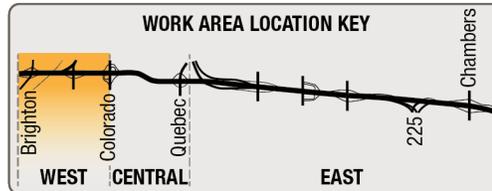
## Available Truck Routes for Use during Construction for Work Area West

Source: Elyria and Swansea Neighborhood Plan, CCD

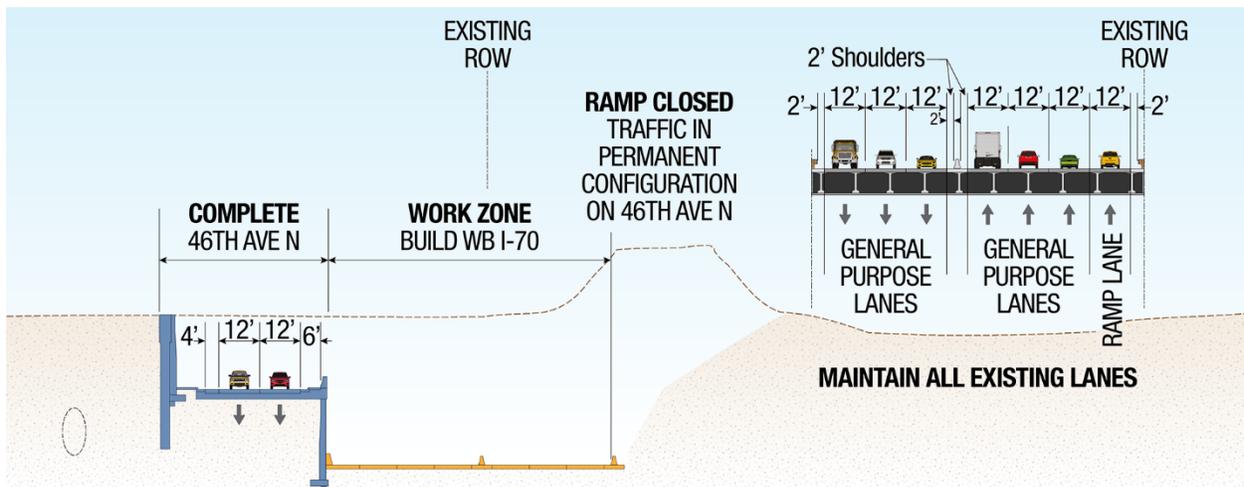
## 2.7 TYPICAL SECTIONS

KMP has developed typical sections for each Work Area and phase in order to communicate our approach to MOT by area. The figures show lane widths, shoulder widths, number of lanes, barrier/wall locations, and proposed work zone locations. These typical sections supplement the phasing description included in Section 2.1.

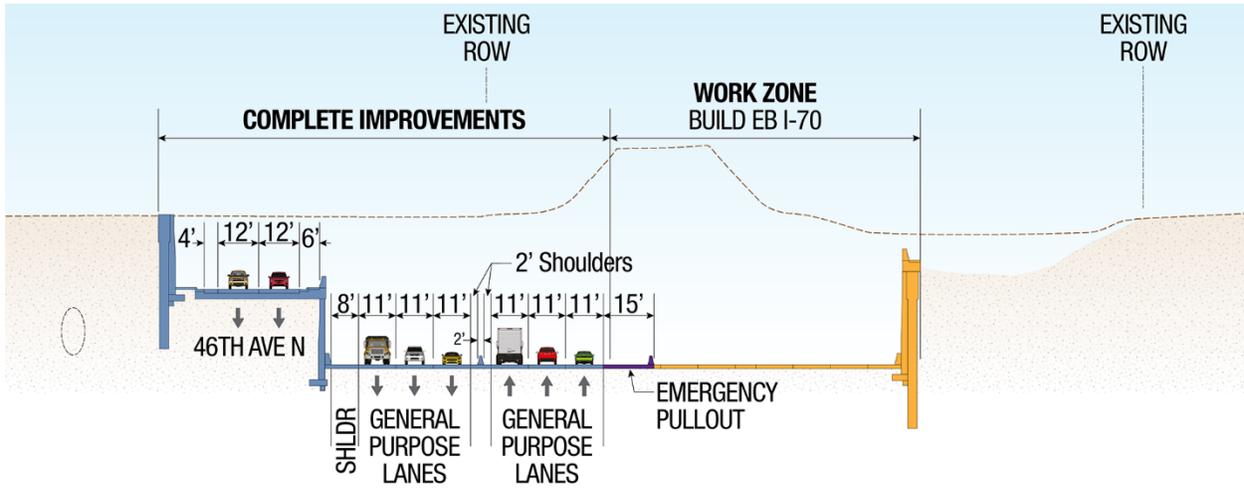
The discussion of the typical sections begins with Work Area West. To assist with orientation, the Location Key map changes to reflect the Work Area under discussion.



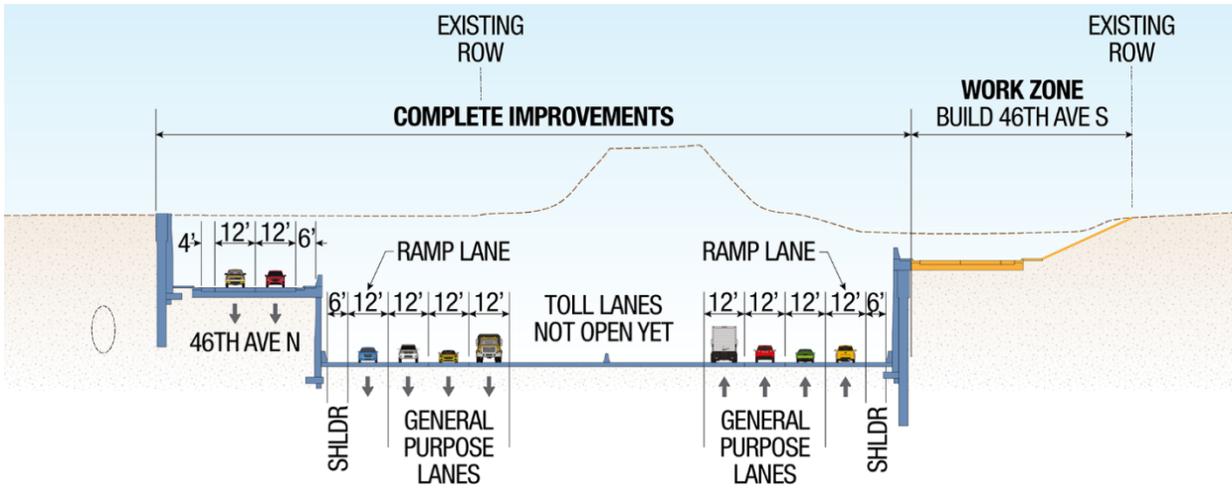
Work Area West, Lowered Section, Phase 1



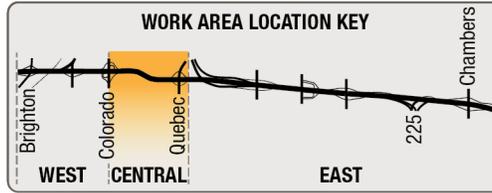
Work Area West, Lowered Section, Phase 2



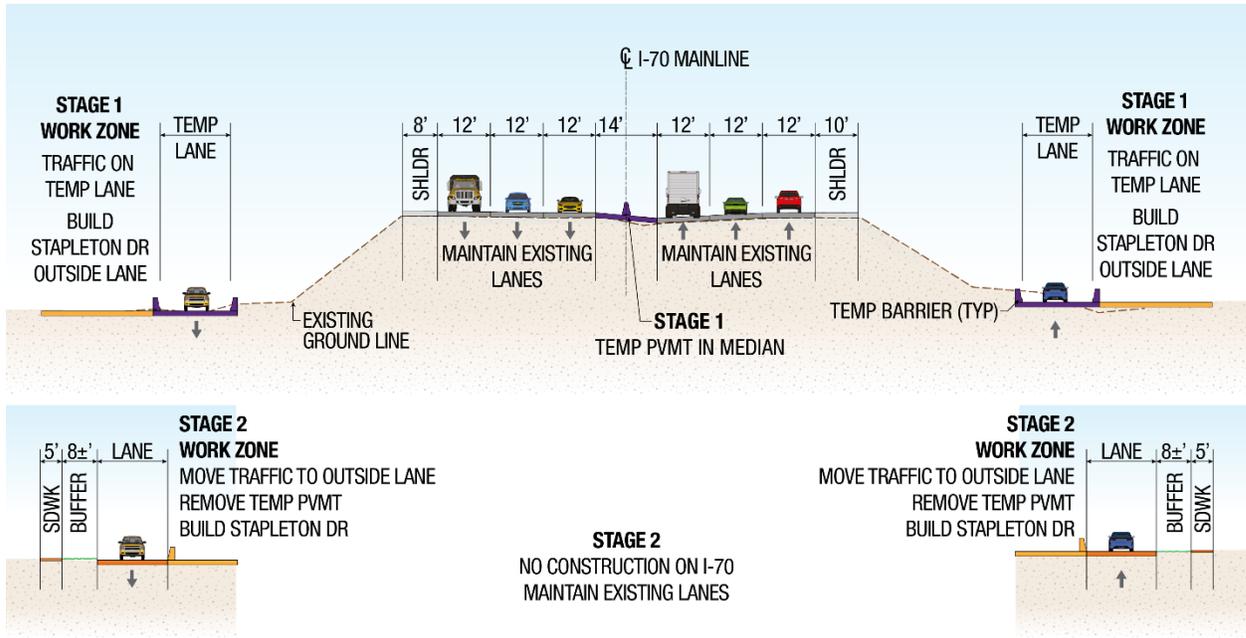
**Work Area West, Lowered Section, Phase 3**



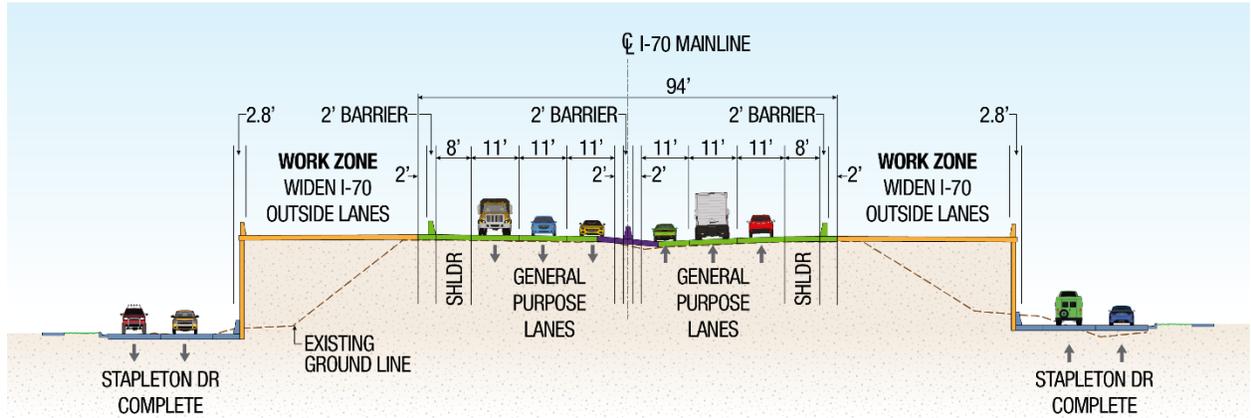
**Work Area West, Lowered Section, Phase 4**



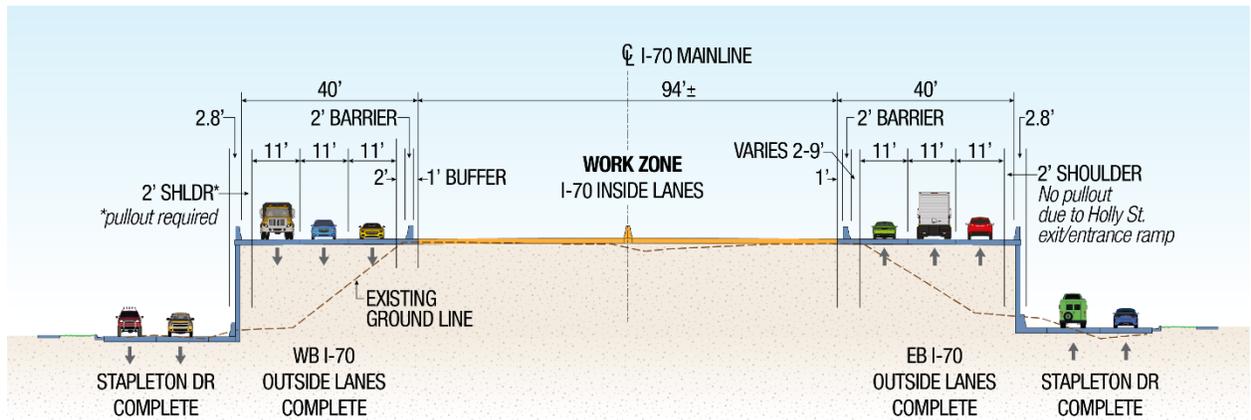
Work Area Key Map



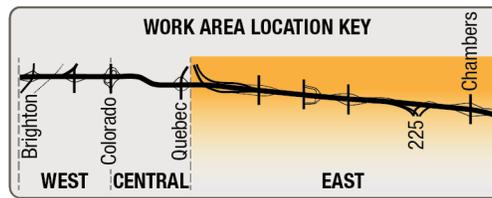
Work Area Central, Phase 1



**Work Area Central, Phase 2**



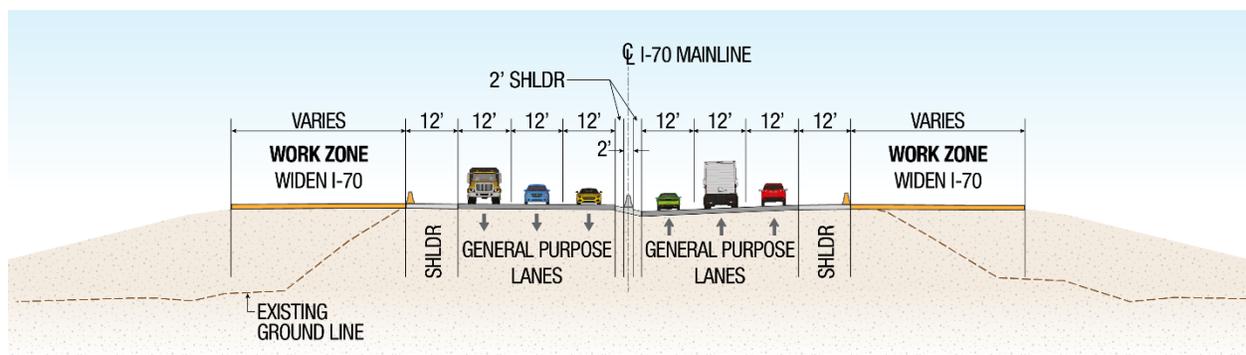
**Work Area Central, Phase 3**



Work Area Key Map

**Work Area East, Phase 1:** In Phase 1, KMP constructs the I-270 bridge structure over I-70. All traffic is generally in the existing configuration, with minor lane shifts and shoulder closures to accommodate safe work zones. No significant changes are required to the I-270 ramp or the I-70 Mainline typical sections.

**Work Area East, Phase 2:** For Phase 2 Work Area East, KMP completes the widening of I-70 between Sand Creek and I-225, including the I-70 bridge over Peoria Street. Traffic is shifted toward the median to accommodate the construction. All existing lanes and ramp movements are maintained throughout this phase



Work Area East, Phase 2

**Work Area East, Phase 3:** In Phase 3, KMP shifts traffic to the permanent General Purpose Lanes in both directions to complete the median improvements and the I-70 bridge over Peoria Street.



## 2.8 EMERGENCY REQUIREMENTS

### 2.8.1 PULLOUT LOCATIONS

To provide the best possible emergency access and incident response during construction, KMP’s goal is to deliver 8-ft. shoulders wherever possible throughout the duration of construction, and limit the need for emergency pullouts. Where 8-ft. shoulders cannot be maintained, emergency pullouts in accordance with the Project Agreement requirements are provided. As indicated in the following table (Location of Pullouts), only five pullout locations are required to construct the multi-phase Project. KMP’s Design for the construction phases, in conjunction with MOT striping and the presence of entrance and exit ramps, generally provides sufficient shoulders. Maintaining shoulders enhances safety through better emergency response access, and improves operations by providing continuous breakdown opportunities for distressed vehicles.

Emergency pullouts are 150 ft. long with 15:1 transitions and are placed on the outside shoulder between interchange entrance and exit ramps, or every half-mile, whichever distance is less.

#### Location of Pullouts

Location	Work Area/Phase/Stage	Direction of Travel
Between Colorado and Quebec	Work Area Central, Phase 2	One eastbound and one westbound
Between Brighton and Colorado	Work Area West, Phase 3	Three locations along eastbound lanes

### 2.8.2 EMERGENCY ACCESS

Emergency access during construction improves over the existing condition. In MOT areas between Brighton Boulevard and Colorado Boulevard without reasonable existing shoulders, we will have 8-ft. shoulders or pullouts beginning in Phase 3 to provide access for emergency vehicles and tow trucks to service disabled vehicles.

We will meet with emergency responders early and throughout the Project (police, fire, and ambulance) to discuss emergency routes to minimize delays. KMP will modify detours to maintain an acceptable level of response, and coordinate changes in travel prior to implementing those changes.

We will also discuss access point locations for fire and police responding to emergencies such as vehicle accidents with injuries, fires, construction worker injuries, utility strikes, or major events. We will have appropriate signage at these access locations, and will meet on a quarterly basis to coordinate the construction phasing with the emergency responders. During the Emergency Response Task Force meetings, we will also establish the process, point of contact, and protocols, and train the construction field personnel on what to do in an emergency.

### 2.8.3 COURTESY PATROL

The Courtesy Patrol Service Plan is described in detail in Appendix H. The goals established for courtesy patrols during construction are to increase public safety, provide

efficient response by authorities to highway accidents, reduce traffic congestion, and improve air quality by maintaining traffic flow.

A focus of courtesy patrol is the quick detection and clearance of incidents. This “safety net” of roadside assistance helps prevent secondary incidents from occurring, and gives prompt relief from the traffic congestion and air quality problems that result from accidents or disabled vehicles.

Courtesy patrols provide direct aid to travelers in need, including changing tires, providing extra gasoline or coolant, and making minor repairs. Other services include removing safety hazards such as debris in the roadway and abandoned vehicles.

KMP courtesy patrols survey all lanes of the facility to identify conditions that are unsafe or have the potential to become unsafe, to identify conditions that could threaten the infrastructure, and to attend to existing or changing conditions. Qualified KMP staff, including KMP supervisors, perform regular patrols.

## 2.9 TEMPORARY CLOSURE SCENARIOS

### 2.9.1 MAINLINE CLOSURES:

Partial or full Mainline closures of I-70 or the intersecting street system are required to maintain a safe environment for motorists and workers when overhead Work such as bridge demolition, girder erection, falsework, and superstructure construction, are occurring. Specific locations and Stages of Construction that require closures are discussed in sections 2.1 and 2.4.2.4

Freeway closures for the I-70 Mainline are required in Work Areas 1, 2, and 3 for the demolition of existing structures, Construction of the superstructure for the new bridges, installation of girders, installation of message signs, temporary and permanent striping, and traffic switches. This situation occurs at Brighton Boulevard, Colorado Boulevard, Dahlia Street, Holly Street, Monaco Street, Quebec Street, I-270 EB, and Peoria Street.

Due to the highly residential nature of the corridor from Brighton Boulevard to Colorado Boulevard, most of the Mainline and arterial detour crossover operations are night operations. When feasible, an “up-and-over” detour is employed using existing ramps. All detours and Mainline closures conform to Project Agreement requirements regarding advanced notification and timeframes, and the KMP Team obtains the necessary Department Approvals. These Mainline closures and detours are announced, as described in Appendix J, to the public prior to implementation through pre-closure signing and our Public Information outreach activities.

### 2.9.2 ARTERIAL CLOSURES:

Arterial street closures, both partial and full, are required to construct new structures at York Street, Josephine Street, Columbine Street, Clayton Street, Fillmore Street, Cook Street, and Monroe Street. Arterial street closures are needed throughout the corridor for material access and to create Construction Work Zones that are safe for both the traveling public and construction activities. Additional closures may be required to install traffic signals, permanent and temporary striping, sign bridges, and arterial dynamic message signs at the locations indicated in the reference drawings.



All arterial street closures comply with the Project Agreement’s requirements for advanced notification and timeframes, and the KMP Team obtains all requisite Approvals from the Department. Local Agency Roadway closures will be Approved by the Local Agency and announced to the public prior to their implementation through pre-closure signing and our Public Information outreach activities.

## 2.10 TEMPORARY CLOSURE NOTIFICATIONS

KMP proposes to use a web-based lane, ramp, and roadway closure request, Approval, and set-up process. We will develop requests in InEight Project Suite, which seamlessly submits them through Aconex, to apply for Department Approval. Planned closures are a standing agenda item in the weekly MOT Task Force meetings.

Requesting a construction lane closure is a three-step process. The three-step process consists of:

1. KMP prepares and submits the lane closure plan and request
2. KMP works with the Department to gain Approval of lane closure
3. KMP’s PI Team and CDOT’s Communication Office work in conjunction to alert the community and other stakeholders

## 2.11 ACCESS

KMP has performed field visits and carefully studied the numerous reports, environmental documents, and Safe Routes to School: Swansea Elementary Walk Audit Report to understand the following existing conditions:

- Existing pedestrian/bike travel patterns
- Sidewalk and crosswalk deficiencies
- Missing sidewalk links
- Unsafe lighting areas
- UPRR Railroad blocking of York Street traffic
- Transit operations (bus routes and the A Line Commuter Rail)
- Truck travel patterns and routes
- Denver Public Schools (DPS) shuttle routes

The sections that follow convey our understanding of the existing connectivity between the Swansea Elementary School, Bruce Randolph School, Garden Place Elementary School, and the residences, businesses, and adjacent neighborhoods connected by the aging roadway network.

The discussion below covers:

- Pedestrian and Bike Access
- Business Access/Property Owner Access
- Project Access
- Bus/Transit Access

### 2.11.1 PEDESTRIAN AND BIKE ACCESS

As pedestrian detours are identified to accommodate the Construction Work, deficiencies in sidewalk connectivity, and crossing accessibility (as defined by ADA Accessibility Guidelines) are improved along the detour routes to provide safe access throughout construction. Bicycle access is maintained via similar routes (other roadways with bike lanes), or by providing temporary shared bike lane signing and pavement markings (shared lane marking). After Phase 1, 46<sup>th</sup> Avenue North, cross-streets, and Stapleton Drive North and South improvements are completed, providing improved connectivity and pedestrian access from Brighton Boulevard to Quebec Street. Similarly, local bicycle access between Brighton Boulevard and Colorado Boulevard is improved in Phase 1.

Work Area East (east of Sand Creek) construction impacts pedestrian and bicycle access only in the area of the Peoria Street Bridge replacement. KMP's planned phasing for these improvements maintains pedestrian and bicycle access on Peoria Street through the interchange at all times by temporarily widening Peoria Street. This is accomplished by installing temporary soil nail walls in place of the existing slope paving at each abutment. Part of our public outreach activities is coordinating access during construction. Please refer to Appendix J, Draft Strategic Communications Plan for more details.

### 2.11.2 SCHOOL ACCESS

KMP's current plan does not impact school access. ATC 57.0 allows construction of Columbine Street and Clayton Street in one summer season to eliminate potential access impacts to Swansea Elementary School. Further, we install a by-pass valve in the waterline at Columbine Street to eliminate the need for a winter roadway closure. Pedestrian and bicycle traffic is maintained through the installation of lit, covered, and secured access beneath the UPRR shoofly. It is not anticipated but if any school bus stops need to be moved or consolidated during construction we coordinate with Denver Public Schools.

### 2.11.3 BUSINESS ACCESS AND OTHER LOCAL/ADJACENT PROPERTY OWNER ACCESS

Communication with property owners, Swansea Elementary School, and other potential impacted residences, business owners, and community resources is critical to the success of the Project. KMP will develop a communication plan and community outreach program at the onset of the Project. Please refer to the Draft Strategic Communications Plan found in Appendix J.

### 2.11.4 PROJECT ACCESS (CONSTRUCTION ACCESS AND HAUL ROUTES)

Construction access locations are identified in the TCPs throughout each phase and area of construction. KMP's approach to construction access is to provide acceleration and deceleration lanes for construction traffic, where entering or exiting traffic on I-70 is required. As access locations are relocated to accommodate the construction activities, these acceleration/deceleration lanes are maintained in accordance with the Design speed of the adjacent roadway. Access locations are well-signed and marked to avoid errant traffic entering the work zone.



### 2.11.5 BUS/TRANSIT ACCESS

RTD has several bus routes that run through the Project Area, such as Routes 24, 40, 44, 88, R, and RC. Recently, RTD began commuter rail (A Line) service from Union Station to DEN. The rail alignment near the Project Area runs along 40<sup>th</sup> Avenue, crossing York Street, then turns northeast to travel easterly along 42<sup>nd</sup> Avenue, crossing at grade at Steele Street, crossing under Colorado Boulevard, and continuing along the south side of Smith Road before exiting the Project Area, ultimately terminating at DEN.

KMP addresses schedules and durations for closures in the five-week look ahead meetings during the construction phase. Notifications of impacts to transit operations are handled in accordance with the Project Agreement requirements. We schedule closures early enough to provide a minimum of 30 days' notice. Durations for closures vary depending on the type of work adjacent to the access point (for example, utilities or driveway reconstruction).

KMP works with RTD to determine whether and where bus stops should be moved, and to provide notice to transit users. We also coordinate with any future commuter rail and bus routes associated with the northwest line improvements.

### 3. Temporary Traffic Control Plan Strategies (TCP)

The TMP describes the construction phasing and staging sequencing, and the traffic control strategies used for the major Construction Work activities.

TCPs for this Project will provide local street and higher road connectivity, safe and efficient traffic flow, and highway worker safety when a work zone, incident, or other event temporarily disrupts normal traffic flows. TCPs and MHTs prepared by KMP are consistent with the Project Agreement requirements, and include FHWA's Manual on Uniform Traffic Control Devices (MUTCD), American Association of State Highway and Transportation Officials (AASHTO), Department, and CCD Work Zone criteria.

The Temporary TCP strategies described below address:

- 1) Standards
- 2) Implementation requirements for lane restrictions and closures
- 3) Detour routes
- 4) Alternate route message signs
- 5) Speed limit reductions (if needed)
- 6) Business access changes and signing
- 7) Maintenance of Swansea Elementary School access
- 8) Temporary striping and signing
- 9) Temporary signal installations
- 10) Construction-related signal timing modifications
- 11) Temporary drainage
- 12) Temporary lighting

Temporary drainage during construction is based on the *CDOT Drainage Design Manual*, which recommends sizing "detour culverts" for monthly discharges for a 2- to 5-year frequency. However, due to the lengthy construction duration of this Project, and the amount of time "temporary" drainage systems will be in operation (especially within the Lowered Section), we determined that a more conservative 10-year flood frequency should be used to minimize the risk to the traveling public. The goals of the Temporary Drainage Design include: utilize existing drainage systems during construction where feasible; install the permanent drainage systems as much as possible for temporary use for each Phase and Stage; and minimize "throw-away" construction.

KMP recognizes the importance of timely submittals of TCPs and MHTs to the Department. KMP will develop a Submittal Schedule at an early MOT Task Force meeting to enable agency Approvals well in advance of construction. Furthermore, our Public Information and outreach program relies upon advance knowledge of MHTs to communicate timely information to the public, and to respond to their questions and concerns.

To address the aggressive schedule, KMP will pursue early Approval on routine TCP elements and standards, such as typical lane closures, construction detour and sign messages, portable VMS messages, safety appurtenances, traffic control materials and devices, and other repetitive TCP components.



The MOT Task Force meetings, conducted by KMP, provide a forum to facilitate preparation and review of Traffic Control Plans. These meetings enable KMP staff responsible to dialogue with their agency counterparts responsible for granting Approvals.

### **3.1 APPROACH FOR DEVELOPING TRAFFIC CONTROL PLANS (TCPs) AND METHODS OF HANDLING TRAFFIC (MHTs)**

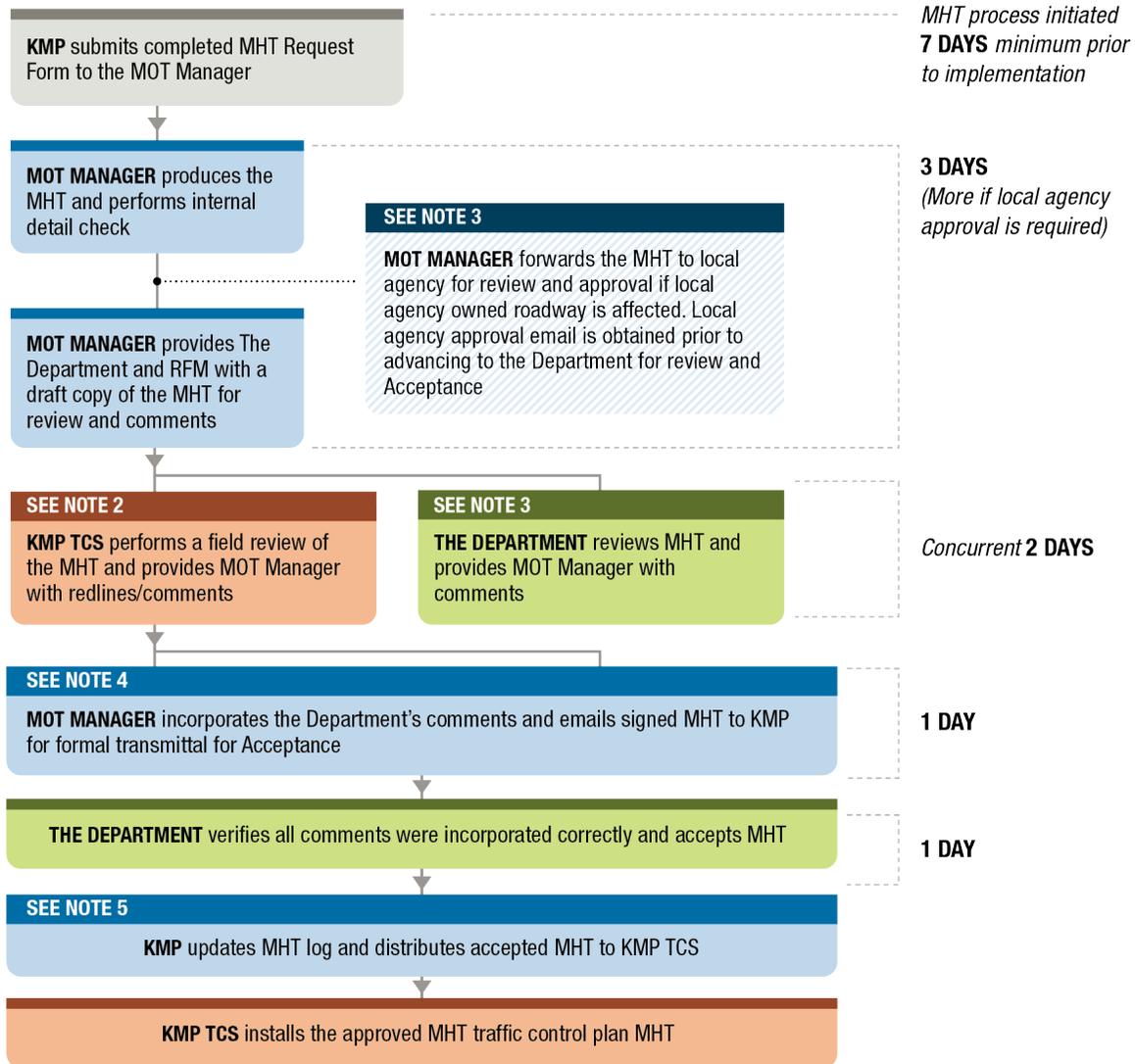
The flowchart on the next page illustrates the process and schedule for development and Approval of MHTs. Prior to implementation, this process will be reviewed and Approved by the Department. Each TCP is controlled by specific requirements related to Work Area conditions, such as available ROW and access needs of local businesses.

The processes are similar for both Department-owned roadways and Local Agency Roadways. For a Local Agency Roadway, the MOT Manager forwards the draft MHT to the Local Agency for review, and incorporates any comments generated by the Local Agency. The MOT Manager obtains proof of Local Agency Approval of the MHT prior to submitting the MHT to the Department for Acceptance.

In the field, we verify the visibility of the installed signs, and propose revised sign locations if needed. Conflicting existing signs are covered where possible (signs on a signal mast arm are not easily covered). The MHT is also revised to accommodate field conditions such as roadway geometry, sight distance, or potentially confusing detour routes. Once ready for distribution, KMP's professional engineer prepares, reviews, and approves all MHTs.

We use the MOT Task Force meetings to confirm planned strategies for TCP/MHT plans. These plans focus on safety and protection of the Work Zone for construction workers and for the public (for example, use of temporary barrier rail, glare screens, temporary lighting, temporary drainage to limit ponding water in the roadway, temporary signing and striping, and temporary ITS). In addition, TCP development includes a detailed discussion of limiting impacts to the traveling public, such as:

- Traffic switches and optimizing the construction schedule
- Maintaining existing traffic operations (that is, maintain existing lane configurations)
- Limiting closure durations
- Providing safe and efficient detour routes
- Implementing temporary signal improvements
- Providing pedestrian and bicycle routes
- Maintaining 8-ft. outside shoulders (or providing for emergency pullouts)



**Typical Approach to Development of TCP and MHT**



### 3.2 IMPLEMENTATION AND MONITORING OF TCPs AND MHTs

KMP has established a successful and efficient process for implementing TCPs for all major MOT activities during construction:

- Lane closures
- Ramp closures
- Freeway closures
- Lane restrictions
- Shifts in TCP
- Traffic detours

The multi-step process for implementing these activities includes:

- Develop a plan that includes an hourly description of activities required to implement the TCP.
- Conduct a pre-implementation planning meeting with affected stakeholders to review the plan and brief stakeholders on the hour-by-hour plan for implementation of the shift or closure. In addition, hold a Pre-Activity Meeting with the Department, CCD, and other stakeholders two days prior to any major construction switch.
- Implement the TCP.
- Perform quality audit to ensure full compliance with TCP.
- Hold a debrief to identify issues, lessons learned, and an action plan to improve future work.
- KMP's Construction Process Control Manager performs periodic audits of the TMP to ensure all processes are followed. KMP issues a Nonconformance Report if the traffic control is not implemented in accordance with the TCP included in the Lane Closure Request (LCR), or if it varies from the TCP.

#### 3.2.1 PROCESS FOR KMP MOT INSPECTIONS (DAY AND NIGHT)

KMP monitors traffic control daily throughout the Project limits to make sure it is safe, effective, and installed properly. A certified Traffic Control Supervisor (TCS) has responsibility for MOT inspections at various times each day and night. The TCS documents each inspection, including: compliance with the Approved TCP or MHT, condition of the devices, any corrections made during the inspection, and any needed device cleaning or replacement. For nighttime inspections, the TCS also notes reflectivity of the devices. Inspection times are based on the following scenarios:

- Active construction (daytime): (1) beginning of shift, (2) mid-shift, and (3) non-working hours.
- Active construction (nighttime/closure): (1) beginning of shift, (2) mid-shift, and (3) after pick-up is complete.
- Non-working hours (weekends): Minimum of once per day.
- All areas with traffic control: Minimum of one nighttime inspection per week.
- The TCS and/or qualified designee inspects all traffic control devices. The TCS also performs nightly inspections of the traffic control devices. Additional inspections may be required for Project activities that occur at night.
- The TCS makes a daily record of traffic control activities using the Daily Traffic Control Report form. KMP submits the completed forms within 24 hours. The TCS

may use photographs to supplement written text. The daily record is available at all times for inspection by the Department.

### 3.2.2 PROCESS FOR OPENING NEW MOT PHASES OR STAGES TO TRAFFIC

KMP uses a multi-step process for implementing TCPs, including opening new Phases and Stages to traffic. The MOT Superintendent and Engineer develop a checklist, along with the Work plan, for opening phases to traffic.

### 3.2.3 PROCESS FOR OPENING NEW MOT PHASES OR STAGES TO TRAFFIC ON LOCAL AGENCY ROADWAYS

KMP also creates a checklist for opening new MOT Phases or Stages to traffic on CCD roadways.

### 3.2.4 PROCESS FOR WINTER MAINTENANCE OF MOT DEVICES AND TEMPORARY STRIPING

Well-maintained traffic control devices are critical for moving people safely in a major Construction Work zone. Clear, clean, and well-maintained traffic control devices (for example, signing, drums, reflectors, and pavement markings) are extremely important for maximizing capacity. These issues are particularly important where lanes need to depart from concrete joints, at night, on wet pavement, and given the winter conditions in Denver.

KMP's first commitment is to the safety of the traveling public; our second is to minimizing impacts. Both commitments can be met through effective traffic control devices that maintain safety and improve capacity. To that end, our maintenance program includes:

- Pre-scheduled repainting of temporary markings
- Replacement of damaged or worn sign panels and supports
- Daily (or more frequent) checking of device status by a traffic control inspector or supervisor
- Device cleaning to remove dirt, snow, and slush, thereby maximizing device reflectivity and maintaining capacity and safety
- Weekly drive-through involving the MOT Design Manager, MOT Construction Manager, MOT Department Manager, and other MOT Task Force members as appropriate

### 3.2.5 PROCESS FOR MONITORING THE SAFETY AND EFFECTIVENESS OF TCPs AND MHTS

Safety within the Work Zone and a safe travel environment is the primary goal for KMP, and a key metric for a successful project. Below are the elements of our approach to safe traffic control:

- **Traffic Control Plans:** The TCS prepares the individual TCPs in cooperation with the designer. The TCPs (described in Section 3.1) are developed to focus on both the safety of workers and that of the traveling public.

- **Traffic Control:** KMP makes sure all traffic control devices are installed and maintained in accordance with the MUTCD 2009 Edition (or most current at the time); local, state, and federal jurisdictional requirements; and any special provisions contained in the Project requirements.
- **Daily Traffic Control Report:** KMP maintains a Daily Traffic Control Report whenever permanent or temporary traffic control devices are in use. This includes days when Work is “shut down.” The TCS maintains the Daily Traffic Control Report. The TCS or acting TCS records the following information in the Daily Traffic Control Report:
  - TCS/Acting TCS Name: TCS name, the amount of time he was on the job, and the names of any traffic control assistants
  - Inspection Date and Times: Date and times of inspection for each MOT setup
  - Weather Information: Weather conditions during the shift
  - Operations: Brief description of operations requiring traffic control during the shift
  - Checklists: Checklists for each report to ensure that all necessary information is included
- **Temporary Traffic Control Devices:** MOT sketch to indicate the type, number, and location of each traffic control device. The Daily Traffic Control Report may simply refer to the TCP, as long as the TCP includes a current layout drawing and any changes in the number of traffic control devices.
- **Temporary Pavement Markings:** Daily sheets from temporary markings (installed/removed/verified) are included in the daily traffic control logs.
- **Inspection Observations:** A checklist is provided for these inspections and is signed by the TCS Manager once the inspection is passed. Any missing or damaged traffic control devices, as well as any maintenance or corrective action taken during inspections will be noted.
- **Daily Reports.** A comprehensive daily diary detailing the use of traffic control devices and methods; flagging (flagger names, locations, and hours worked); incidents involving traffic control and traffic control personnel; contacts with non-contractor personnel; and other pertinent information related to traffic control. This diary is included in the Daily Traffic Control report, and is not a separate document.
- **Traffic Control Supervisor Responsibilities:** In addition to the duties described above, the TCS documents traffic incidents. This documentation includes all incidents that occur within the Project Limits. The documentation includes photographs of the incident scene, police reports, witness statements, and a description of the traffic control in place at the time of the incident. Where emergency responders are involved in the incident response, the TCS does not interfere with or become involved in the active enforcement or investigation. The TCS creates a separate file for each incident, containing collected documentation, including the Daily Traffic Control Report. The Traffic Control Engineer maintains these files.
- **Night Operations and Work within Traffic Control:** Operations with night activities have a written plan that addresses safety issues of working at night, such as lighting, proper personal protective equipment (PPE), and reduced visibility.

- **Retro-reflectivity:** All equipment used in the Work Zone has Department Approved reflective material placed to increase visibility. All reflective surfaces are cleaned as required so that reflectivity is not degraded. Any areas of reflective surface that are damaged or obscured are replaced.
- **Illumination:** Light plants or temporary lighting is used to illuminate the Work Area. On mobile operations, additional lighting on equipment may be used to illuminate the Work Area.
  - Equipment, at a minimum, has working strobe or warning beacon lights
  - Equipment had working lights, confirmed through daily visual inspections
  - Flag persons are placed in illuminated areas only
  - Lighting is checked after setup to ensure that it is not blinding approaching traffic or other equipment in the Work Zone
- **Communication:** Prior to the start of any night operation, KMP’s Lead Contractor prepares a detailed Hazard Analysis addressing the possible hazards of night work. The Hazard Analysis is discussed with the crews, and is updated as needed. At the start of each shift, the daily safety reminder is used to reaffirm the night work requirements as found in the Hazard Analysis. The Hazard Analysis should also provide for:
  - The selection of a competent person to maintain surveillance on the Work Area to alert other workers of vehicles entering the Work Zone
  - A method to signal workers when vehicles enter the Work Zone
  - A system to account for workers at all times, which may include a buddy system
  - Emergency communication or warning signals used by workers, such as radio, signal horn, or whistle used to call for help.
- **Attenuator Vehicles and Crash Trucks:** As appropriate for each task, attenuator trucks or crash trucks are used immediately ahead of workers in a Work Zone. The vehicle should be placed to provide the best protection for workers, with the wheels turned so that if struck, the vehicle will turn away from workers, but not into live traffic.
- **Right-of-Way Safety:** KMP staff who work on a Railroad property complete the required Roadway Worker Protection Training course prior to the start of Work. The employee, consultant, or contractor has evidence of this training on their person when within the ROW.

### 3.2.6 MONITORING TCP SAFETY AND EFFECTIVENESS: TRAFFIC ANALYSIS STRATEGIES

Monitoring the safety and effectiveness of MHTs and TCPs is critical to maintaining mobility and reducing traffic delay within the Work Zone. Prior to the start of construction, KMP requests baseline travel time and queue data from the Department and CCD to evaluate MHTs and TCPs. KMP uses the Department’s COGNOS reports for travel times and speeds, the DTD Automatic Traffic Recorder to review monthly posted traffic volumes, INRIX to extract queuing or bottle-neck locations, and review reports from the



Department Courtesy Patrol Program for this segment of I-70. For CCD-maintained roadways, the Team discusses the availability of similar equipment and reports to evaluate cross-street travel times and queuing during construction.

We evaluate traffic operations of MHTs, and complex TCPs using traffic modeling and the Highway Capacity Software for ramp merge/diverge and weaving operations based on the above data. These traffic models forecast traffic queuing, travel times, ramp queue lengths, and arterial travel times. Once implemented, the MHTs are monitored for actual performance by the Department’s inspectors, KMP’s TCS, and the MOT Team on a regular basis during the days, evenings, peak periods, and weekends. Any areas that did not meet acceptable performance on a rolling two-week average will be reviewed with the Department at the weekly MOT Task Force meetings to analyze the effectiveness of the implemented TCPs and identify any needed improvements. We also discuss any accidents/incidents in the Project area related to MOT at the weekly MOT Task Force meetings.

### 3.2.7 PROCESS FOR REFINING UNSAFE OR INEFFECTIVE TCPS AND MHTS

KMP has developed a multi-faceted approach for refining unsafe or ineffective MOT. All personnel are authorized to pick up downed devices (for example, drums in the travel lane). The TCS corrects discrepancies in the Approved plans during routine inspections. The TCS can modify the Approved plan if it improves operations and/or safety, and follows a CDOT M&S Standard Plan, MUTCD, or another Approved MHT or TCP plan for the area. At the MOT Task Force Meetings, KMP reviews more detailed design modification needs to reach consensus on the new approach. If applicable, KMP revises the TCPs.

When a TCP or MHT is determined to be unsafe or ineffective, KMP generates revised plans to address the identified deficiencies. Throughout the duration of the Project, KMP generates MHT plans and the related TCPs that are required to implement the MHT plan. The MHT plans will be produced under the direct supervision of the KMP Design Manager, and Accepted by the Department prior to field implementation.

The KMP process for development, review, Approval, and Acceptance of each MHT is shown in the MHT development Flow Chart included in Section 3.1.

KMP monitors the effectiveness of MHTs and TCPs with our Daily Traffic Control Report form. The TCS and/or qualified designee inspects all traffic control devices. The TCS also performs nightly inspections of the traffic control devices. Additional inspections may be required during Project activities that occur at night.

The TCS makes a daily record of traffic control activities using the Daily Traffic Control Report form. KMP submits the completed forms within 24 hours. The TCS may use photographs to supplement written text. KMP makes the daily record available at all times for inspection by the Department.

### 3.2.8 TIERED APPROACH TO ADDRESSING FIELD ISSUES

The KMP MOT Professional Engineer shall be in responsible charge of the MOT Design. The Engineer prepares, or oversees, reviews, and seals with a Colorado PE stamp Release for Construction Documents, TCPs, and Field Design Changes (FDC). FDCs

that require a revision to a previously stamped and Approved TCP plan sheet shall be processed using the following three-tiered approach:

- **Level 1:** FDC revision that can be readily addressed and Approved by the Inspector and/or TCS without requiring a revision to a previously stamped and Approved plan sheet. Solutions to these issues are implemented Onsite without requiring further written Approval. A record copy of the FDC revision is documented and included in the Project file.
- **Level 2:** Change that requires additional information from the engineer in responsible charge, but does not require revisions to previously stamped and Approved plans. These issues are addressed through the Request for Information process but are not stamped by the engineer in responsible charge.
- **Level 3:** FDC requiring revisions to stamped and Approved plans. These issues are addressed under the Release for construction plan revision and Approval process described in the Design Quality Management Plan.

### 3.2.9 ADDRESSING FIELD MHT ISSUES

The Project's quality program ensures that traffic control devices shown on the TCPs are installed properly in the field. However, KMP prefers to have a mechanism in place to evaluate the effectiveness of the TCPs on a regular and continuing basis after installation. Therefore, we devised the weekly Project drive-through. Each week, the MOT Design Manager, the MOT Construction Manager, the MOT Department Manager, and other MOT Task Force members as appropriate, drive the corridor together. Based on their observations, they develop a plan of action to resolve identified issues. Items to be considered may include:

- Placement of traffic control devices
- Maintenance of construction signs and pavement markings
- Changes to devices to improve motorist understanding and safety
- Traffic signal timing and coordination issues
- Effectiveness of detours and suitability of identified alternative routes
- Effectiveness of guide signing
- Changes to reduce traffic-related impacts on neighborhoods and businesses

The day and time of the drive-through vary from week to week, and include weekends and off-hours, so that we can observe conditions at various times. The results of the drive-through are a regular agenda item at the weekly MOT Task Force meetings.

As part of the drive-through efforts, KMP creates a deficiency log using InEight Project Suite. The deficiency log allows KMP to track the duration of deficiencies, and focus efforts on addressing those that are not being addressed in a timely fashion. For more information on refining unsafe or ineffective MHTs, refer to Section 3.2.7.

## 3.3 BUSINESS AND PRIVATE ACCESS

KMP understands that constructing this challenging Project will cause short term impacts to the community and traveling public. Therefore, the MOT Team reviewed multiple options to minimize the number and duration of construction detours and phases required.



KMP’s Design addresses the core construction activities that create impacts as well as positive actions. Through the use of innovative designs, KMP minimizes our effects to the environment, communities, businesses, and the traveling public.

KMP achieves further impact reductions to traffic detours, disruptive construction operations, nighttime work, and noise intensive operations through our detailed planning and scheduling of each construction activity.

### 3.3.1 ACCESS POINTS IMPACTED BY PARTICULAR CONSTRUCTION PHASE OR STAGE

Access to businesses and residential areas is maintained throughout the construction Period as required by the Project Agreement. The details of the traffic control presented above in Section 2.1, show that KMP’s Design requires no long term or permanent restrictions to residential or business access.

### 3.3.2 ALL NOTIFICATIONS OF AFFECTED BUSINESSES AND LAND OWNERS

The KMP MOT Manager and Project Communications Manager work closely with the Department Public Communications Manager to prepare the public for traffic disruptions, and to provide advance information on changes to relevant traffic movements and access. We coordinate messages to affected businesses and landowners through our community outreach programs. This information is maintained on the Project’s website and social media networks. See Appendix J, Draft Strategic Communications Plan for further details on Public Involvement, including outreach to affected businesses and landowners.

In addition, KMP staff discuss upcoming changes in access, and possible delivery requirements and/or schedules, with each business owner to minimize construction impacts in the area.

### 3.3.3 SCHEDULE OF CLOSURES AND ESTIMATED DURATIONS

KMP’s communications coordinators alert affected businesses and residents to upcoming closures and their durations. Some of the significant closures are presented in the table below.

Location	Closure	Estimated Duration
<b>UPRR Construction</b>	46 <sup>th</sup> between Brighton and York	3 to 6 months
<b>Cross-streets over the Lowered Section</b>	Street closure for bridge construction (follows Project Agreement restrictions)	3 to 6 months
<b>I-70 over Dahlia, Holly and Monaco</b>	Nighttime closures of local streets to allow setting bridge girders and other similar activities	1 to 3 months
<b>Stapleton Drive</b>	Driveways and smaller cross-streets may be closed for short durations. Maintain at least one driveway per property at all times, and do not close adjacent cross-streets concurrently.	6 to 9 months

<b>I-70 Mainline</b>	Single or multiple lane closures following Project Agreement restrictions	Construction phase, as needed
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### 3.3.4 PROJECT SPECIFIC ACCESS OR DELIVERY REQUIREMENTS FOR LOCAL BUSINESSES

During construction, there are some short term realignments and traffic movements (turn lanes, ramp access, and merge lanes) that are impacted. In these cases, limited residential and business access along these routes are properly signed, and access is maintained for local traffic through alternate means. Options for maintaining access include flaggers, temporary pavement or routings, walkway bridges, temporary business signage, or other business owner support services (see Appendix J). Communications Plan for details about communicating with local businesses.

As noted in Section 3.3.2, members of KMP meet with business owners to discuss MOT changes and Schedule, as well as to learn of individual delivery access needs. KMP considers maintenance and delivery schedules, and use of non-working hours, when possible.

### 3.3.5 PROPOSED MITIGATION EFFORTS

KMP maintains business access. We understand that new paths may be unfamiliar to local traffic. To account for this, our Communications Team works with the local business community, as well as with individual businesses, to identify specific measures that are needed to mitigate this impact, such as:

- Improved signage or lighting
- Temporary driveways

KMP wants to be a good neighbor to the residences and business in the area, and protect the environment in which they live. Protecting the ROW, ancillary roads, and properties adjacent to the Project is a very important requirement, and KMP will maintain these in accordance with Schedule 10, Section 2, Maintenance of Traffic. As part of our MOT efforts, it is our responsibility to minimize negative impacts on the environment and damage to properties, and to limit the inconvenience to adjacent communities and residents. Some of our specific focus areas include:

- **Minimize Dust:** One of the most important steps in protecting the public and workers in the field is eliminating dust from the air. Whether the concern is vision impairment, medical issues (asthma), or just cleanliness, dust is an irritant. Where practical, KMP installs permanent installations as quickly as possible, and supplies sufficient dust suppression controls such as the application of water and temporary soil stabilization materials to reduce impact from its operations. We also provide street sweeping for the duration of the construction.
- **Minimize Noise:** Noise associated with construction is always a major concern to residents during the extended hours of construction, specifically during excavation. The Team ensures that noise restrictions are addressed before equipment is selected and construction takes place. Other measures applied to the operations include minimizing nighttime construction adjacent to residences; minimizing



equipment idling; erecting local, moveable sound barrier walls designed to minimize noise dispersion; early construction of permanent sound walls where designed; and selecting electric powered equipment where feasible and effective.

- **Minimize Vibration:** To mitigate vibrations, the Lowered Section was designed so there are no permanent driven piles. We will do vibration monitoring as needed for temporary sheet piling and H piles.
- **Minimize Light:** Temporary and permanent roadway and navigational lighting is designed and placed to minimize the dispersion of light beyond the ROW in all residential and business areas. This is accomplished by using shielded fixtures and lower-level lighting. Construction lighting for off-shift operations is used on a temporary basis, and is adjusted to minimize light dispersion to non-construction areas.
- **Minimize Damage to Local Roads:** The Team uses controlled access points and haul roads as a priority to minimize congestion and damage to local roadways. Where appropriate, protection material is placed across local roadways when crossing with heavy machinery. Oversized loads are routed to avoid cross-streets.
- **Clean Existing Roadways:** The roads in the Project's zone of influence are kept clean by employing regular street sweeping and daily cleanup of operations. Temporary traffic control and signage is implemented to control access and traffic flow.
- **Erosion and Sediment Control:** Reporting to the Environmental Manager, KMP's Environmental Field Engineer develops and implements the stormwater pollution prevention plans (SWPPP) required for the Project. Through this development, temporary and permanent Best Management Practices (BMPs) are identified and incorporated into the Design and work plans. BMPs are installed and maintained in accordance with the plan, and documented as required. Field workers are trained on compliance with the Project's plans, and on the proper installation, inspection, maintenance, and repair of the BMPs.

### 3.4 COLORADO TRANSPORTATION MANAGEMENT CENTER (CTMC) COORDINATION

KMP coordinates with the Department and CTMC staff to determine the best protocol for communicating major traffic shifts, I-70 Mainline closures and detours, ramp closures and detours, and intermediate- or major-level incidents as defined in the incident management plan.

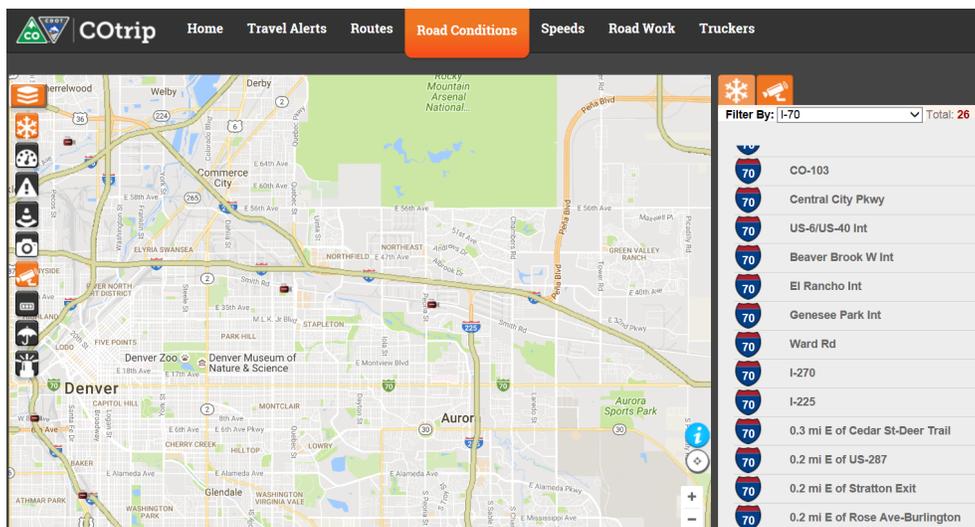
Team members have experience on previous Department projects working with Department CTMC staff in Golden, CO, and are familiar with the Department's VMS Usage Policy, closed-circuit television (CCTV) video system, Road and Weather Information Systems, INRIX, as well as with coordination procedures for lane closures and detours that include local police and construction TCSs.

The Team plans to use Department Intelligent Transportation System (ITS)/VMS boards to advise motorists of major changes to traffic patterns well in advance of the I-70 construction Work Zone, with the goal of diverting trips away from the areas to help reduce travel delay and congestion that may happen after a major traffic event has begun. We anticipate frequent use of the Department's overhead VMS along I-70, I-25, and I-225 to communicate closure and detour information as well as advising the traveling public to use an alternate route. KMP will also

provide at least four VMS boards in strategic locations throughout the Construction Period to promote alternate routes and provide information on modified travel times.

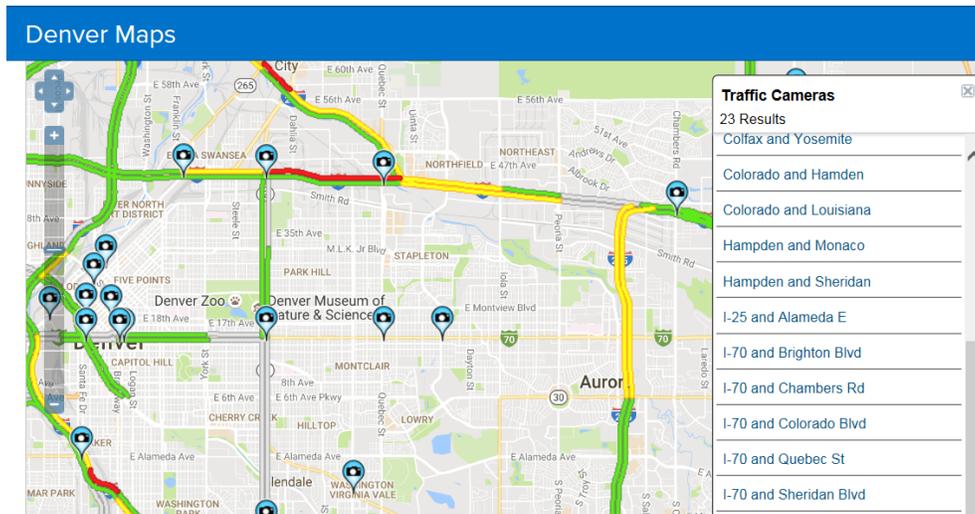
KMP provides a CCTV streaming camera feed to the Havana Maintenance Yard. The streaming video includes all the cameras within the Project Area, as well as those two miles west and east of the Project on I-70, and two miles north and south of I-70 on I-25. For the major traffic switches and main line closures, the KMP requests assistance from CTMC staff to support these events. This support includes allowing members of the MOT Team to sit in the CTMC to monitor major lane closure/detour activities and/or traffic switches, and to communicate with the Project incident management commander and KMP TCS staff as the event unfolds.

KMP regularly monitors the traffic speed maps (COTRIP and SIGALERT-Denver) and the Department’s live streaming cameras throughout the duration of the Project. We request use of INRIX performance measure data from the Department at the onset of the Project to develop a baseline for actual traffic flow conditions. In addition, we request INRIX data taken during Mainline closures/detours and traffic switches so that the MOT Task Force can understand the magnitude of traffic impacts and develop appropriate countermeasures. KMP will also ask the Denver Transportation Management Center (DTMC) about CCTV camera locations, available traffic flow data, and what current signal timing plans can be used to reduce traffic impacts and delays to cross-street traffic during construction. The figures below show that only two Department streaming cameras, and up to four CCD cameras, are available in the Project area.



I-70 CDOT CCTV Camera Map

Source: CDOT



**Denver Transportation Management Center (DTMC) Cameras**

Source: CCD

**3.4.1 REQUESTS FOR USE OF CTMC VMS BOARDS**

Coordination with the CTMC is discussed and confirmed at an early MOT Task Force meeting. Based on the requirements of the Project Agreement, KMP submits requests as follows:

For routine requests, KMP submits requests to the Department for use of the CTMC VMS boards by 10:30 a.m. on Thursday of the week before the VMS boards are needed (Monday through Sunday of the following week).

Requests for routine use of the VMS are reviewed by 12 noon Friday of the same week of the submittal. The KMP MOT Task Force coordinates directly with the CTMC following review by the Department.

For after-hours or short-turnaround requests, KMP coordinates directly with the CTMC.

KMP coordinates with the Department, CCD, and the CTMC in relation to emergencies, in accordance with the Incident Management Plan (IMP), described below in Section 4.7.

## 4. Transportation Operation Plan (TOP) Strategies

Maintaining access to businesses, neighborhoods, community centers, RTD, and pedestrian facilities throughout construction is a priority for KMP. Coordination with businesses is discussed in Section 5 of the TMP and in KMP's Communication Plan. To allow for the 30-day minimum public notices of route changes, KMP coordinates well in advance with RTD for any impacts to bus stops or other transit facilities. KMP looks for the shortest possible pedestrian routes when closures and detours are necessary. We identify Safe Routes to School and maintain access at all times. KMP has a "get in, get out" approach to construction to limit impacts of closures to driveways, RTD, and pedestrian facilities. We also work with businesses to identify specific access needs for trucking operations.

The TMP includes strategies for transportation system management and operations during construction. These TOP strategies are employed to mitigate traffic impacts in the Work Zone and include:

- Travel demand management (TDM)
- Access management
- Traffic signal coordination during construction
- Traveler information systems
- Special event management
- Traffic incident management
- Work zone ramp metering
- Ride sharing
- Parking management

The TOP strategies incorporate the Department's Active Transportation Management System (ATMS) to monitor traffic flow operations on I-70 during construction. KMP deploys additional VMS signs for monitoring, coordinates traveler information to the CTMC and DTMC, and uses the freeway courtesy patrol for incident management. The KMP PI Team coordinates and works with affected stakeholders to develop agreements on how to incorporate TOP strategies during construction.

To complete the TOP strategy requirements, a detailed IMP has been prepared for this Project, and is included in Section 4.7.

TOP strategies are implemented to maintain mobility during construction. We evaluate various strategies, including signed truck routes, park and ride promotions, reduced fares/transit incentives, and shuttle services.

TOP strategies used in the Work Zone to reduce accidents and slow traffic to safe speeds include:

- Temporary barrier and end treatments
- Glare screens
- Portable changeable or variable message signs
- Speed display trailers
- Increased fines in work zones
- Temporary lighting at crossovers



- The sections below discuss the following additional TOP strategies and issues to improve mobility within and through the area:
  - Travel Demand Management
  - Transit Operations
  - Traffic Access Management
  - Airport Traffic Management
  - School Access
  - UPRR York Street Crossing Pedestrian and Bike Approach
  - Incident Management Plan

## 4.1 TRAVEL DEMAND MANAGEMENT (TDM) STRATEGIES

TDM strategies aim to reduce the demand for roadway travel, particularly in single occupancy vehicles (SOV). Alternate forms of transportation (transit, bike to work, walking, vanpools); adjusting work hours (flex time, compressed work weeks, telecommuting); and traffic management (ramp metering, managed lanes, commuter parking lots, managed motorways); are some of the tools available.

At the onset of the Project, the KMP MOT Task Force meets with local Transportation Management Organizations (TMOs) and Transportation Management Associations (TMAs), such as Northeast Transportation Connections and the Stapleton Area TMA, to develop a TDM market plan and discuss the implementation of relevant TDM strategies to reduce traffic during construction, including:

- **Walking:** KMP maintains sidewalk connectivity to common destination points affected by construction. The MOT Team reviews current sidewalk conditions and missing sidewalk segments, and determines locations of temporary sidewalk improvements to promote walking.
- **Biking/Bike sharing programs:** KMP is familiar with the existing bike routes in the area. We will maintain bike route connectivity during construction. Use of existing Denver bike sharing programs (B-Cycle) may be helpful in reducing the impact of long pedestrian detours, as well as the number of vehicles traveling in the Project Area.
- **Ride sharing programs:** KMP will work with the TMO to study the opportunity and feasibility of promoting Ride Sharing (five or more people) during construction.
- **Parking options:** Temporary use of commuter parking, coupled with ridesharing and transit, can be used to reduce single occupancy vehicle use.
- **Transit:** Promoting the use of RTD's system, including the local buses, the existing A Line, the R Line the N Line currently under construction, and the planned L Line.
- **Shuttle busses:** Local shuttles can supplement transit and provide access to schools, shopping, and other community amenities
- **First and final mile transit access:** We will work with TMOs like Northeast Transportation Connections, other TMAs, and Denver Regional Council of Governments (DRCOG) to determine if these strategies can be successful in the Project corridor.
- **Implement existing approaches such as the DRCOG Way to Go program:** We will jointly craft Project specific strategies with DRCOG's Way to Go program, and provide up-to-date Project information to the community.

KMP uses dedicated variable message signs and public outreach to reduce traffic traveling through the Project area by encouraging drivers to take alternate routes and modify their travel times. KMP advises drivers of ongoing Work and any lane closures at interchanges or Mainline closures well in advance of the closure location. Depending on the degree of closure and road impacted, this could include advance signing, including use of multiple VMS, at the I-25/I-70, I-225/I-25, Airport Boulevard/I-70, and E470/I-25 interchanges.

KMP includes a TDM link on the Project website to promote the use of the above measures, and reduce SOV use during construction

## 4.2 REGIONAL TRANSPORTATION DISTRICT (RTD) COORDINATION

### 4.2.1 RTD COORDINATION APPROACH

Maintaining access to transit options within the Work Zone is accomplished through close coordination with RTD. Existing bus routes and stops are maintained to the extent possible. Where necessary, relocations of bus stops and modifications to routes will be publicized at least 30 days prior to implementation.

KMP is committed to minimizing impacts to transit services within Work Zones, and ensuring that pedestrians and bicyclists have an adequately safe area to enter and exit transit services:

- We will work closely with RTD to reduce construction impacts and service delays to existing bus stops and transit stops within Work Zones
- TCPs will be drafted, and the MOT Task Force will have adequate time to comment and provide input
- If existing paths to bus stops and commuter and light rail stations are affected during construction, temporary bicycle and pedestrian access ways and detours are constructed to provide a safe means of travel to and from stops and stations

### 4.2.2 PUBLIC TRANSIT COORDINATION

KMP uses the weekly MOT Task Force meetings to coordinate efforts with RTD. We address RTD's concerns and establish procedures to coordinate modifications to the transit routes if needed. We discuss any restricted bus routes, Project issues, or complaints. Jointly, the MOT Task Force and the Public Communications Manager address comments for resolution.

The KMP PI and MOT Task Force meet to confirm all active public transit routes and schedules potentially disrupted by the multiple phases of construction. The KMP Traffic Control Supervisor engages key members from the Department, CCD, the Project PI Team, RTD, and Denver Public Schools (DPS) to review concerns regarding impacts to public transit resulting from construction.

At all regularly scheduled MOT Task Force meetings, the meeting agenda includes public transit coordination. This provides a forum to update stakeholders about upcoming Construction Work activities, resolve schedule conflicts, and gain feedback from previous events that affected public transit. KMP has implemented successful coordination with RTD on the I-225 Light Rail Line and Brighton Boulevard projects. We have established processes and collaborative working relationships with RTD.



#### 4.2.3 RTD NOTIFICATION PROCEDURES

KMP coordinates our Work with RTD to provide the agency with advance notice of potential impacts. The notification procedures include a provision to coordinate with RTD more than 30 days in advance during construction to minimize disruptions to service areas and schedules, and to allow adequate notification to transit users if changes to service are needed.

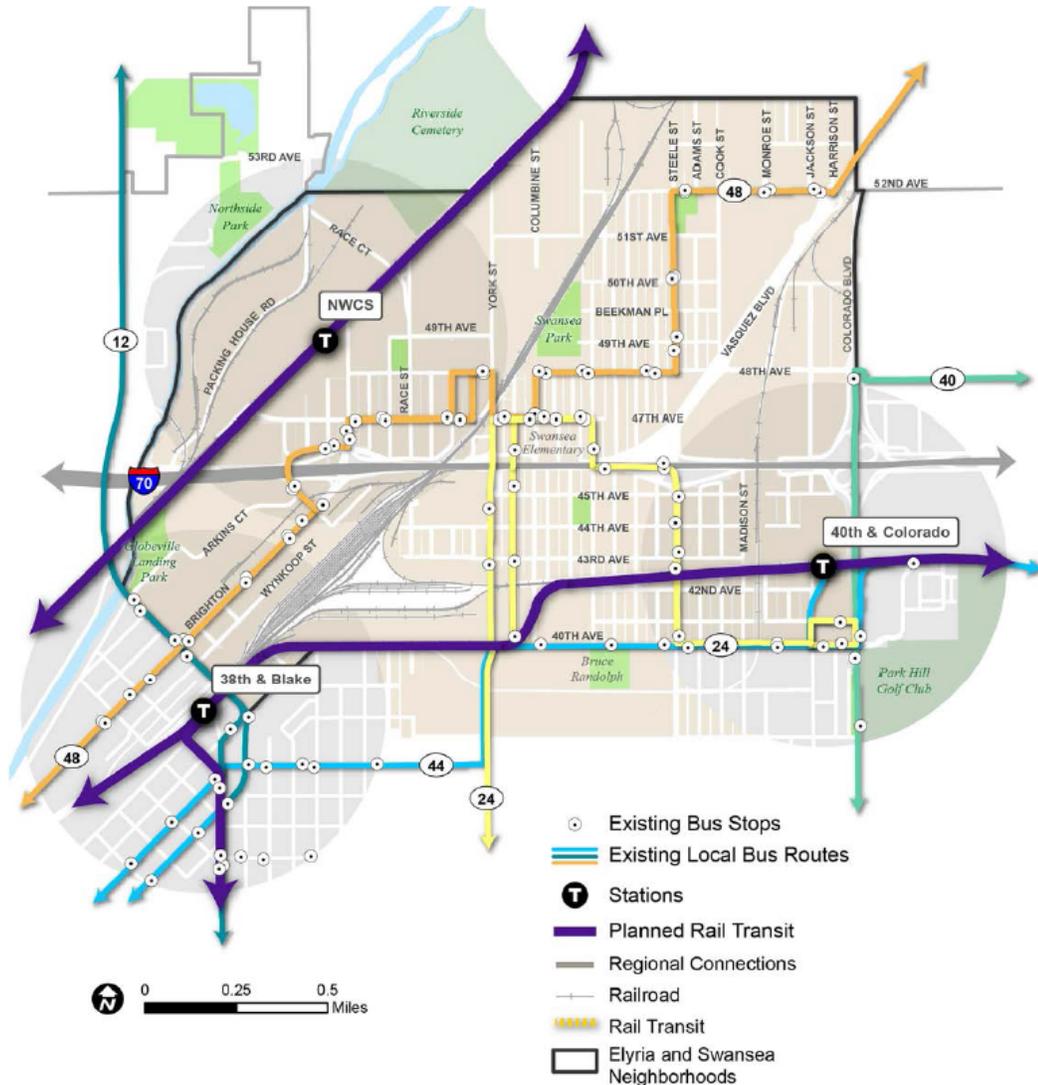
At the onset of the Project, and at an early MOT Task Force meeting, KMP collaborates with RTD and the other key stakeholders about notification procedures, including an exchange of contact information. These stakeholders include the Department, CCD, DPS, the City of Aurora, Commerce City, Adams County, and other local agencies.

The KMP PI Team works with RTD to determine the best means to notify transit users in advance of any closures, delays, modifications in bus or rail routes, and modifications or relocation of transit stops or signage along the affected routes.

#### 4.2.4 EXISTING TRANSIT, LIGHT RAIL AND EXPRESS SHUTTLE ROUTES

RTD has several bus routes that run through the Project Area including Routes 24, 37, 40, 44, 45, 88, AB, AT, R, and RC. There is also the newly opened commuter rail A Line that runs south of I-70 along 40<sup>th</sup> Avenue and Smith Road, and the DPS Success Express. Regional routes and Call-n-Ride routes potentially impacted during construction will be identified at the Public Transit/MOT Task Force coordination meeting. The figure on the next page shows some of the public transit services around the Elyria and Swansea neighborhoods that could potentially be affected by construction. These routes should not be affected directly by the construction, but changes in traffic volumes from potential detours could have an impact on travel times.

RTD has two local bus lines which access some of the cross-streets under I-70 in Work Areas 2 and 3, including Routes 37 and 45. Route 37 crosses I-70 at Colorado Boulevard, Quebec Street, and Airport Boulevard, while Route 45 crosses I-70 at Peoria Street. Based on an initial review of a current bus stop map, KMP anticipates that no bus stop locations on these routes will be affected by Project Construction in the Central or East Work Areas. A field review of all bus stop locations will be completed at the onset of the Project. All bus stop locations potentially impacted by construction will be discussed and resolved with RTD at regularly scheduled MOT Task Force meetings prior to the start of any Work.



### Transit Map

Source: Elyria and Swansea Neighborhood Plan

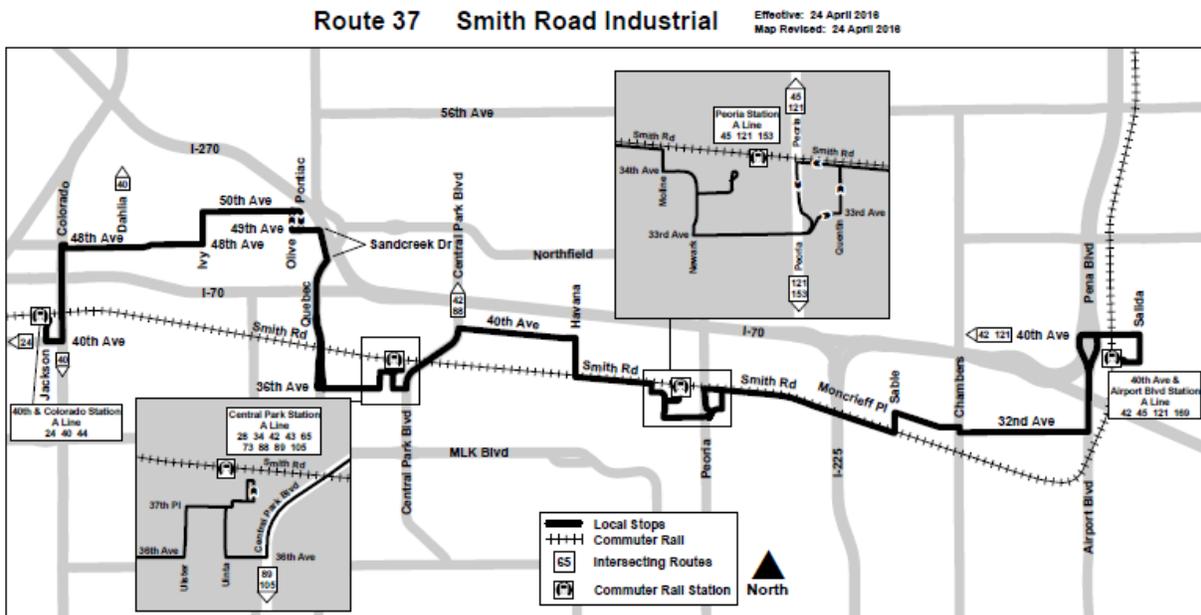


# CENTRAL

## 4.2.5 TRANSIT OPERATIONS AND CONSTRUCTION PHASING

KMP has reviewed the existing local bus routes, RTD A Line Commuter Rail, and Success Express routes and schedules to develop construction phasing that maintains local circulation and reduces impacts to public transit.

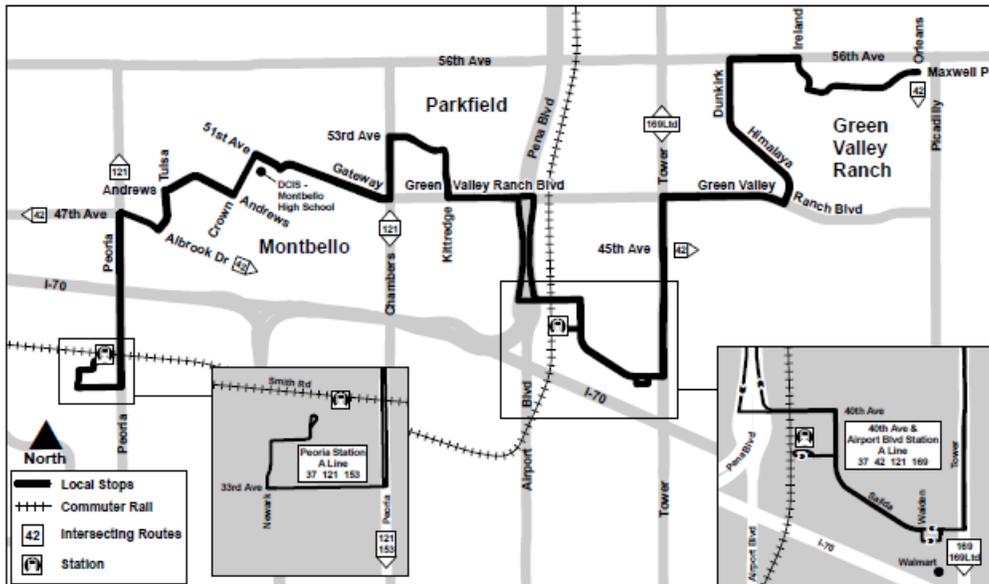
Development of the multi-phase TCPs identified the potential for disruption to current RTD transit operations on short segments of York Street, Josephine Street, Steele Street, 46<sup>th</sup> Avenue, Clayton Street, Colorado Boulevard, Dahlia Street, Havana Street, Peoria Street, and Chambers Road near the Project. Potentially impacted routes include Routes 37 and 45, shown in the figures below. At working MOT Task Force meetings, KMP communicates current and future work activities with RTD and other key stakeholders, to mitigate impacts and determine the need for changes in transit service and the location of temporary transit stops.



**RTD Transit Route 37**

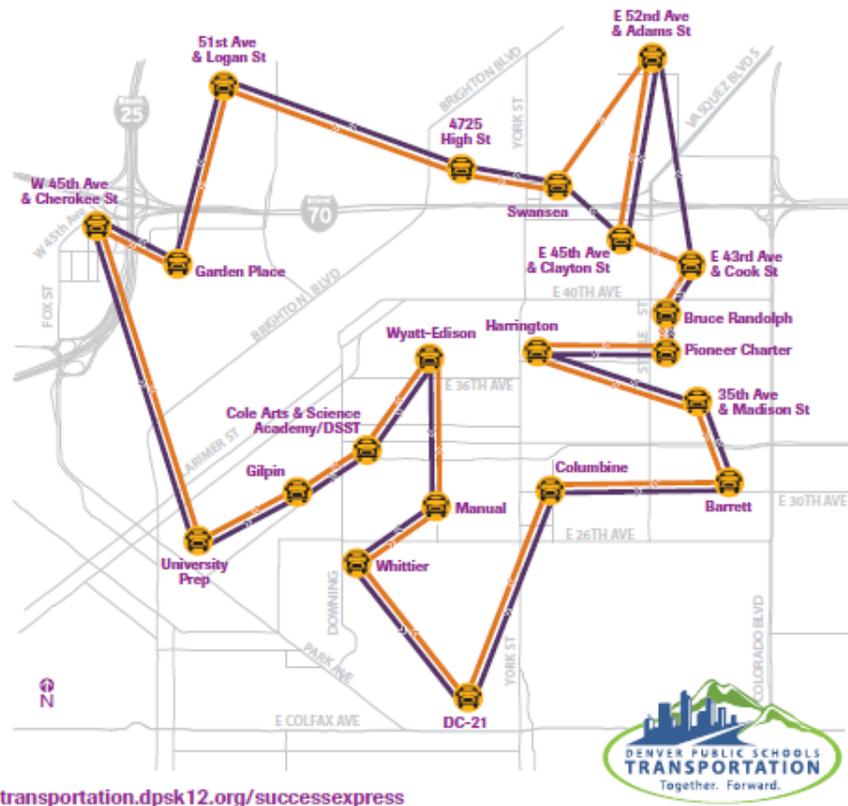
Route 45 Montbello via 51st/Green Valley Ranch

Effective: 24 April 2018  
Map Revised: 24 April 2018



RTD Transit Route 45

Similarly, the multi-phase TCP identifies potential impacts to the DPS Success Express shuttle routes. We will discuss impacts to the DPS Success Express shuttle routes at the Public Transit/MOT Task Force meeting. It is anticipated that Construction Work on Clayton Street, Columbine Street, and existing 46<sup>th</sup> Avenue will affect the current travel routes and schedules.



**Swansea Area Success Express Route**

#### 4.2.6 INCREASE IN TRANSIT SERVICES AS A TDM MEASURE

In addition to maintaining current transit service, KMP will look into additional options with RTD to increase bus services on certain routes, add routes to light rail stations in the Project Area, and provide reduced fares or free rides. The objective is to make transit a more convenient option, thereby reducing single occupancy vehicle trips within the Project area.

### 4.3 TRAFFIC ACCESS MANAGEMENT APPROACH

The safety of pedestrians and bicyclists within the corridor is a paramount goal to ensure a safe and successful Project. KMP is committed to performing the following procedures to minimize incidents and increase safety of pedestrians and bicyclists in the Project Area.

- All pedestrian and bicycle detours are included in the TCPs so that the MOT Task Team can provide adequate input.
- Access corridors through the Work Zones are fenced with warning barrier, such as orange construction fencing along pedestrian paths.
- All pedestrian and bicycle paths are maintained and kept clean and usable, with signage clearly indicating the pathway.
- Construction traffic avoids sidewalks to eliminate potential hazards associated with people on foot.

- Flagmen are used as needed to assist pedestrians crossing traffic.
- Temporary ADA measures are implemented, as needed, if existing ADA facilities are affected by construction.
- Bike route detours are proposed and reviewed by members of the KMP MOT Task Force. Once Approved, the TCS oversees the setup and maintenance of the temporary bike route detours. Information on proposed bike route detours and durations is posted on the Project website.

#### 4.4 DENVER INTERNATIONAL AIRPORT (DEN) APPROACH

KMP will set up a meeting with DEN to coordinate construction staging, peak travel periods, notification processes, future construction projects on Peña Boulevard, and any major detours for construction at the airport. We will also coordinate regarding times during the night where closures would have the least impact for DEN. .

To accommodate major travel volumes at DEN, lane closures are coordinated to avoid established peak travel periods. KMP monitors traffic through the Project during these special events to keep I-70 traffic moving, and efficiently mitigate incidents that may occur within the Project limits.

#### 4.5 SCHOOL ACCESS APPROACH

Our approach to school access during construction is twofold. First, we maintain safe pedestrian and bicycle access. Second, we work with DPS for students' safe access to and from school using DPS Success Express services. KMP works with DPS, with individual schools, and with the MOT Task Force to coordinate school access issues during construction.

##### 4.5.1 COORDINATION WITH SCHOOL AND PROVIDE SAFE ROUTES TO SCHOOL

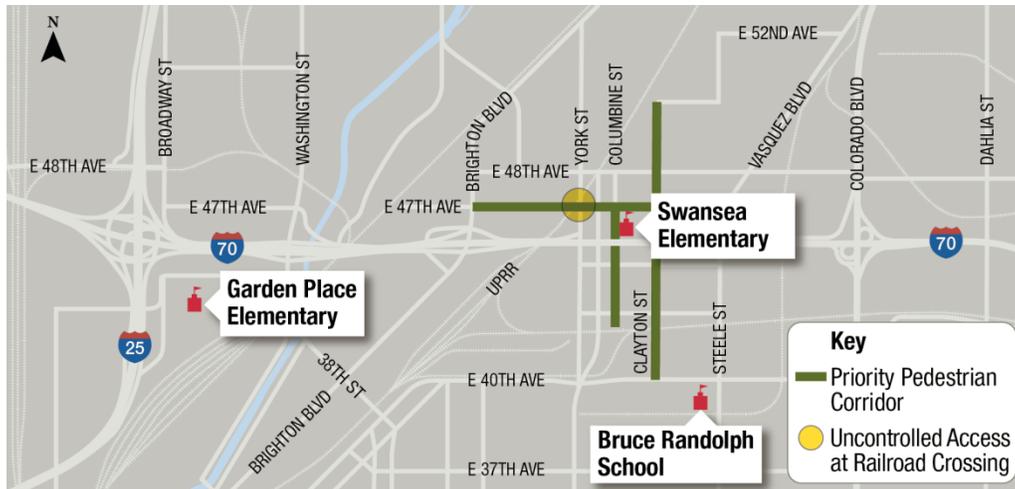
The PI Team coordinates with schools so that notice of changes to roads, sidewalks, and bicycle facilities is provided to school administrators and employees, as well as students and parents. Fencing of pedestrian and bicycle corridors through Work Zones is critical to student safety, and KMP provides guide signs and lighting if needed. KMP coordinates with schools if changes are needed for parent/child drop-off/pick-up and/or deliveries.

We reviewed the *Safe Routes to School: Swansea Elementary Walk Audit Report* to identify current pedestrian and bike travel routes, and understand local sidewalk conditions, including the location of missing sidewalk links and crosswalks, poor lighting areas, areas of high traffic speeds, and the difficulty of crossing the railroad tracks at York Street. This report, and information from *I-70 East Record of Decision (ROD)*, were used to develop conceptual level pedestrian and bicycle connectivity plans.

The figure on the next page shows the locations of Swansea Elementary School, Bruce Randolph School, and Garden Place Elementary School. The map also indicates the walk audit's priority pedestrian corridors (47<sup>th</sup> Avenue, Columbine Street, and Clayton Street) and key railroad crossings (yellow dots) that bisect the local road and possible pedestrian routes that connect these schools. While the Garden Place Elementary School and Bruce Randolph School are separated from Swansea Elementary School by distances of 1.64 and 0.67 miles, respectively, the local roads and possible pedestrian

routes connecting them are few and have active rail crossings (UPRR and RTD A Line, respectively).

As discussed in Section 4.5.2, during the closure of 46<sup>th</sup> Avenue between Brighton Boulevard and York Street for UPRR bridge construction, KMP provides a lit, covered, and secured access under the UPRR shooflies. This eliminates the need for pedestrian detours and the safety concerns associated with pedestrian traffic at the 47<sup>th</sup> Avenue and York Street grade crossing of the UPRR.



**Swansia Elementary School, Bruce Randolph School, and Garden Place Elementary School Map with Walkscope Audit Priority Routes**

#### 4.5.2 SWANSEA ELEMENTARY SCHOOL ACCESS DURING CONSTRUCTION

Construction of the new Clayton and Columbine bridge structures and a portion of 46<sup>th</sup> Avenue North from Josephine Street to Columbine Street are completed outside of the school year to limit the impacts to students walking to school, student drop-offs and pickups, staff travel, and school bus operations. KMP completes both roadways in the Project’s first summer construction season so that the improved accesses are available early. During construction of Columbine Street and Clayton Street, north-south vehicle, pedestrian, and bicycle access are maintained on a detour along Elizabeth Street and Thompson Court.

KMP will:

- Clearly mark sidewalk closures or restrictions if construction occurs during school hours to provide a safe route to school.
- Maintain access for school bus drop-off and pick-up, deliveries, maintenance and teaching staff, and trash pick-up.
- Maintain access to private property, and clear construction debris at the end of the workday or upon completion of the Work.
- Maintain and protect the playground area outside of the construction limits with raised fences and traffic control devices.

- Restrict parking on Columbine Street to expedite curb, gutter, and sidewalk replacement. Once complete, on-street parking and sidewalks are available for use.
- Ensure detours are ADA compliant.
- Communicate with affected property owners on upcoming Construction Work activities.

Construction of the new 46<sup>th</sup> Avenue North during the first Stage of Construction requires existing sidewalk closures and pedestrian detours where the new roadway crosses existing streets. While the majority of the detoured east/west pedestrian routes are less than 1,000 ft., KMP considers installing short segments of temporary asphalt sidewalks where ROW is available to limit the detour length. Opportunities for adding shorter east/west sidewalk connections to improve connectivity and eliminate some detours are examined during early MOT Task Force meetings. If Construction Work occurs during school hours, KMP provides and maintains additional safety enhancements such as signing, pavement markings, temporary signals, crossing guards, and flaggers (for two-way one-lane operations).

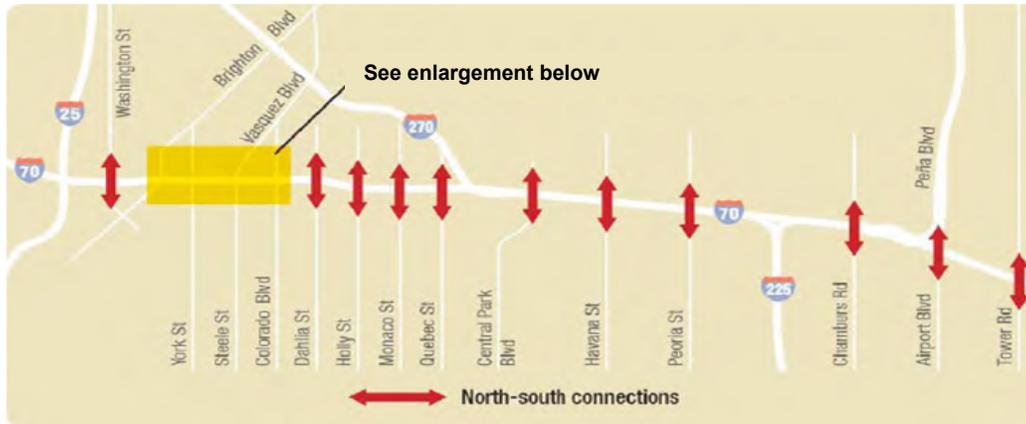


**Swansia Elementary School Access During Construction**

The existing north-south pedestrian movements, as identified in the I-70 East ROD, are maintained during construction of the Project. Some connections are temporarily closed and detoured to complete a Stage of Construction. It is anticipated that no pedestrian detour lengths will exceed 1,000 ft. The ability for pedestrians to cross-streets at non-designated locations or “jaywalk” in the middle of a block is limited during construction by installed construction fencing. This condition is not considered adverse as it creates a safer pedestrian environment. The existing north-south connectivity patterns across I-70 are shown in the following figures.

East-west pedestrian connectivity in proximity to I-70 uses 47<sup>th</sup> Avenue, 46<sup>th</sup> Avenue under the viaduct, and 45<sup>th</sup> Avenue from York to Madison.

### 4.5.3 Bruce Randolph School and Garden Place Elementary School Access During Construction



### Existing North-South Connectivity

Source: CDOT I-70 East ROD

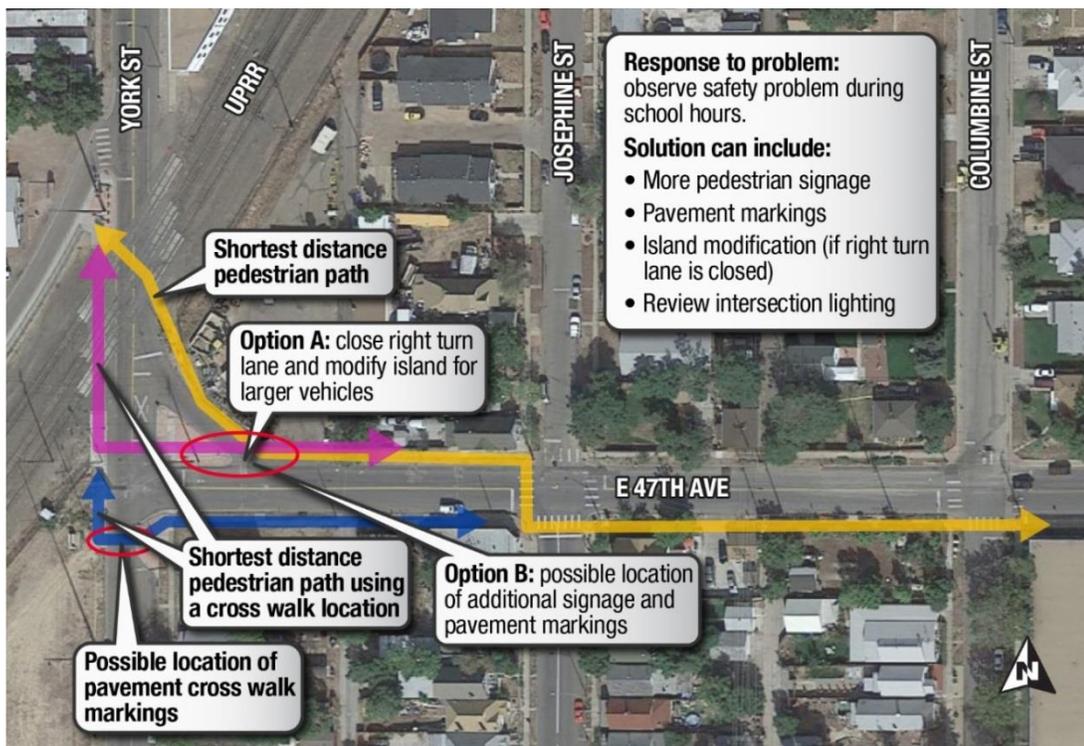
## BRUCE RANDOLPH SCHOOL AND GARDEN PLACE ELEMENTARY SCHOOL ACCESS DURING CONSTRUCTION

Although KMP does not have specific construction activities identified that impact the immediate school areas, we conduct a parent/staff survey at each school to determine the best way to maintain access for vehicles, pedestrians, and bicycles during school hours. At that time, specific construction activities may be identified.

### 4.6 UPRR YORK STREET CROSSING PEDESTRIAN & BIKE APPROACH

The UPRR cuts diagonally through the Project area and inhibits connectivity. For nearly a mile north of I-70/46<sup>th</sup> Avenue, the York Street/47<sup>th</sup> Avenue crossing is the only crossing of the railroad. Many roads south of I-70 also end at the rail line, including 43<sup>rd</sup> Avenue, 44<sup>th</sup> Avenue, and 45<sup>th</sup> Avenue.

It is critical to community connectivity that access across the UPRR grade crossing remains available for vehicles, pedestrians, and bicyclists. With the inclusion of the lit, covered, and secured access along 46<sup>th</sup> Avenue during the construction of the new UPRR bridge over future I-70, only the York Street grade crossings are impacted by the improvements. There is no KMP planned detour route directing pedestrian or bicycle traffic to the York Street crossing. However, our construction phasing approach includes MHTs for constructing improvements at this crossing. These MHT address construction of the grade crossing improvements. While we perform this construction, pedestrian traffic is directed by KMP provided flaggers.



UPRR and York Street Pedestrian and Bicycle Movements



## 4.7 INCIDENT MANAGEMENT PLAN

Incident response and management is a critical operational element for a major facility such as the Project. Major incidents impact the essential mobility and safety functions of the highway, and a failure to react quickly and effectively could harm the public image of both the O&M contractor and the Department.

Attachment 2 of Appendix H, Draft Operations Management Plan presents KMP's O&M Incident Response Plan for the Project. The Plan describes the following major elements:

- Preparedness
- Detection of incidents
- Coordination/communication
- Response/site management
- Recovery/site clearance

### 4.7.1 COORDINATION WITH THE PUBLIC INFORMATION PLAN (PIP)

The KMP PI Team establishes a stakeholder group comprising representatives from affected agencies to coordinate and review the Incident Management Plan (IMP), and determine a process for future updates to the Plan.

Coordination and planning with local and regional emergency service providers, law enforcement, and other related agencies occurs through quarterly meetings and weekly emailed construction updates, as detailed in the PIP. In conjunction with the IMP, KMP develops a Crisis Communications Plan (CCP) describing our response strategy for crisis events and other emergencies that may occur. The CCP is coordinated with our overall Incident Management Plan. We update the CCP annually to include lessons learned, input from Team members, and best practices.

Preparation is the key to proper response. In our planning, we:

- Develop and refine procedures related to traffic movement and evacuation during major emergency and disaster events.
- Develop and document reverse-lane activities and procedures for use within the Project limits, and on the local roads network.
- Develop, review, and update this Incident Management Plan to ensure timely and effective emergency response and recovery.
- Train O&M employees in incident response procedures at all levels. Use drills to promote emergency skill readiness.
- Develop and document local mitigation strategies.

Additional information on our CCP is included in Appendix J, Draft Strategic Communications Plan.

### 4.7.2 INCIDENT DETECTION AND IDENTIFICATION

Accurate and responsive incident detection and identification is a high priority for KMP. For this Project, incidents can include crashes, disabled vehicles, problems resulting

from weather, debris, or any other impacts that adversely affect traffic flow. Many notifications will be via 911 calls. In addition, incident sources include:

- Courtesy patrol call reports
- Colorado State Patrol and Denver Police Department call reports
- Department employee/contractor/subcontractors advising of an incident
- CTMC and DTMC CCTV cameras providing incident detection and location confirmation

#### 4.7.3 INCIDENT RESPONSE

The KMP approach to incident management requires the presence of an Incident Commander, and varies based on incident severity level. The four levels as defined by the Department are:

- **Minor (Level 1):** Impact to traveled roadway estimated to be less than 30 minutes, with no lane blockage.
- **Intermediate (Level 2):** Impact to traveled roadway estimated to be greater than 30 minutes, but less than two hours, with lane blockages, but not a full closure of the roadway.
- **Major (Level 3):** Congestive impact to traveled roadway is estimated to be greater than two hours, or roadway is fully closed in any single direction.
- **Major Long Term Closure (Level 4):** Extended closure greater than 24 hours. Closure duration shall be determined by the incident commander.

Timely and effective response is a critical component of incident management for all potential events. The primary goal is to ensure an effective response to the challenges that can occur. For advanced warning events, actions depend on the type and timeline of the incident. For those without warning, responses depend on the type of incident and the resulting conditions.

We immediately dispatch notifications received during the workday to the closest available responder. Incident response trucks have GPS tracking systems, allowing office administrators and supervisors to know immediately which units are nearest to an incident. Incident responders are also on-call during off-peak hours.

KMP's main priorities at an incident site are to provide for the safety of the public and first responders, manage lane closures as conditions or law enforcement directives dictate, and expeditiously procure resources to clear debris, remove vehicles, and safely resume traffic. Additional details of our response plan can be found in Attachment 2 of Appendix H, Draft Operations Management Plan.

#### 4.7.4 INCIDENT SITE MANAGEMENT

The safety of responders, victims, and the traveling public requires effective incident site management. A well-planned and managed response provides for the safety of responders, victims, and the traveling public while minimizing the number of responding units, yet provides for efficient and effective resources to mitigate the incident.

Incident site management topics are discussed here, with guidelines developed further and refined at an incident site management planning workshop to be held as part of an early MOT Task Force meeting. Goals of these guidelines are timely and predictable multi-agency response, safety of the responders and traveling public, and consistent agency communications of an incident in order to reduce impacts to traffic on I-70 and the cross-streets. In Colorado, law enforcement is 100% in charge of accident sites. This is why Traffic Incident Management training is important for all responders.

#### 4.7.5 INCIDENT CLEARANCE

The IMP for this Project enhances incident detection, response, and clearance times compared to the operations that exist today. Safe and quick clearance of incidents is a goal set by KMP for this Project, and the performance measures will be discussed and reviewed with the Department to establish achievable goals and realistic expectations. Safe, quick clearance is defined by our proactive approach of rapid, safe, and aggressive removal of temporary obstructions from the roadway. This approach minimizes the responders' exposure to passing traffic, the probability of secondary crashes, and overall congestion and delay.

Safe and Quick Clearance Practices include:

- **Move-Over Laws:** These Laws require drivers approaching a scene where emergency responders are present to change lanes when possible and/or reduce speed.
- **Authority Removal Laws:** These laws provide authorization (preferably immunity from liability in general) to a predesignated set of public agencies to remove (1) driver attended disabled or wrecked vehicles, and (2) spilled cargo or other personal property blocking a travel lane(s) or otherwise creating a hazard to the flow of adjacent traffic. KMP discusses with the Department the entity responsible for authorizing removal/towing of incidents.
- **Driver Removal Laws (*Move Your Crash Colorado*):** These laws require the motorist involved in minor crashes—those which involve no serious injuries and the vehicle(s) can still be driven—to move the vehicles off travel lanes.

Many of the strategies for incident clearance correspond to incident site management strategies, and include:

- Public education program
- Available personnel resource lists
- Equipment/material resource lists
- Pre-planned alternate routes
- Alternative emergency response routes
- Construction traffic protocols

- Incident response manual
- Agency radio communication protocols
- Interagency training program
- Strategic placement of equipment storage sites
- Defined traffic control techniques
- Incident Management Review Team
- Travel on shoulder guidelines
- Closure and alternate routes guidelines
- Rapid removal guidelines
- Medevac landing zone guidelines
- Push bumpers for righting overturned vehicles
- Accident investigation site guidelines
- Traffic signal control plans
- Ramp metering
- Incremental lane opening guidelines
- VMS

KMP collaborates with the Department to decide on the most applicable incident site clearance measures for this Project during construction.

KMP's philosophy for safe, quick clearance response is to:

- Work with a sense of urgency to clear incidents
- Use unified command, and include safe quick clearance in incident objectives
- Complete tasks concurrently, when possible
- Use all available resources for clearance
- Seek the opportunity to think outside the box on how things can be done differently

#### 4.7.6 DISSEMINATION OF TRAVELER INFORMATION REGARDING INCIDENTS

The KMP Project Communications Manager and Department Public Information Officer are responsible for disseminating travel information regarding incidents to the public and other agencies.

During incident response, KMP correctly classifies the incident response level, and communicates this information to the KMP Project Communications Manager who communicates immediately with the Department when a construction-related event occurs. The KMP Project Communications Manager will coordinate with the Department, who will push this information out to the public and other agencies.



Details on communication protocols are included in the Crisis Communications Plan as part of KMP's Strategic Communications Plan.

#### 4.7.7 COURTESY PATROL

The Courtesy Patrol Service Plan, included as an Attachment to Appendix H, Draft Operations Management Plan, provides an overview and establishes procedures for courtesy patrol services (CPS) as required in Section 10 and Appendix B of Schedule 11 of the Project Agreement. KMP provides CPS during the Construction and Operating Periods, providing continuity for greater reliability and effectiveness.

Courtesy patrols are an important component of the Project. The patrols minimize impacts to the traveling public, ensure reliable travel speeds in managed and other travel lanes, and protect the safety of the workforce and public within the O&M limits. Courtesy patrollers provide assistance to motorists, maximize traffic flow, and enhance safety. As discussed in Section 6.1 of Appendix H, patrollers receive specialized CPS training for properly assisting motorists and coordinating with the Colorado Traffic Management Center (CTMC). Our Courtesy Patrol Program is an extension of KMP's commitment to motorist and worker safety.

Courtesy patrol services vary daily. Many variables impact service requirements, including traffic volumes, weather conditions, accident history, and roadway conditions. KMP bases CPS schedules, routes, and resource needs on our Project knowledge, and our experience providing CPS services on similar projects.

CPS is provided within the Project's O&M Limits, as stipulated in the Project Agreement. The courtesy patrol drives their assigned routes during the day, stopping to clear debris/litter from the roadway, assist with incidents, and inspect the roadway when needed.

#### 4.7.8 NOTIFICATION OF EMERGENCY SERVICES

All staff are empowered to make initial contact with First Responders if emergency services are required. Following contact of First Responders, the Public Communications Manager is immediately notified and communicates with the Department Project Manager and Public Information Officer. When an incident occurs, working closely with the appropriate agencies is necessary to ensure proper incident resolution, and consistent and accurate release of information from one source. Advance planning with responding agencies and the Project's PI Team is critical.

#### 4.7.9 NOTIFICATION OF LOCAL SCHOOL DISTRICTS ABOUT POSSIBLE IMPACTS TO SCHOOL BUS ROUTES, STUDENT DROP-OFFS AND/OR PEDESTRIAN FACILITIES

For planned Work in the vicinity of a school, KMP works with DPS and representatives of the local school to create the least possible impact to school operations. Work is performed during non-school hours when possible.

Because of pre-planning, temporary changes to school bus routes, student drop off, or pedestrian crossings can be safely implemented, with adequate notice to involved parties. For emergency situations, the KMP Communication Manager, who serves as a point-of-contact for the KMP Project Management and PI Team, notifies DPS about the

incident, how it impacts the DPS facilities or services, and the estimated time for incident clearance.

#### 4.7.10 GEOGRAPHIC AND OTHER SPECIAL CONSTRAINTS

KMP will identify and meet with each relevant city, county, and agency for potential jurisdictional issues, geographical constraints, and potential conflicting operations procedures related to incident management during construction. We prepare a jurisdiction map identifying geographical constraints prior to construction. When any proposed phasing affects jurisdictional boundaries or creates additional geographical constraints, we collaborate with the agencies for solutions or mitigation measures during the MOT Task Force meetings, and incorporate into the IMP.

#### 4.7.11 AVAILABLE RESOURCES

KMP provides the available resources to fulfill the obligations of the IMP. A detailed list of planned staffing and equipment to be provided for courtesy patrols, emergency response, and Routine Maintenance is included in Appendix H, Draft Operations Plan and In Appendix I, Draft Maintenance Management Plan.

#### 4.7.12 OPERATIONAL PROCEDURES FOR TRAFFIC INCIDENTS

Project specific procedures are established to provide a systematic process for a consistent and thorough approach to incident detection, response, and clearance, as well as coordinated crisis communications.

#### 4.7.13 DETOUR ROUTES TO BE USED IN THE EVENT OF A CATASTROPHIC INCIDENT ALONG I-70 MAINLINE OR RAMPS

Working in conjunction with first responders, KMP establishes potential detour routes to be used if an emergency event closes I-70 during the Construction Period. These Approved detour routes, together with the TMPs needed to implement the detours, are included in the final IMP.

### 4.8 WORK WITH CORRIDOR-FOCUSED TMOs AND THE DEPARTMENT

As noted in Section 4.1, KMP anticipates working closely with local, corridor-focused TMOs and TMAs during construction. Specifically, we provide four portable VMS boards during the Construction Period for the exclusive use of supporting TDM programs and outreach. Additionally, KMP will establish a grant program, in cooperation with the Department, funded with \$100,000 for use during the first three years of the Operating Period. The grant program supports community-based programs that reduce total vehicle miles traveled and encourage multi-modal options within the community. Improvements to bus stops, sidewalks, and bike lanes might be included, as may employing additional crossing guards at key pedestrian crossing locations. Our competitive grant program will be open to all nonprofit groups, registered neighborhood organizations, and schools located within the Project Area. Using selection criteria we will develop jointly with the Department, we will select the best uses and award grant funds appropriately. We anticipate that a number of grants of various amounts will be awarded.

**4.9 DYNAMIC RIDE SHARING PROGRAMS** The construction of managed lanes on I-70 creates the opportunity to develop a dynamic ride sharing program within the Denver metropolitan region. This program can include the combined efforts of RTD, the



Department, and local TMOs. Congestion-based pricing, high occupancy vehicle discounts for the managed lanes, commuter parking lots, and shuttle service are common techniques which could be developed. KMP will cooperate with the Department in regards to any dynamic ride sharing program established in the metro area.

## 5. Public Information (PI) Strategies

KMP's Draft Strategic Communications Plan, included as Appendix J, discusses protocols on 'what' and 'how' to communicate traffic incident information to the traveling public in a timely manner. The Strategic Communications Plan includes how KMP addresses:

- Identifying stakeholders, their potential issues and concerns
- Working with stakeholders, and meeting schedules
- Addressing congestion and delay during the Construction Period
- Communication for traffic incidents and alternate routes
- Notification of major traffic switches, ramp closures, lane reductions, lane closures, and detours
- Eliminating traffic impacts for major events, such as the National Western Stock Show, and others to be identified

### 5.1 PUBLIC INFORMATION APPROACH

KMP's PI Team has worked on large highway projects, and they understand the needs and expectations of stakeholders, community members, and construction staff. Our communications staff acts as the center for the two-way communication strategy needed for successful project delivery.

The KMP Communications Team is embedded with the Construction Team as well as with the community. This allows the Team to stay current on all construction activities and, by having a community office, stay current with their concerns.

A Draft Construction Period Communications Plan (CPCP) to manage and implement the PI process is included as an Attachment to Appendix J. The plan describes KMP's holistic approach to communications during the Construction Period. A draft of the Maintenance and Operations Communications Plan and the Crisis Communication Plan are also included in Appendix J, and address the Operating Period and actions in the event of a crisis. KMP will update and review the plan quarterly to reflect construction activities and planned traffic control during that quarter.

The chart on the next page presents an overview of KMP's plan for Communication Activities and Responsibilities.

## KMP Communications Activities and Responsibilities Across Project Periods

 <p style="text-align: center;"><b>After Award</b></p>	<p>Department will continue to communicate on vision and need for Project.</p>	<p style="text-align: center;"><b>TOGETHER</b></p> <p>Foster open, two-way communication through public meetings, phone calls, email, and other outreach efforts; Strengthen community trust by identifying concerns prior to construction; Work together to develop outreach tools that effectively communicate and have a consistent look and feel, such as the Project website and communications collateral.</p>	 <p>KMP will support the Department in communicating overall Project information and generating positive perceptions about community enhancements and improved connectivity; Educate stakeholders about the execution of the work and KMP's plans to minimize impacts such as noise, dust and traffic congestions; Work closely with community groups to talk about KMP processes and learn how to best meet their needs.</p>
<p style="text-align: center;"><b>During Construction</b></p>	<p>Department will communicate Project Work Plan and Schedule.</p>	<p>Maintain a strong, visible presence in the community and demonstrate commitment to accessibility, transparency, and community enhancement; Develop energetic and imaginative communications initiatives to engage with the community and sustain positive public perceptions about the Project.</p>	<p>KMP will lead communicating overall coping information during the Construction Period; Advocate for communities along the Project corridor and work with the Project Team to adjust construction and traffic control plans, where feasible, to minimize impacts and disruptions; Respond to inquiries and provide solutions to community concerns about air quality, noise, fugitive dust and travel impacts; Develop communications strategies and adjust or develop new, more effective communications methods as they become available, keeping the public informed of potential impacts caused by constructions, lane closures, alternate routes.</p>
<p style="text-align: center;"><b>Operating Period</b></p>	<p>Department will communicate description and implementation of Toll Lanes.</p>	<p>Collaborate with Department to develop key messages related to O&amp;M work activities; Clarify unfamiliar, complex, or often misunderstood concepts related the Project's long-term O&amp;M, allowing the public to make informed decisions; Demonstrate our continued commitment to two-way communication and effective public outreach by engaging with the public and determining, with the Department, which O&amp;M activities are warranted.</p>	<p>KMP will refine communications processes begun during Construction Period and develop new tools based on changes in technology and communication preferences; Continue excellent customer service by providing timely response to public concerns and inquiries.</p>



## 5.2 CHECKLIST

KMP develops a checklist so that all traffic control plans are clearly understood by our Team, and thorough communication plans are implemented. Included in the chart below are activities we review when developing the Project checklist.

### TCP Checklist

Checklist Input	
ACTIVITY	DETAILED DESCRIPTION OF THE CONSTRUCTION ACTIVITY
Timing	When will it start, what is the duration, times of operation
Traffic Control Required	Detours, full closure, lane restrictions
Potential Impacts	Will there be noise, dust, traffic delays, or confusion due to changes in travel lanes, or any changes in pedestrian access, schools access, transit service, emergency service provider response time, or business access
Stakeholders	Residents, commuters, tourists, businesses
Messages	What do the stakeholders need to know with respect to the activity
Communication Tools	What is the best way to get the stakeholders the information: <ul style="list-style-type: none"> <li>• Website</li> <li>• Email/text alert</li> <li>• Information hotline</li> <li>• Individual meetings</li> <li>• Newsletter</li> <li>• Signage</li> </ul>

Timing of communication, and all communications tools, are reviewed/Approved by the Department prior to distribution, following the notification requirements in the table below.

### Notification Approach

Deliverable	When to be Published
Full road closures, detours, and major traffic impacts lasting seven Calendar Days or longer	14 Calendar Days prior to the beginning of activity in any area of the Project
Major Project activities (such as major lane shifts, bridge demolitions) lasting seven Calendar Days or less	Seven Calendar Days prior to the beginning of the activity
Other remaining types of construction Activities in any area of the Project, including: <ul style="list-style-type: none"> <li>• Night Work</li> <li>• Heavy Noise Work</li> <li>• Utilities</li> <li>• Change of business/residential access</li> </ul>	Seven Calendar Days prior to the beginning of activity in any area of the Project, or as determined jointly by the Developer and Department
Other construction updates (e.g., cancellation of planned closures, additional lane closures, closure removals, major traffic shifts) that directly impact the public	As soon as known with at least 24-hour notice

### 5.3 WEEKLY COMMUNICATION COORDINATION MEETINGS

Our Communications Team holds weekly Strategic Communications Meetings at the Project office that include the Department’s Communications Team. We discuss communications issues, upcoming media advisories/press releases, community meetings, Lane Closure Reports, website updates, and information line recordings.

We use the checklist to facilitate discussion. For the highest impact events, including major traffic shifts, road closures, bridge demolition, and/or construction adjacent to vulnerable sites such as Swansea Elementary School, we develop additional communications materials to ensure that we address individual activities, impacts, and schedule; and that we accurately communicate the right information to the right constituents. These communications “Work plans” are similar in detail to those developed by our technical counterparts in the field.

These work plans are reviewed with the Department at the weekly meetings to ensure we have addressed all potential issues.

As indicated in the example below, our Work plans are consistent with traditional Department Work plans, ensuring transparency and a mutual understanding of communication goals and techniques.

**CENTRAL 70 PROJECT**  
Construction Start: Traffic Switch for Viaduct Removal

<b>DATE</b>	Construction to begin summer 2019
<b>ACTIVITY</b>	<ul style="list-style-type: none"> <li>Move current traffic off viaduct</li> <li>Move viaduct traffic to new/completed westbound lanes between Colorado and Brighton boulevards</li> </ul>
<b>GOALS</b>	<ul style="list-style-type: none"> <li>To communicate change in traffic patterns</li> <li>Inform public about upcoming viaduct removal (separate communication work plan)</li> <li>Minimize impacts to commuters and residents</li> <li>Build trust between the public and Kiewit/CDOT by staying in constant communication about construction activities</li> <li>To communicate any changes in construction phasing and schedule</li> <li>Coordinate Communications with CDOT PI team</li> </ul>
<b>FACTS</b>	<ul style="list-style-type: none"> <li>Traffic switch for Westbound and eastbound lanes between Colorado and Brighton boulevards</li> <li>I-70 travelers will have different traffic pattern</li> <li>Access to and from I-70 will be shifted to accommodate new traffic patterns</li> <li>Overnight traffic switches</li> <li>Westbound and eastbound traffic switches to happen on different nights</li> </ul>
<b>LIKELY ISSUES</b>	<ul style="list-style-type: none"> <li>Traffic delays during traffic switch</li> <li>Driver confusion with new travel lanes</li> <li>Traffic impacts and possible delays with traffic switch</li> <li>Noise, vibration and lights from equipment – especially at night with adjacent neighborhoods</li> <li>Traffic switch impacting emergency services and bus routes</li> </ul>
<b>MESSAGES</b>	<ul style="list-style-type: none"> <li>Speed limits reduced through work zone for worker and public safety</li> <li>Traffic impacts expected; watch for message boards/signage re-railing traffic</li> <li>Possible overnight work</li> <li>Construction schedule is weather dependent and subject to change</li> <li>Check website for “know before you go” video for the latest travel pattern</li> <li>Moving traffic onto the new lanes and demolishing the viaduct take construction into the final phase</li> </ul>
<b>COMMUNICATION TOOLS TO PREPARE</b>	<ul style="list-style-type: none"> <li>Develop traffic shift demonstration video for website and social media</li> <li>Develop maps for traffic shifts (visuals for static communication)</li> <li>Meeting with surrounding businesses and neighborhoods most impacted by traffic switch prior to starting work</li> <li>Milestone event to celebrate completion of lowered interstate section</li> <li>Press release/Earned media – emphasis on traffic reporters</li> <li>Newsletter to include construction updates</li> <li>Website – updated weekly</li> <li>Weekly construction update and information line update</li> <li>Traffic shift factsheet – distributed to stakeholders</li> <li>Signage</li> </ul>

Area B2 – Alameda Avenue and Sable Boulevard Intersection      PAGE 1 OF 2 / LAST UPDATED 12/12/2016

Stakeholder	Tasks/Tools/Activity	Timing
<b>I-70 Travelers</b>	<ul style="list-style-type: none"> <li>MOT and signage</li> <li>Construction Hotline Update</li> <li>Website update</li> </ul>	<ul style="list-style-type: none"> <li>MOT and signage at least 7 days prior</li> <li>Weekly Updates</li> <li>At least once a week</li> </ul>
<b>Businesses</b>	<ul style="list-style-type: none"> <li>Business Meeting</li> <li>Identify business that will be impacted and contact information</li> <li>Update contact info in Commentsense</li> <li>Email newsletter</li> <li>Email construction updates</li> <li>Traffic Alert prior to full closure</li> <li>Follow up phone calls as necessary</li> <li>Signage to showcase specific business access</li> </ul>	<ul style="list-style-type: none"> <li>Prior to start of work</li> <li>Prior to construction</li> <li>Prior to start of work – Ongoing</li> <li>Monthly – prior to start of work</li> <li>Weekly</li> <li>At least one week prior</li> <li>At least one week prior to construction activity</li> <li>Prior to construction</li> <li>Notification as per each specific agreement</li> </ul>
<b>Neighborhoods/Residents</b>	<ul style="list-style-type: none"> <li>Email construction alert and fact sheet</li> <li>Verify contacts in database</li> <li>Email newsletter</li> <li>Email construction updates</li> <li>Email traffic alert prior to full closure</li> </ul>	<ul style="list-style-type: none"> <li>7 days Prior to construction activity</li> <li>Prior to construction</li> <li>Monthly – prior to start of work</li> <li>Weekly</li> <li>At 14 calendar days prior to full closures</li> </ul>
<b>Emergency Service Providers: Police, Fire Dept., Ambulance</b>	<ul style="list-style-type: none"> <li>Email newsletter</li> <li>Email construction updates</li> <li>Traffic Alert prior to full closure</li> <li>Call prior to closures</li> </ul>	<ul style="list-style-type: none"> <li>Monthly – prior to start of work</li> <li>Weekly</li> <li>As necessary</li> <li>As necessary</li> </ul>
<b>Elected Officials: City Council, CDOT Board of Directors</b>	<ul style="list-style-type: none"> <li>Email newsletter</li> <li>Email construction updates</li> <li>Weekly construction updates</li> </ul>	<ul style="list-style-type: none"> <li>Quarterly</li> <li>Monthly – Prior to start of work</li> <li>Weekly</li> </ul>
<b>Media: Traffic Reporters and PIOs for CDOT, City and County of Denver, Schools, Churches, Hospitals, Police, Fire</b>	<ul style="list-style-type: none"> <li>Email newsletter</li> <li>Email construction updates</li> <li>Press release for full closures</li> <li>EMS detour alert</li> <li>Story pitches to local reporters</li> <li>Flyover shots with reporters</li> <li>Special story pitches to traffic reporters – radio/T.V.</li> </ul>	<ul style="list-style-type: none"> <li>Monthly – Prior to start of work</li> <li>Weekly</li> <li>At least a week prior to full lane closures</li> <li>Database email</li> </ul>

Area B2 – Alameda Avenue and Sable Boulevard Intersection      PAGE 2 OF 2 / LAST UPDATED 12/12/2016

### Sample Communications Work Plan



The KMP Communications Team and the Department Communication Team works together to develop additional communication campaigns, as needed, to improve traffic flow and safety through the construction area:

- Move It—move accidents off the road
- Distracted Driving
- Know Before You Go—plan your trip to reduce delays
- Videos about how to drive through construction—what you can expect in Work Zones
- Work/Travel Zone safety
- Travel options/TDM resources and information

The Teams also work together on the crisis communication plan and Project-wide Team communications.

## 5.4 MAINTENANCE OF TRAFFIC TASK FORCE

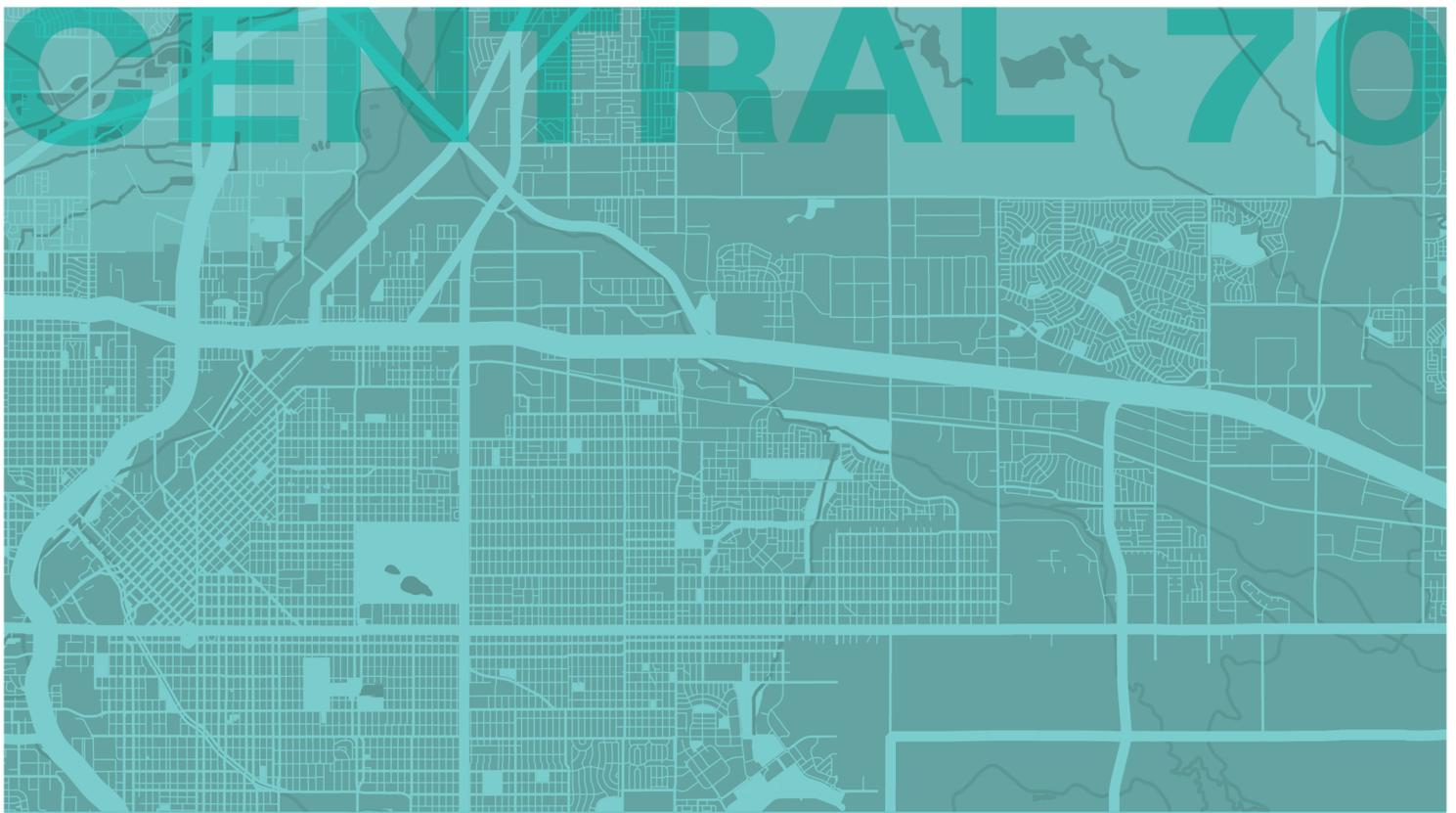
Coordinating all traffic control plans with adjacent projects and jurisdictions for easy travel is key to making the Central 70 Project a success. KMP establishes an MOT Task Force to coordinate plans and establish a forum for communicating travel related information. We submit for Approval within 30 days of NTP1 the list of proposed attendees, and convene a Kick-Off Meeting within 14 days of list Approval to develop agreement on TMP detail and agenda topics moving forward.

Our preliminary list of task force attendees includes representatives from the following:

- KMP Communications Manager and Team
- KMP MOT Team
- Department Communications Team
- Traffic Control Supervisor
- Traffic Control Superintendent
- Department Traffic Control staff
- RTD
- Denver Police traffic unit
- CCD Public Works Street Permits
- Commerce City
- Adams County
- City of Aurora
- Emergency Service Providers
- Highway Maintenance Team
- DEN
- National Western Center (as needed)
- DPS Bus Service (as needed)

## **5.5 WEEKLY TASK FORCE MEETINGS**

The MOT Task Force meets weekly, and KMP develops the agenda, and prepares and posts minutes for Approval. At the meeting, the Task Force reviews open action items from the previous meeting, any incidents from the prior week prior, and the Communications Team's report on community feedback received. The Task Force looks for patterns in comments received and evaluates if changes to the MOT are needed. Upcoming TMPs are reviewed and discussed to confirm there are no conflicts, and planned detours are Approved. Communication to the public regarding TMPs are planned and discussed. Lessons learned are reviewed quarterly to make updates to TMPs and communication Work plans moving forward.



APPENDIX G

*Relates to Part 1, Volume 2*



# Draft Cover Design Baseline Report



**SUBMITTED TO:**

Colorado Bridge Enterprise  
High Performance Transportation Enterprise  
c/o Colorado Department of Transportation



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**APPENDIX G**  
Draft: May 18, 2017

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PROJECT MANAGER

DATE

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COVER DESIGN MANAGER

DATE



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## ATTACHMENTS

- **ATC 37:** Alternate Cover Electrical System Requirements
- **ATC 66:** Cover Air Quality Monitoring
- **ATC 71:** Alternate Cover Standpipe System Requirements



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## EVALUATION CRITERIA – APPENDIX G, VOLUME 2

Sch. 10 Section	Item	App. G Section	Section Name	Check
<b>12.11</b>	<b>The Cover Design Baseline Report shall provide a system description that includes as a minimum the elements below, incorporating information on concept proposals, design criteria, performance, durability, maintenance requirements and spares:</b>			
<b>12.11.a</b>	System block diagrams for the overall CCMS, each Cover subsystem, and any other systems or software that are related to the Cover operations;	<b>4.0</b>	System Block Diagrams	<input type="checkbox"/>
<b>12.11.b</b>	Detailed logic and development plan for CCMS interfaces with other systems or software	<b>5.0</b>	CCMS Interface Logic and Development Plan	<input type="checkbox"/>
<b>12.11.c</b>	Proposed ventilation system type and supplier i. Proposed ventilation design process ii. Approach to derivation of design adverse Cover portal pressure condition due to the influence of meteorological conditions induced by a headwind at one Portal	<b>6.0</b>	Proposed Ventilation System	<input type="checkbox"/>
<b>12.11.d</b>	Proposed FFFS type and supplier	<b>7.0</b>	Proposed Fixed Firefighting System	<input type="checkbox"/>
<b>12.11.e</b>	FDAS type, model and supplier	<b>8.0</b>	Fire Detection and Alarm System	<input type="checkbox"/>
<b>12.11.f</b>	CCTV camera system type, model and supplier	<b>10.0</b>	CCTV Camera System	<input type="checkbox"/>
<b>12.11.g</b>	Operator interface system	<b>11.0</b>	Operator Interface Systems	<input type="checkbox"/>
<b>12.11.h</b>	Monitoring and control system	<b>12.0</b>	Monitoring and Control System	<input type="checkbox"/>
<b>12.11.i</b>	Proposed system operation, including temporary operation during construction	<b>12.1.13</b>	Temporary Cover Systems Operation During Construction	<input type="checkbox"/>
<b>12.11.j</b>	Hydraulic and pneumatic calculations	<b>13.0</b>	Hydraulic and Pneumatic Calculations	<input type="checkbox"/>
<b>12.11.k</b>	Computational Fluid Dynamics (CFD) analysis process, model, cases and assumptions	<b>14.0</b>	Computational Fluid Dynamics	<input type="checkbox"/>
<b>12.11.l</b>	Cover Ventilation System (CVS)	<b>15.0</b>	Cover Ventilation System	<input type="checkbox"/>
<b>12.11.m</b>	Proposed approach to demonstrating FFFS performance	<b>16.0</b>	Proposed Approach to Demonstrating FFFS Performance	<input type="checkbox"/>
<b>12.11.n</b>	Analysis of the safety functions for all fire and life safety systems as prescribed in IEC61508-1	<b>17.0</b>	Analysis of Safety Functions for all Fire and Life Safety Systems	<input type="checkbox"/>
<b>12.11.o</b>	Proposed approach to passive fire protection as prescribed in NFPA 502, Section 7.3	<b>18.0</b>	Proposed Approach to Passive Fire Protection	<input type="checkbox"/>
<b>12.11.p</b>	Lighting	<b>19.0</b>	Lighting	<input type="checkbox"/>

## EVALUATION CRITERIA – APPENDIX G, VOLUME 2

Sch. 10 Section	Item	App. G Section	Section Name	Check
12.11.q	Emergency way-finding signing	20.0	Signing	<input type="checkbox"/>
12.11.r	ITS and communications system	21.0	ITS and Communications System	<input type="checkbox"/>
12.11.s	Drainage	22.0	Drainage	<input type="checkbox"/>

# 1. Project Summary

## 1.1 KIEWIT-MERIDIAM PARTNERS CORE VALUES

Kiewit-Meridiam Partners (KMP) is committed to delivering the Central 70 Project (Project) with a focus on client relations, achieving the Project goals, and maintaining transparency with the Department. To achieve these objectives, the KMP Team has adopted the following core values:

### KMP Core Values

Every day we strive to fulfill our role as stewards in our communities—after all, we work in our own backyards.

#### STEWARDSHIP



#### PEOPLE

We are relentless in our ongoing focus that *Nobody Gets Hurt*. We hire bright minds that are hungry for the best training available and committed to Team success.



**KMP's four core values form the cornerstone of our company and the sum of our business ethics conduct. We train on these values so that they are constantly on the minds of our leaders and workforce.**



#### INTEGRITY

We conduct ourselves with the highest levels of integrity. We are responsible, accountable, honest, straightforward, and deal fairly with everyone.



#### EXCELLENCE

We focus on quality production, commit to excellence, and encourage new and innovative ideas. We build our work *Right First Time*.



### 1.2 PLAN MANAGEMENT

This Project summary is presented at the start of each Appendix to serve as a quick reference to our core values, the Project overview, our Team’s composition, and our Key Personnel and Critical Staff. We developed each Appendix to demonstrate our understanding of the Project requirements and facilitate timely Approval by the Department after award.

This document describes KMP’s approach for the Work. KMP will resubmit this Plan, including an updated Project summary, to the Department as required per the Project Agreement.

All Project plans, including this document, are stored electronically per KMP’s Document Control System (DCS) Plan. Revisions to these documents may be required as the Project progresses, and annual updates are completed in accordance with Section 4.2 of the Project Management Plan (PMP). The latest revision of all Management Plans will be stored per KMP’s DCS and submitted to the Department through Aconex.

### 1.3 OVERVIEW

The Project is a Public-Private Partnership to design, build, finance, operate, and maintain planned improvements to the I-70 corridor between I-25 and Tower Road.

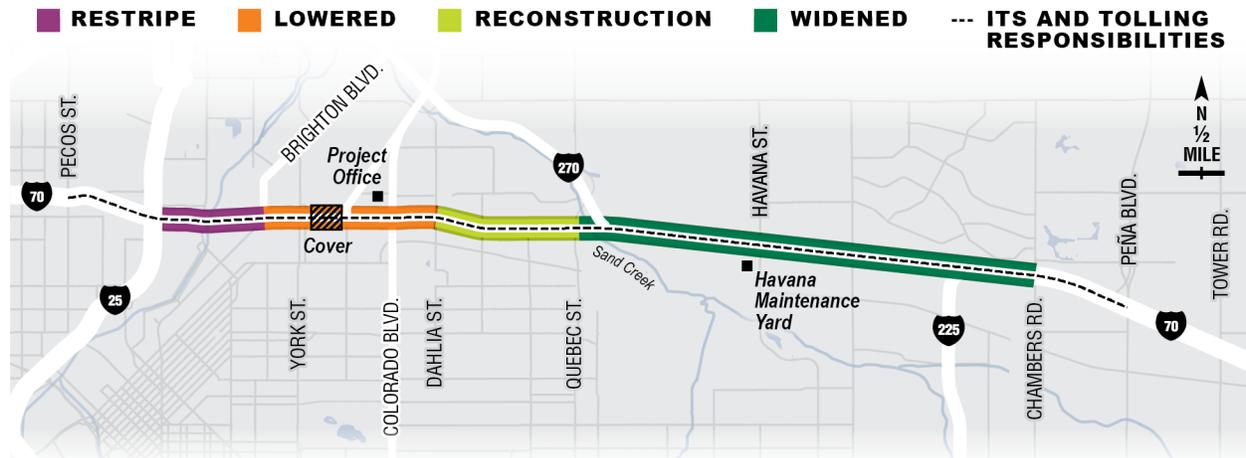
The Project’s scope is broken down into the following timeframes:

#### Project Time Frames

Time Frame	Period	Description	Estimated Duration
<b>Notice of Award to NTP1</b>	Submittals	Plan development, submittals, and mobilization of Quality Management staff	3 months
<b>NTP1 to NTP2</b>	Construction	Financial Close and Design	6 months
<b>NTP2 to Substantial Completion</b>	Construction	Construction and O&M During Construction (other than snow and ice control services)	45 months
<b>Pre-Substantial Completion to Substantial Completion</b>	Transition	Transition from Construction to Operating Period, and O&M submittals	8 months
<b>Substantial Completion to Final Acceptance</b>	Operating	Final submissions and inspections	4 months
<b>Substantial Completion to Expiry Date</b>	Operating	Operations and Maintenance (including Renewal Work)	30 years
<b>NTP3 to Term</b>	Construction, Operating	KMP snow and ice control services	33-34 years
<b>62-68 months prior to Expiry Date</b>	Operating	Handback Inspections, Handback Work, and Department training to facilitate seamless handover at Expiry Date	62-68 months

Improvements made by KMP during the Construction Period, highlighted in the figure, are described below.

### Project Scope



#### 1.3.1 RESTRIPE: I-25 TO BRIGHTON BOULEVARD

Restriping I-70 from I-25 to Brighton Boulevard to accommodate one managed lane in each direction, including:

- Design and Construction for improvements to associated drainage infrastructure

#### 1.3.2 LOWERED: BRIGHTON BOULEVARD TO DAHLIA STREET

Full reconstruction of I-70 between Brighton Boulevard and Dahlia Street, including:

- Removing the viaduct between Brighton Boulevard and Colorado Boulevard, and reconstructing the Interstate below grade to accommodate the Ultimate Project roadway configuration and associated elements
- Adding one managed lane in each direction with supporting infrastructure to accommodate a second managed lane in the Ultimate Project roadway configuration
- Removing and replacing the Interstate structures over Brighton Boulevard
- Constructing the Cover and associated elements over the Interstate between Columbine Street and Clayton Street
- Constructing cross-street structures at York Street, Josephine Street, Columbine Street, Clayton Street, Fillmore Street, Steele Street/Vasquez Boulevard, Cook Street, Monroe Street, and Colorado Boulevard
- Constructing I-70 Mainline structures at Dahlia Street
- Removing one Railroad structure, and Constructing two Railroad structures at Union Pacific Railroad (UPRR) and BNSF Railway (BNSF)

#### 1.3.3 RECONSTRUCTION: DAHLIA STREET TO SAND CREEK

Full reconstruction of I-70 Mainline between Dahlia Street and Sand Creek, including:



- Adding one managed lane in each direction with supporting infrastructure to accommodate a second managed lane in the Ultimate Project roadway configuration
- Removing and replacing Interstate structures over Holly Street, Monaco Street, Denver Rock Island Railroad, and Quebec Street

#### 1.3.4 WIDENED: SAND CREEK TO CHAMBERS ROAD

Widening I-70 from Sand Creek to Chambers Road with associated elements, including:

- Adding one managed lane in each direction with supporting infrastructure to accommodate a second managed lane in the Ultimate Project roadway configuration
- Removing and replacing the I-270 flyover structure to I-70 eastbound
- Removing and replacing Interstate structures over Peoria Street

#### 1.3.5 INTELLIGENT TRANSPORTATION SYSTEMS (ITS) AND TOLLING RESPONSIBILITIES

Additional ITS and tolling responsibilities, including:

- Closed circuit television (CCTV) camera coverage for I-70 corridor, including interchanges between Pecos Street and Airport Boulevard
- Microwave vehicle radar detection between Pecos Street and Tower Road
- Travel time indicators between Pecos Street and Tower Road
- Lane use signals between Pecos Street and Chambers Road
- Dedicated short range communications radios between Pecos Street and Tower Road

#### 1.3.6 OPERATIONS AND MAINTENANCE (O&M) WORK DURING CONSTRUCTION

Operations and maintenance of existing infrastructure within the O&M Limits During Construction as defined by the Project Agreement, including:

- I-70 Mainline and associated infrastructure
- Local Agency infrastructure
- Drainage
- Water quality
- ITS and electronic toll collection facilities
- Utility services
- Traffic signals and lighting
- Railway structures
- Fencing
- Snow and ice control services (following NTP3)

#### 1.3.7 OPERATIONS AND MAINTENANCE WORK DURING THE OPERATING PERIOD

Operations and maintenance of I-70 within the limits defined by Schedule 11 of the Project Agreement for the Operating Period (dashed line in figure above), including:

- Providing resources to safely maintain the roadway throughout the Term

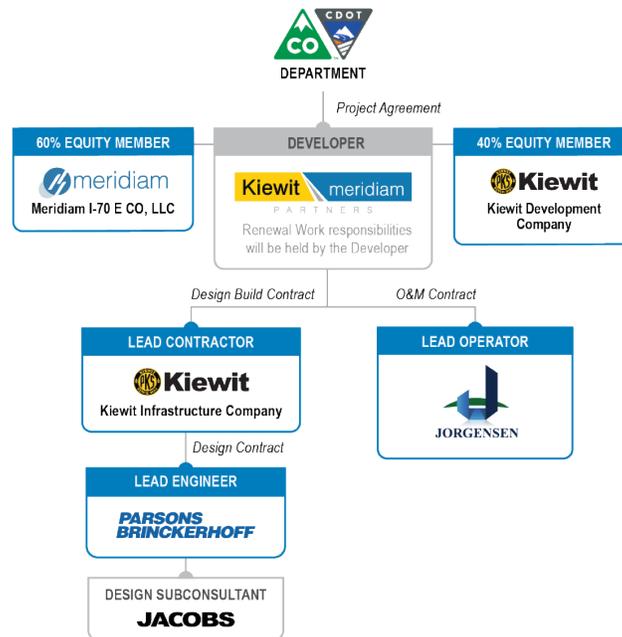
- Asset preservation including repair and Renewal
- Snow and ice control services
- Courtesy patrols
- Incident response
- Meet Handback requirements

### 1.4 KIEWIT-MERIDIAM PARTNERS COMPOSITION

KMP organized a streamlined Team to successfully deliver the Central 70 Project. The Core Proposer Team Members of Meridium, Kiewit, Parsons Brinckerhoff, and Jorgenson are united by a commitment to Project success under a common project management system. KMP’s lean approach has been cultivated from a history of working together, and by our shared cultures of safety, quality, environmental stewardship, and community service. The KMP Team needs no learning curve to start working together, and is positioned to execute on our joint Project delivery commitments from day one.

KMP’s equity members—Meridium and Kiewit Development Company—formed KMP for the sole purpose of developing this Project. KMP’s Core Proposer Team Members, shown below, include Kiewit Infrastructure Company (KIC) as the Lead Contractor, Roy Jorgensen Associates (Jorgensen) as Lead Operator, and Parsons Brinckerhoff (PB) as Lead Engineer. Our Team is supported by the expertise of subconsultants and subcontractors who possess additional local knowledge and experience, including Jacobs as PB’s main Design subconsultant. KMP is committed to identifying opportunities to maximize the involvement of small and disadvantaged businesses. Throughout the Project, KMP will remain the single point of responsibility for meeting all Project Agreement requirements.

KMP will co-locate with the Department in both the Project Office and the Colorado Transportation Management Center (CTMC) to foster a collaborative approach that ensures we meet the Department’s Project goals throughout the Project.





## 1.5 KEY PERSONNEL AND CRITICAL STAFF

The table below shows KMP’s Key Personnel who will be overseeing the Project. KMP has also identified positions, and individuals, as Critical Staff who will be instrumental in the successful delivery of the Project.

### Key Personnel and Critical Staff

Staff Type	Title	Name	Employed by	Seconded to
KEY PERSONNEL	<b>Project Manager</b>	Chris Hodgkins	Meridiam	KMP
	<b>Design-Build Manager</b>	Tom Howell	KIC	
	<b>Construction Manager</b>	Barry Thoendel	KIC	
	<b>Design Manager</b>	Doug Andrew, PE	PB	
	<b>O&amp;M Manager</b>	Abraham Henningsgaard, PE	Jorgensen	
	<b>Project Quality Manager</b>	Gordon Peterson, PE	KIC	KMP
	<b>Independent Design Quality Manager</b>	James Rozek, PE	PB*	
	<b>Construction Process Control Manager</b>	Sean McAfee	KIC	
	<b>Independent Quality Control Manager</b>	Tracy Martin, PE	KIC*	
	<b>Environmental Manager</b>	Jenn Bradtmueller, PE	KIC	KMP
	<b>Utilities Manager</b>	Kevin Custy	Jacobs	KIC
	<b>Project Communications Manager</b>	Hunter Sydnor	KIC	KMP
CRITICAL STAFF	<b>Technical Manager</b>	Martin Currie	KDC	KMP
	<b>Financial Manager</b>	Christopher Couallier	Meridiam	KMP
	<b>Safety Manager</b>	Ben Snow	KIC	KMP
	<b>Construction Safety Manager</b>	Kenyon Manley	KIC	
	<b>Civil Rights Program Manager</b>	Matt Christensen	KIC	
	<b>DBE/ESB Program Manager and Outreach Training Manager</b>	Colean Bemby	KIC	
	<b>Lead Scheduler</b>	Mauricio Solano	KIC	
	<b>Design Integration Manager</b>	Tim Nelson	KIC	
	<b>Deputy Design Manager</b>	Mark Talvite, PE	Jacobs	
	<b>Cover Design Manager</b>	Heath Therrien, PE	PB	
<b>Commercial Manager</b>	Jamie Harvey, PE	KIC		

*\*Per Approved ATC 9.1 (see Attachment to the Quality Management Plan), KMP shall use in-house personnel in lieu of employees from an Independent Quality Control Firm*

## 2. Introduction

KMP prepared this Draft Cover Design Baseline Report to assist the Department in assessing the overall design of the Cover systems, and evaluating how these systems work together to provide all required elements and amenities as prescribed in the Project Agreement, Schedule 10, Section 12, Cover MEP Systems, Schedule 11, Operations and Maintenance Requirements, and other applicable Project requirements. The Final Cover Design Baseline Report will serve as an owner’s manual for the operation, maintenance, and use of the Cover MEP systems for both the Department and KMP O&M staff.

The Cover Park is the signature element of the Central 70 Project that will provide recreational opportunities and community event space for area residents to enjoy. The park emerges by lowering the I-70 roadway and building the Cover. Many mechanical, electrical, and plumbing (MEP) systems, which are generally hidden from public view, are required for safe use of the CLS by the traveling public along I-70. This Draft Cover Design Baseline Report describes these “behind the scenes” systems that make safe and enjoyable use of the Cover possible.

The final report will identify all Cover system types and suppliers, as well as the interaction of all MEP systems to meet or exceed all fire and life safety, ventilation, and fire suppression requirements of the Project documents and National Fire Protection Association Standard 502, 2017 Edition (NFPA 502). KMP will submit the draft Final Cover Design Baseline Report prior to Notice to Proceed 2 (NTP2) and will submit the Final Cover Design Baseline Report for Acceptance prior to Release for Construction (RFC) documents.

KMP worked throughout the preliminary design process to optimize the MEP systems, with the goal of providing safe, compliant systems design. KMP collaborated with the Department to develop multiple Alternative Technical Concepts (ATCs), several of which are incorporated into the KMP Cover systems design. The Department amended the Project Agreement requirements regarding the Cover drainage system based on KMP ATC 60.0, resulting in an overall benefit to the Project. The KMP ATCs pertaining to the Cover (see Volume 2, Binder 13 of this Technical Proposal), and the Department’s responses, are listed in the table below.

ATC No.	ATC Subject	Department Response
37.2	Cover Electrical System	Conditional Approval
60.0	Cover Drainage System	Amended RFP
71.0	Cover Standpipe System	Conditional Approval

KMP’s roadway MEP systems experts completed the Cover systems design in-house. The KMP Cover Systems design team is led by William Connell, chairman of the NFPA 502 Committee from 2005 through 2016. KMP’s Design Quality Management Plan, implemented throughout the Preliminary Cover systems design process, includes quality control (QC) for this Draft Cover Design Baseline Report.



In addition to the ATCs mentioned above, other design optimizations implemented fit within the requirements of the Project Agreement. KMP's Utility Manager, Kevin Custy, worked with the Denver Water Department to obtain water supply system information to model the Fixed Firefighting System (FFFS) and confirm that sufficient water pressure exists for the FFFS to function properly. This allowed for elimination of the FFFS pumping system, resulting in construction and maintenance savings over the life of the Cover.

KMP further optimized the Cover design by using the concessions and restroom building to house many of the Cover MEP systems control rooms. This reduces the footprint of the Cover systems, and maximizes the usable area of the Cover Park, benefitting all park users and the surrounding community.

Collaboration with the Department included a confidential, one-on-one topic meeting with the Denver Fire Department on January 25, 2017, at the City and County of Denver (CCD) offices in the Webb Building. Denver Fire Department is the Authority Having Jurisdiction (AHJ) for the Project, and as such, its acceptance of fire and life safety systems is required prior to Final Acceptance and issuance of RFC documents. The meeting provided an opportunity for the KMP Team to present specific ATCs and other design topics to the AHJ, starting a dialogue that will continue throughout the final design process and construction.

KMP discussed ATC 37.2 and ATC 71.0 with the AHJ during our one-one-one topic meeting. ATC 37.2 proposes an optimized Cover electrical system design solution that the Department initially accepted, but later rejected, citing AHJ concerns. KMP discussed the proposed design solutions in detail with the AHJ and successfully resolved concerns, and received AHJ agreement with the Cover electrical system design proposed in the ATC. The optimized Cover standpipe system proposed in ATC 71.0 was also discussed at the meeting and was viewed positively by the AHJ. This Draft Cover Design Baseline Report incorporates the electrical system and standpipe system designs proposed in the ATCs, as well as ATC 66.0 regarding air quality sensors.

The Final Cover Design Baseline Report is one of many reports that KMP will develop during final design and submit to the Department and other stakeholders as the Project Agreement requires. These include the following reports, manuals, and plans that will support the Final Cover Design Baseline Report:

- Tunnel Operation, Maintenance, Inspection, and Evaluation Manual (TOMIE)
- Cover Top Operation and Maintenance Manual
- Fire System Performance Report
- Emergency Response Plan
- Requirements Traceability Matrix
- Functional Design Specifications (for each Cover system)
- Commissioning Test Plan
- Full Scale System Test Program
- Full Scale System Test Report

Appendix A of Volume 2 contains detailed systems plans that supplement the MEP systems descriptions and diagrams found in this Draft Cover Design Baseline Report.

### 3. References and Abbreviations

Additional reports and documents that support this design report are listed below. These sources provide information on the operation and maintenance (O&M) of the Cover MEP systems.

- 1) Tunnel Operation, Maintenance, Inspection, and Evaluation Manual (TOMIE). Federal Highway Administration, Publication No. FHWA-HIF-15-005, July 2015.
- 2) Fire Dynamics Simulator User's Guide, NIST Special Publication 1019, Sixth Edition, 2016.
- 3) Sprinklers in Japanese road tunnels, Stroeks, R., Chiyoda Consultants Report, 2001.
- 4) Numerical simulations on the performance of water based fire suppression systems, Vaari, J., Hostikka, S., Sikanen, T. and Paajanen, A., VTT Technology 54, 2012.
- 5) Modeling realistic fire spread of large fires, application to road tunnels, investigation using Computational Fluid Dynamics, **M. O'Connor, Parsons Brinckerhoff**, 2013.
- 6) Energy budget in tunnel fires – consideration of fixed firefighting systems and passive fire protection, **Bilson, M. and McQuade, K.** (both of **Parsons Brinckerhoff**), Seventh International Symposium on Tunnel Safety and Security, Montreal, Canada, 2016, 281-292.
- 7) I-70 East Project, Denver, CO, Partial Covered Lowered Alternative, Ventilation and Fire Life Safety Report, Atkins North America, September 2015.
- 8) Critical Velocity – Past, Present and Future, WD Kennedy, **Parsons Brinckerhoff**, 1997.
- 9) Systems and Equipment for Fire and Smoke Control in Road Tunnels, World Road Association, 2007.

This Draft Cover Design Baseline Report uses the following abbreviations:

Abbreviations			
<b>AHJ</b>	Authority Having Jurisdiction	<b>ITS</b>	Intelligent Transportation Systems
<b>AID</b>	Automatic Incident Detection	<b>LUS</b>	Lane Use Signal
<b>CCTV</b>	Closed Circuit Television	<b>LHD</b>	Linear Heat Detector
<b>CTMC</b>	Colorado Transportation Management Center	<b>NFPA</b>	National Fire Protection Agency
<b>CFD</b>	Computational Fluid Dynamics	<b>PA</b>	Project Agreement
<b>DMS</b>	Dynamic Message Sign	<b>PLC</b>	Programmable Logic Controller
<b>FHRR</b>	Fire Heat Release Rate	<b>SCADA</b>	Supervisory Control and Data Acquisition
<b>FFFS</b>	Fixed Firefighting System	<b>Vc</b>	Critical Velocity (minimum velocity to direct smoke downstream of a fire)

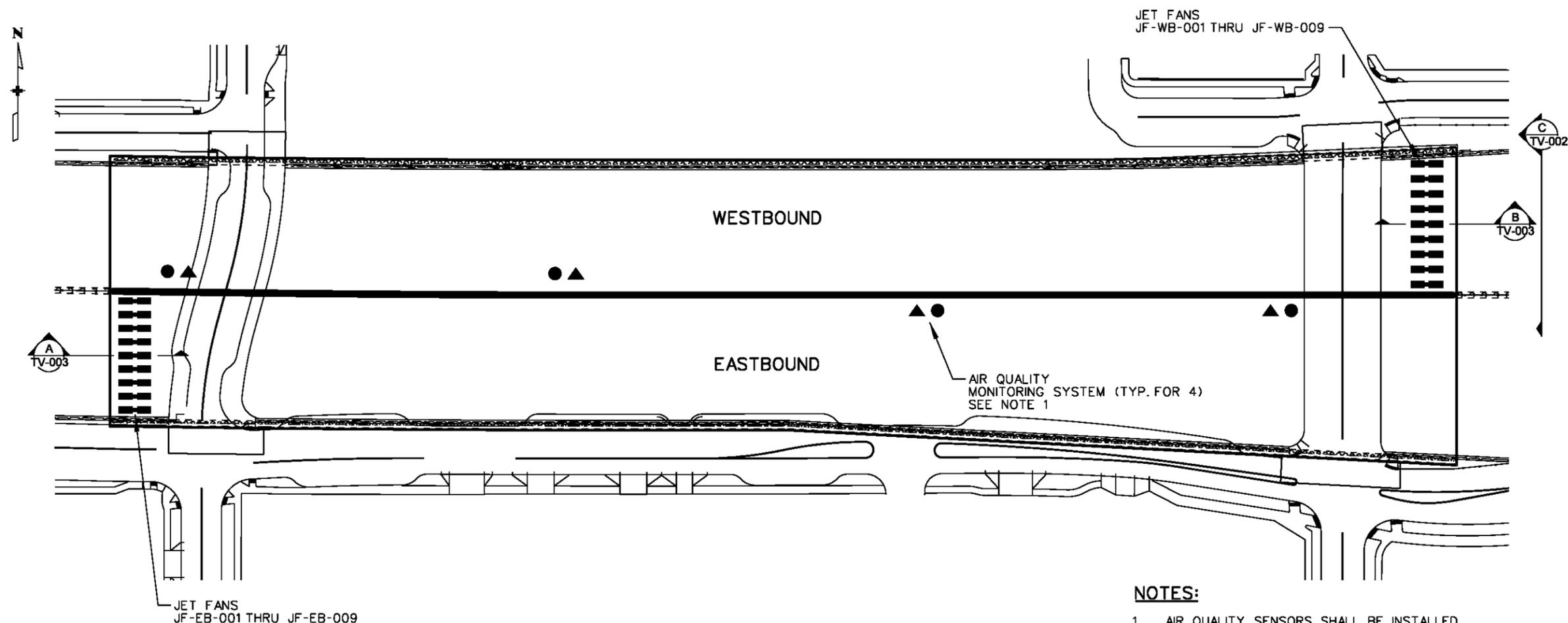
### 4. System Block Diagrams

The system block diagrams shown in this Section 4 can also be found within the MEP systems plan sets included in Appendix A of Volume 2. Those plan sets include preliminary electrical, ventilation, fire protection, communications, and lighting systems plans.



4.1 VENTILATION BLOCK DIAGRAM

Cover Ventilation System Diagram  
(Appendix A Sheet TV-001)



PLAN - COVER SECTION VENTILATION  
NOT TO SCALE

NOTES:

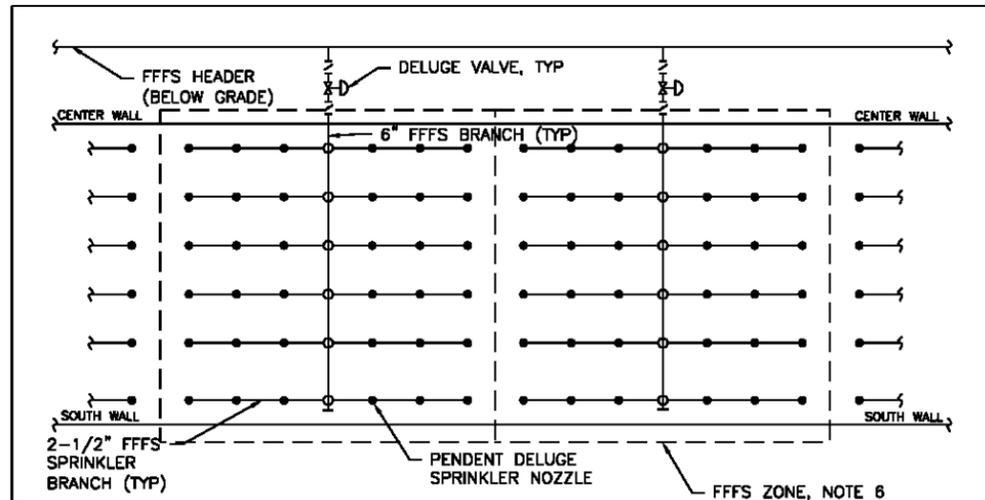
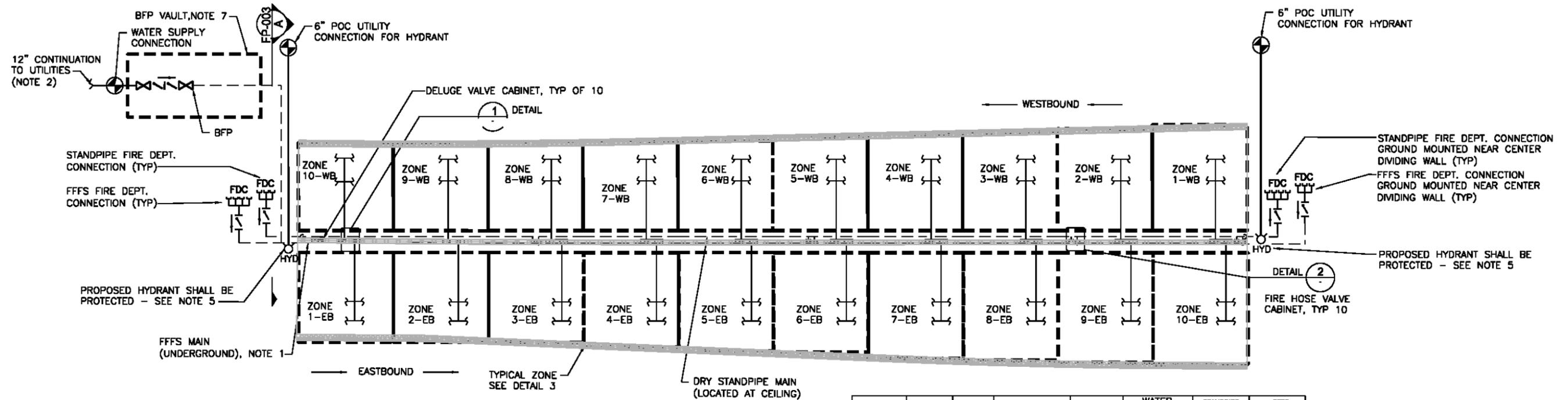
1. AIR QUALITY SENSORS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER REQUIREMENTS.

LEGEND:

- JET FAN
- AIR QUALITY SENSOR (CODEL TUNNELTECH 205 - NO2 MONITOR OR EQUIVALENT)
- ▲ AIR QUALITY SENSOR (CODEL TUNNELTECH 201 - CO, VIS AND NO OR EQUIVALENT)

## 4.2 FIXED FIREFIGHTING SYSTEM BLOCK DIAGRAM

### Fixed Firefighting System, Standpipe System, and FFFS Water Supply (Appendix A Sheet FP-001)



**DETAIL**  
TYPICAL FFFS ZONE 3

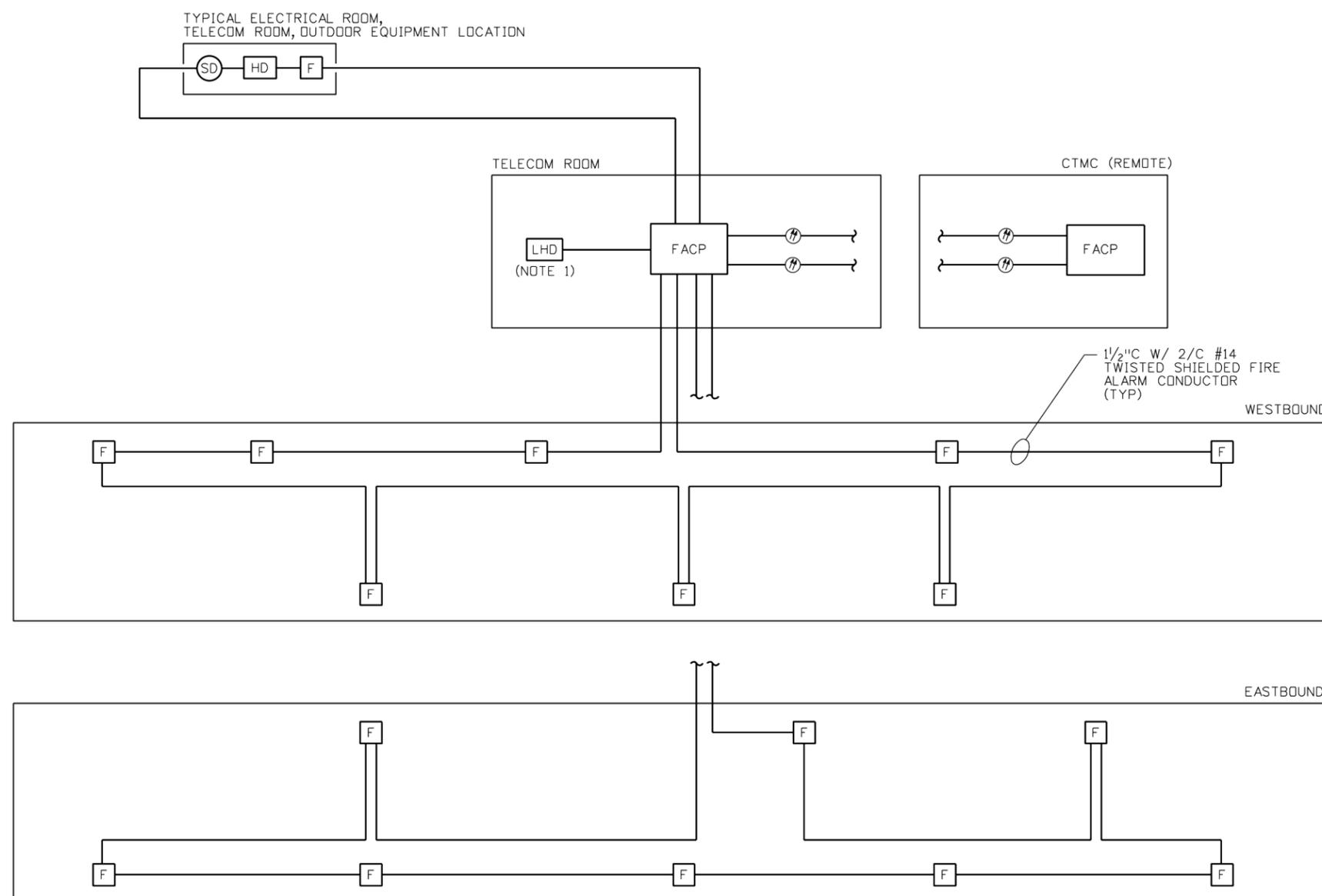
ZONE OPTION	ZONE LENGTH	TOTAL ZONE QTY	ACTIVATED ZONES DURING EVENT	COVERAGE AREA, SQFT	WATER APPLICATION RATE (GPM/SQFT)	STANDPIPE DEMAND (NOTE 8)		FFFs DEMAND (NOTE 3,4)	
						GPM	PSI	GPM	PSI
PA REQ.	100 FT	20	2	20000	0.15	750	100	3750	7.8

**NOTES:**

1. FIXED FIREFIGHTING SYSTEM (FFFs) SUPPLY PIPING TO BE BURIED BELOW ROADWAY GRADE TO REDUCE HEAT TRACING REQUIRED.
2. THE REQUIRED WATER SUPPLY FOR THE FFFs IS BASED ON A 12" SINGLE WATER SUPPLY CONNECTION TO THE PROPOSED CIVIL CONNECTION TO THE 36" TRANSMISSION LINE NEAR THE WEST PORTAL.
3. DELUGE SYSTEM WATER DEMAND APPLIES A 1.25 EFFICIENCY FACTOR.
4. MINIMUM PRESSURE FOR THE MOST REMOTE ZONE AND NOZZLE IS 23 PSI.
5. STANDPIPE AND DELUGE FDC'S ARE TO BE LOCATED WITHIN 100 FEET OF MUNICIPAL HYDRANTS.
6. LAYOUT IS SHOWN AS A SCHEMATIC. FINAL DESIGN LAYOUT WILL CONSIDER OBSTRUCTIONS, CEILING AND BEAMS.
7. LOCATION OF 10" BACKFLOW PREVENTER (BFP) TBD. UNDERGROUND VAULT SIZED TO 7'W X 11'L X 8'D. VAULT SHALL INCLUDE MAINTENANCE ACCESS.
8. STANDPIPE DEMAND BASED ON NFPA 502 SECTION 10.1.1 IN REFERENCE TO NFPA 14 SECTION 7.10.1.1.2
9. ADDITIONAL STANDPIPE COVERAGE BEYOND COVER PORTALS WILL BE REQUIRED BY THE AHJ WHERE ROADWAYS ARE LOWERED (BELOW GRADE) HIGHWAY IS CONSIDERED LIMITED ACCESS PER NFPA 502 SECTION 4.3.5.
10. SEE SHEET NO. E-009 FOR ORIENTATION OF FIXED FIREFIGHTING AND STANDPIPE SYSTEM COMPONENTS WITH OTHER MEP ELEMENTS WITHIN COVER CROSS SECTION.

### 4.3 FIRE DETECTION AND ALARM SYSTEM BLOCK DIAGRAM

Fire Detection and Alarm System Riser Diagram  
(Appendix A Sheet E-014)



**NOTES:**

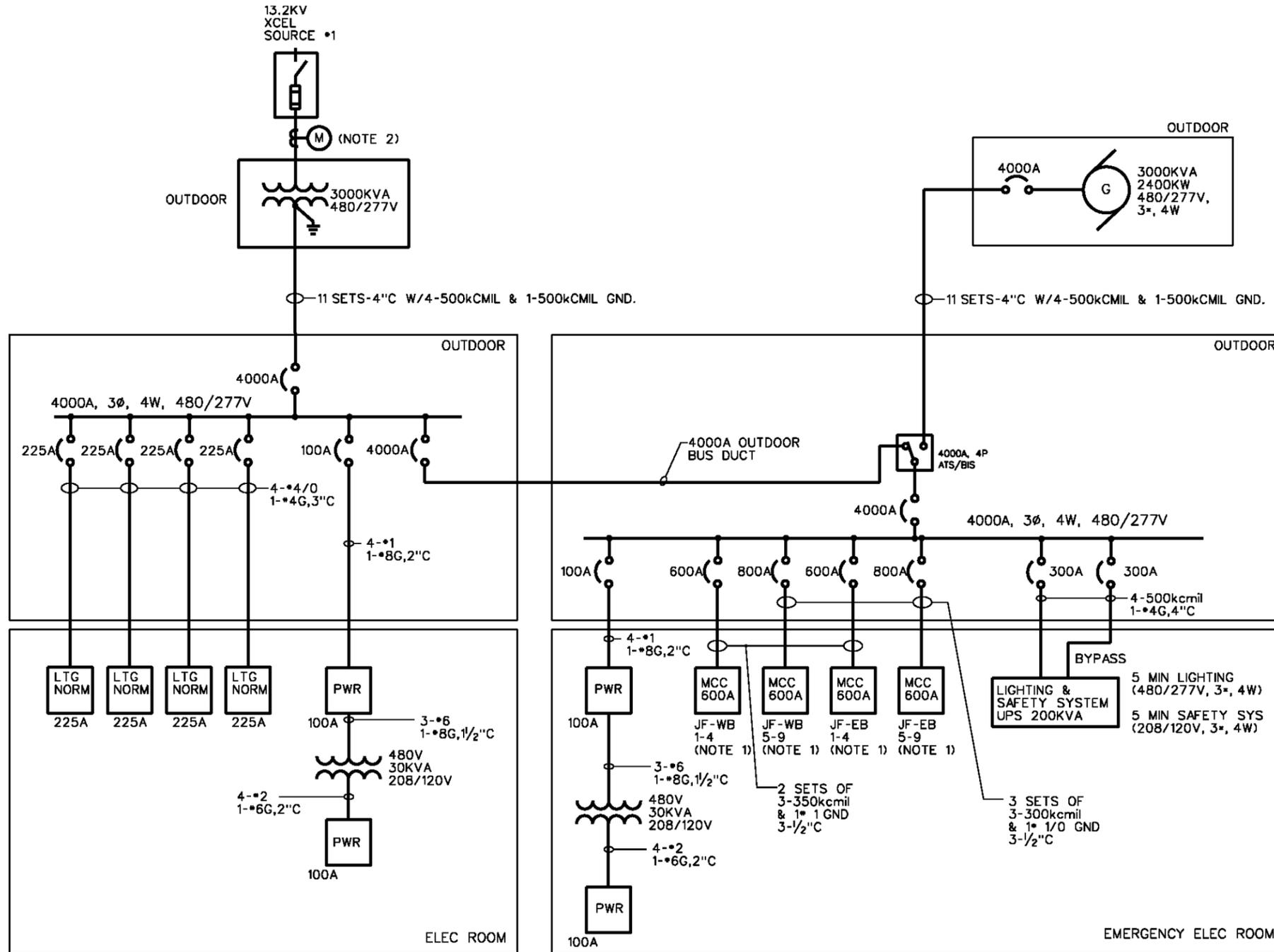
1. FIBER OPTIC LINEAR HEAT DETECTOR CABLE SHALL BE PLACED OVER THE CENTERLINE OF EACH TRAVEL LANE FROM PORTAL TO PORTAL. CABLES SHALL BE ROUTED OVER EACH LANE TO PROVIDE LINEAR COVERAGE.

**LEGEND:**

- F MANUAL PULL STATION
- LHD LINEAR HEAT DETECTOR CONTROL PANEL
- FACP FIRE ALARM CONTROL PANEL
- HD HEAT DETECTOR
- SD SMOKE DETECTOR

### 4.4 POWER SUPPLY BLOCK DIAGRAMS

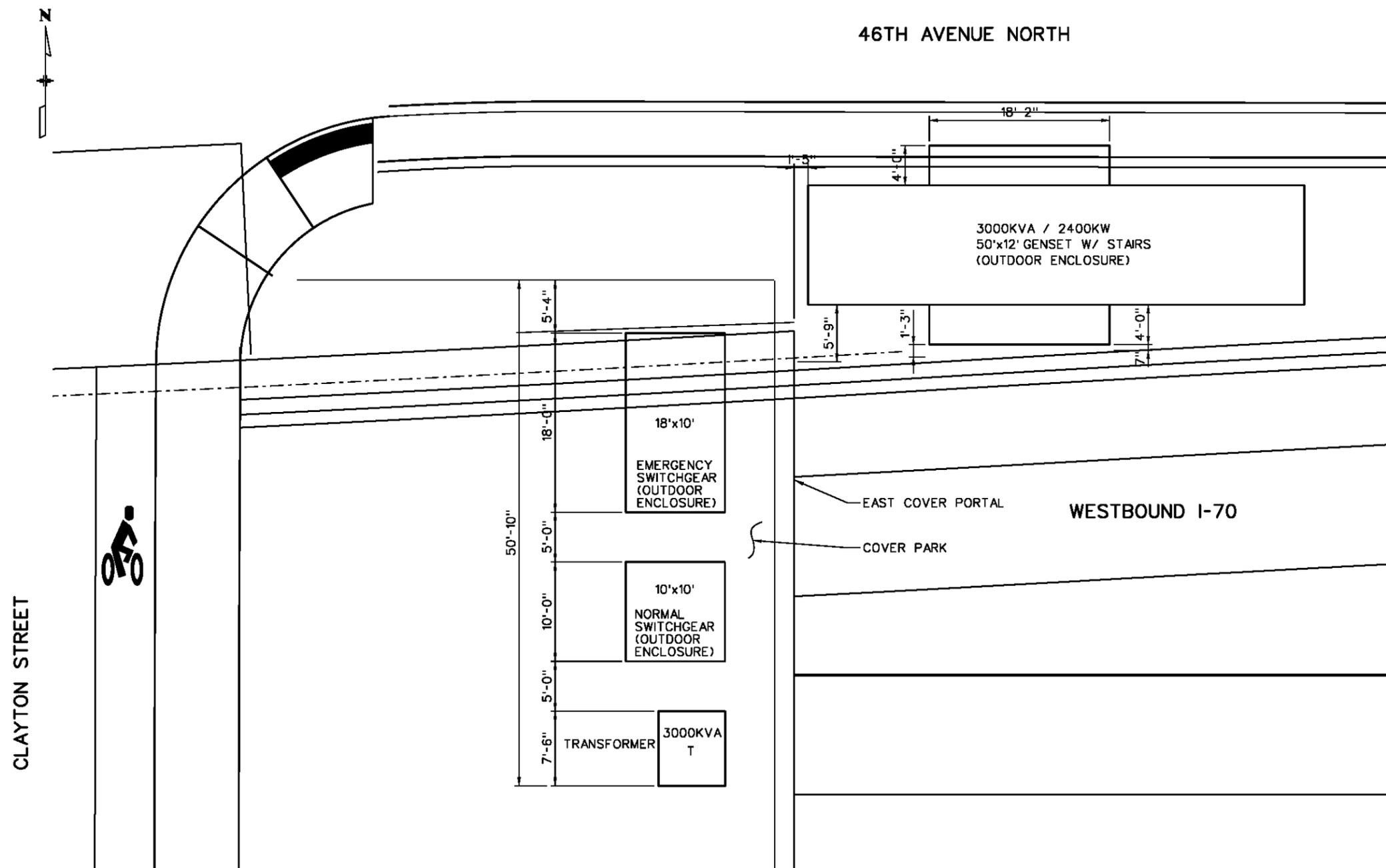
Power Supply One Line Diagram  
(Appendix A Sheet E-001)



NOTES:

1. EACH FEEDER FROM MCC TO RESPECTIVE JET FAN SHALL BE 3-Ø 2/0 & 1-Ø 3 GND.
2. CUSTOMER SHALL PROVIDE & INSTALL METERING CABINETS, CABLING AND OTHER RACEWAY & PAD INFRASTRUCTURE TO SUPPORT PRIMARY METERED SERVICE FROM XCEL ENERGY PER THEIR STANDARD INSTALLATION REQUIREMENTS. XCEL ENERGY TO PROVIDE POTENTIAL AND CURRENT TRANSFORMERS & REVENUE METER ENCLOSURE FOR CUSTOMER INSTALLATION.
3. LOCAL DISCONNECTS ARE NOT REQUIRED FOR THE JET FANS. MCC UNITS SHALL BE PROVIDED WITH PADLOCKING MEANS FOR LOCKING OUT WITH MCP HANDLE IN OFF POSITION.

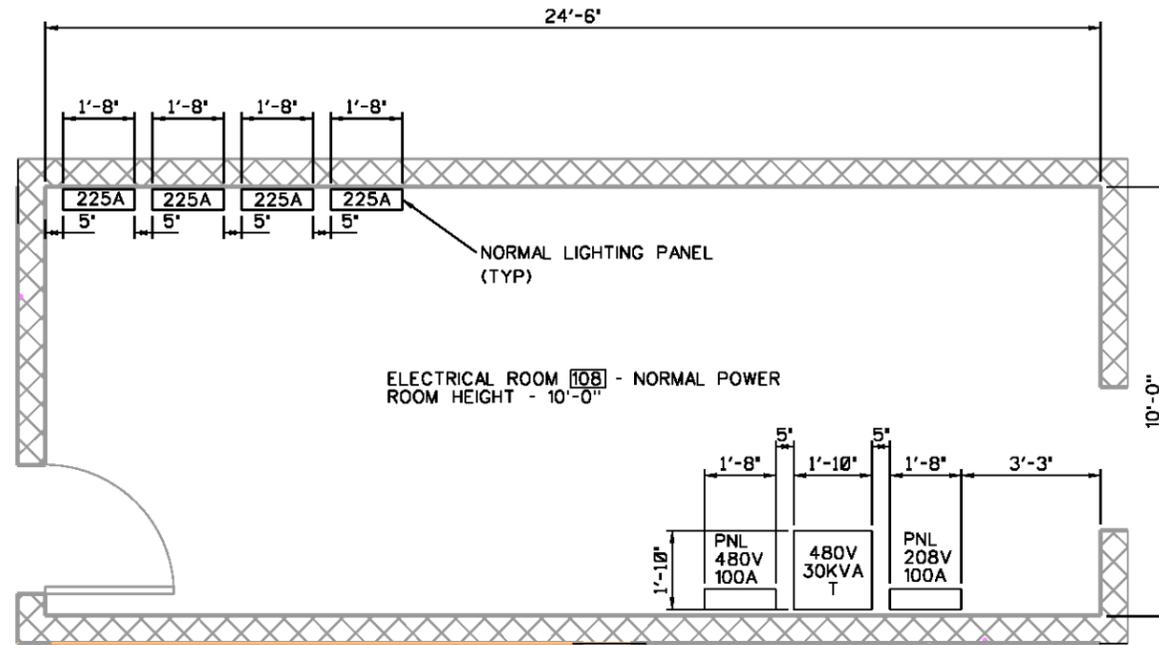
Outdoor Electrical Equipment Layout Plan  
(Appendix A Sheet E-002)



NOTES:

1. SEE DWG. NO. E-010 FOR OVERALL LOCATION ON SITE PLAN.
2. SEE DWG. NO. E-001 FOR CIRCUIT INFORMATION BETWEEN TRANSFORMER AND NORMAL SWITCHGEAR AND GENERATOR AND EMERGENCY SWITCHGEAR.

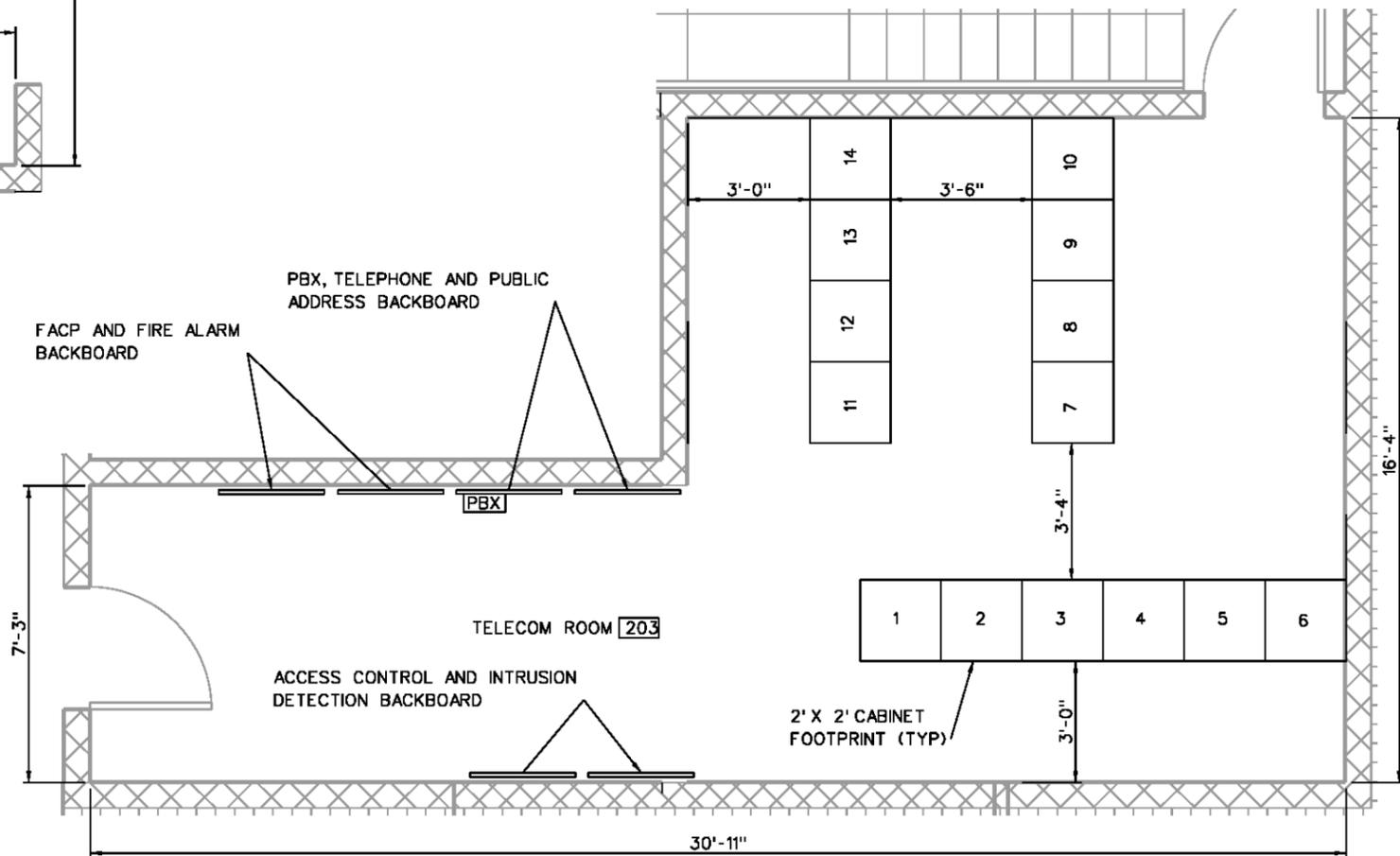
**Normal Electrical and Telecom Room Layout  
(Appendix A Sheet E-003)**



FIRST FLOOR

**TELECOM LEGEND:**

- 1 - FIBER OPTIC CABINET
- 2 - PATCH PANEL CABINET
- 3 - DATA SWITCH CABINET
- 4 - PRIMARY CCMS PLC CABINET
- 5 - LOCAL PLC I/O CABINET
- 6 - STANDBY CCMS PLC CABINET
- 7 - AM/FM REBROADCAST CABINET
- 8 - 2 WAY RADIO REBROADCAST CABINET (AGENCY/1ST RESPONDERS)
- 9 - CELLULAR REBROADCAST CABINET
- 10 - RADIO REBROADCAST CABLE TERMINAL CABINET
- 11 - CCTV DATA SWITCHES CABINET
- 12 - CCTV CABLING TERMINAL AND VEHICLE DETECTION INTERFACE CABINET
- 13 - LFC FOR DMS CABINET
- 14 - LFC FOR LUS CABINET



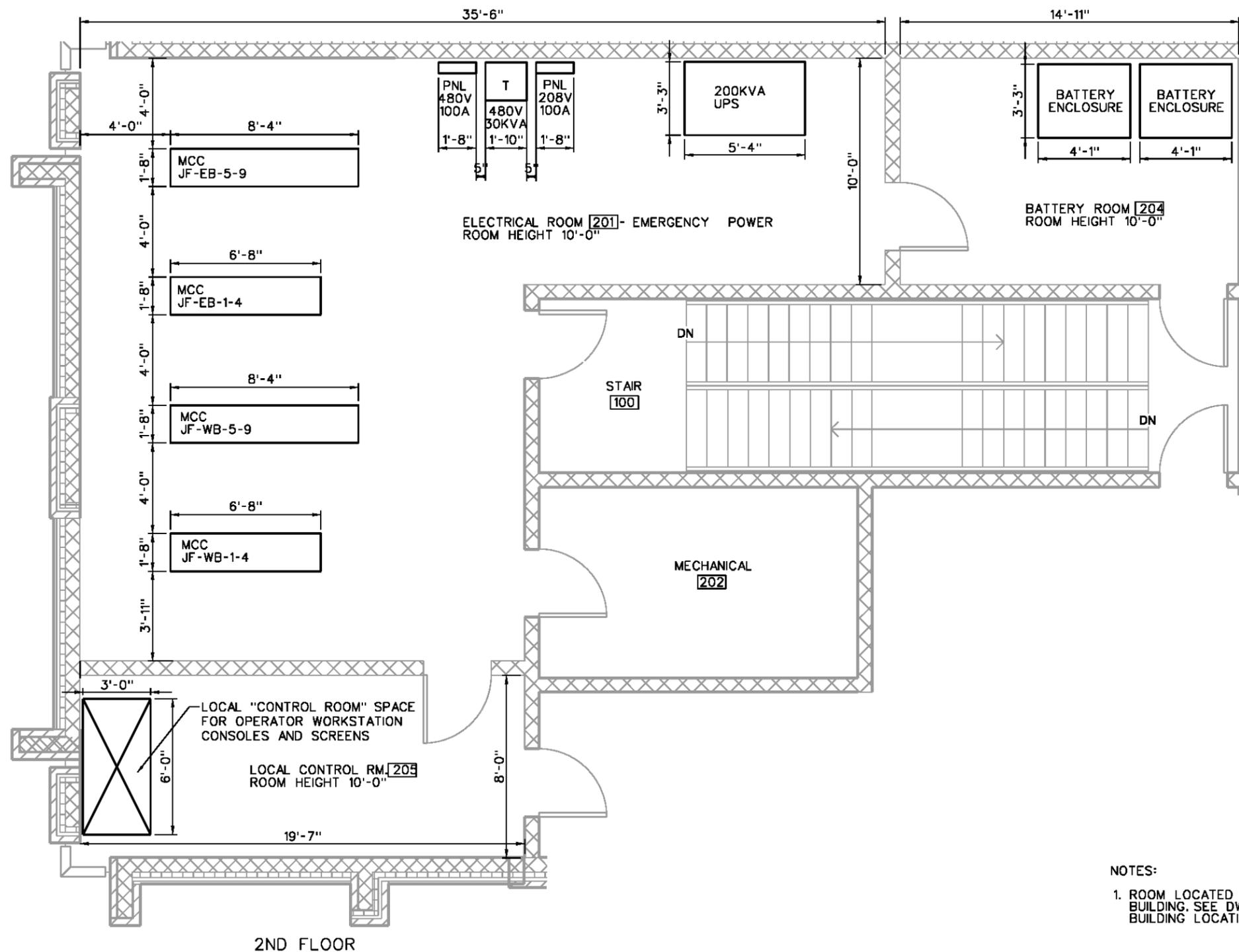
**NOTES:**

1. ROOMS LOCATED IN CONCESSION/BATHROOM BUILDING. SEE DWG NO. E-010 FOR OVERALL BUILDING LOCATION ON SITE PLAN.

**LEGEND**

- 225A - LIGHTING POWER PANEL
- T - 30KVA TRANSFORMER
- [ ] - ELECTRICAL POWER PANEL

Emergency Electrical Room Layout  
(Appendix A Sheet E-004)

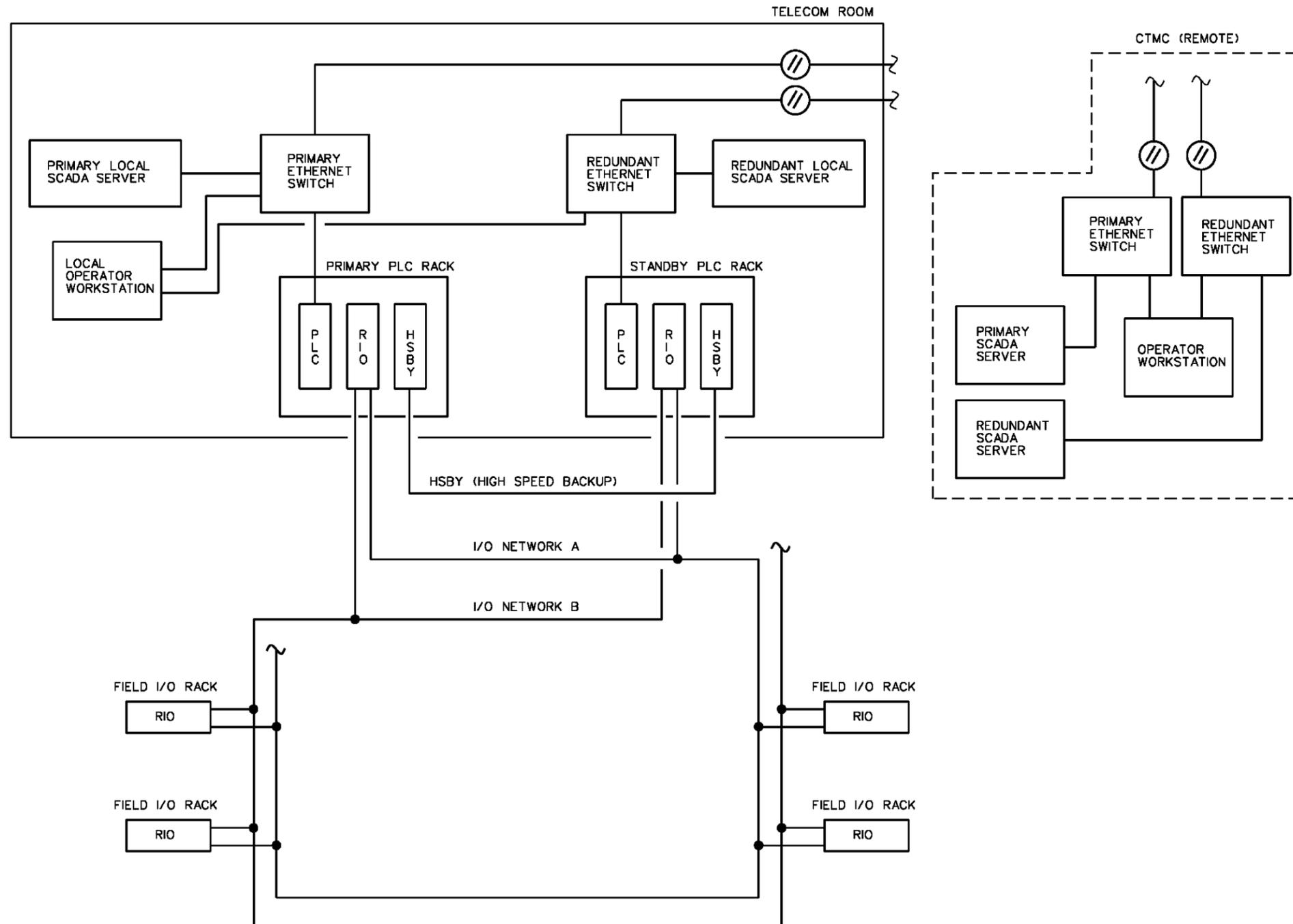


NOTES:

1. ROOM LOCATED IN CONCESSION / BATHROOM BUILDING. SEE DWG NO. E-010 FOR OVERALL BUILDING LOCATION ON SITE PLAN.

### 4.5 DATA, COMMUNICATIONS, AND EMERGENCY SYSTEMS BLOCK DIAGRAMS

Command Control and Monitoring System (CCMS) SCADA System Riser Diagram  
(Appendix A Sheet E-011)



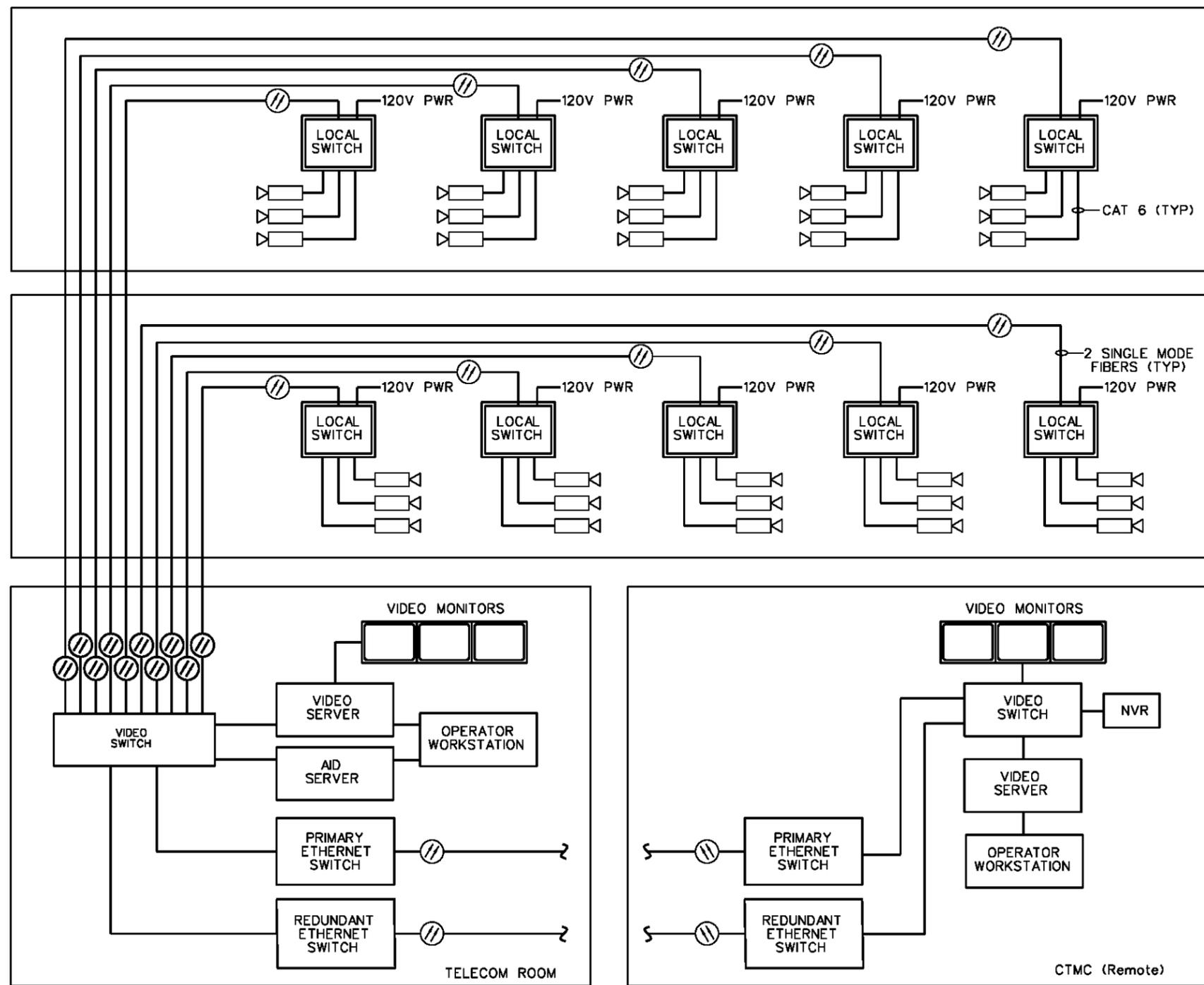
**NOTES:**

1. CCMS CONTROL AND MONITORING REQUIREMENTS FOR SUBSYSTEM INTEGRATION ARE DESCRIBED IN PROJECT AGREEMENT SECTION 12.16 OF SCHEDULE 10.

**LEGEND:**

- PLC** PROGRAMMABLE LOGIC CONTROLLER
- RIO** REMOTE I/O NETWORK COMMUNICATIONS MODULE
- HSBY** HIGH SPEED COMMUNICATIONS BACKUP MODULE

Closed Circuit Television (CCTV) System Riser Diagram  
(Appendix A Sheet E-012)



WESTBOUND

EASTBOUND

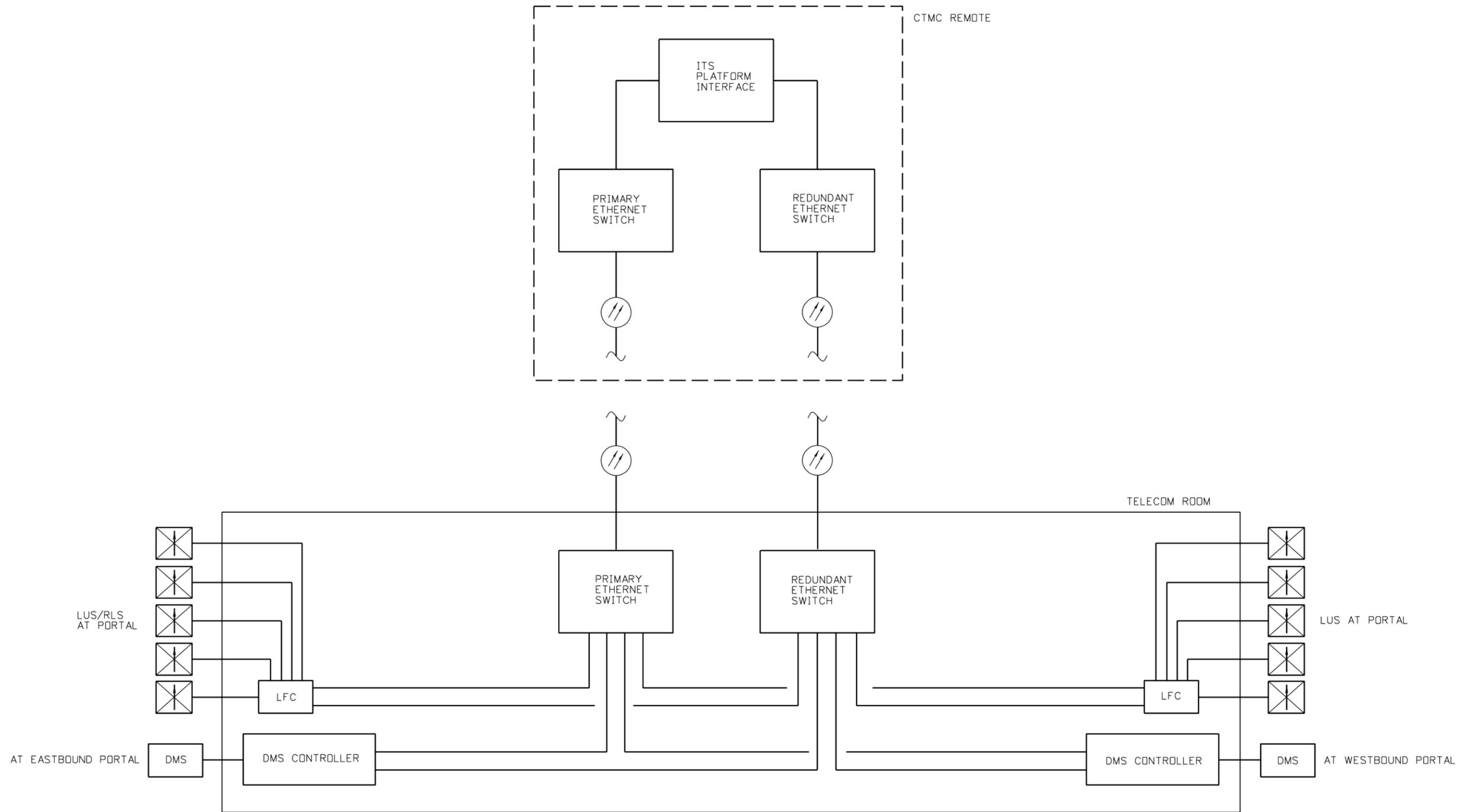
NOTES:

1. FIBER OPTIC CABLE SHALL BE ROUTED IN 1/2" C IN COVER WITH 120V POWER ROUTED IN OTHER 1/2" C

COVER CCTV

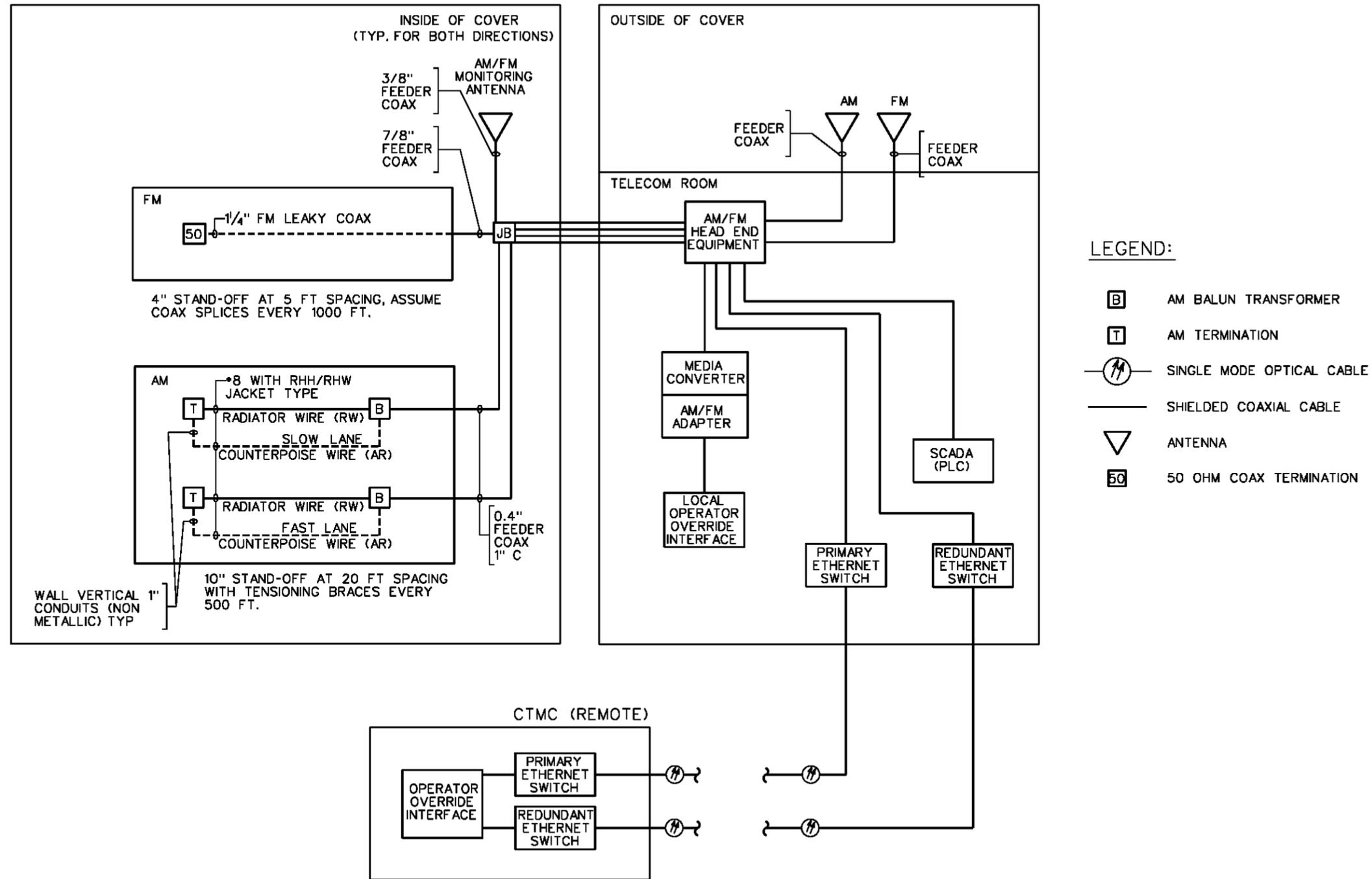
CTMC (Remote)

**Dynamic Message Sign (DMS) and Lane Use Signal (LUS) Riser Diagram  
(Appendix A Sheet E-013)**

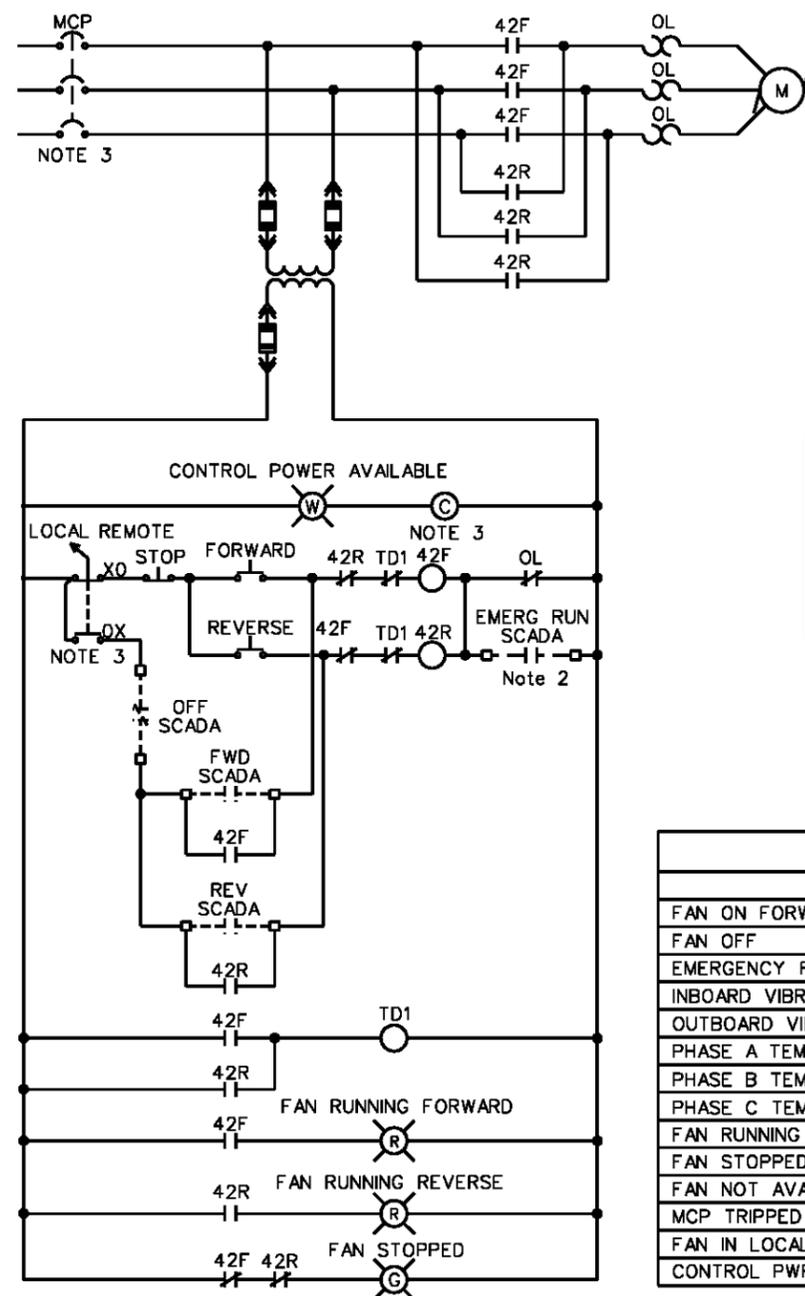




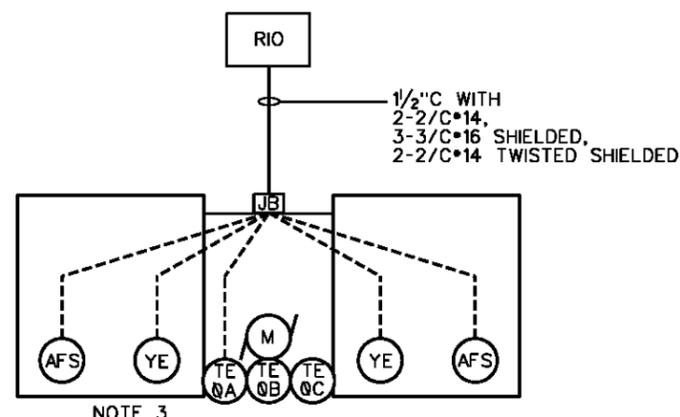
Radio Rebroadcast System Riser Diagram  
(Appendix A Sheet E-016)



### Jet Fan and Deluge System Control Schematic (Appendix A Sheet E-017)

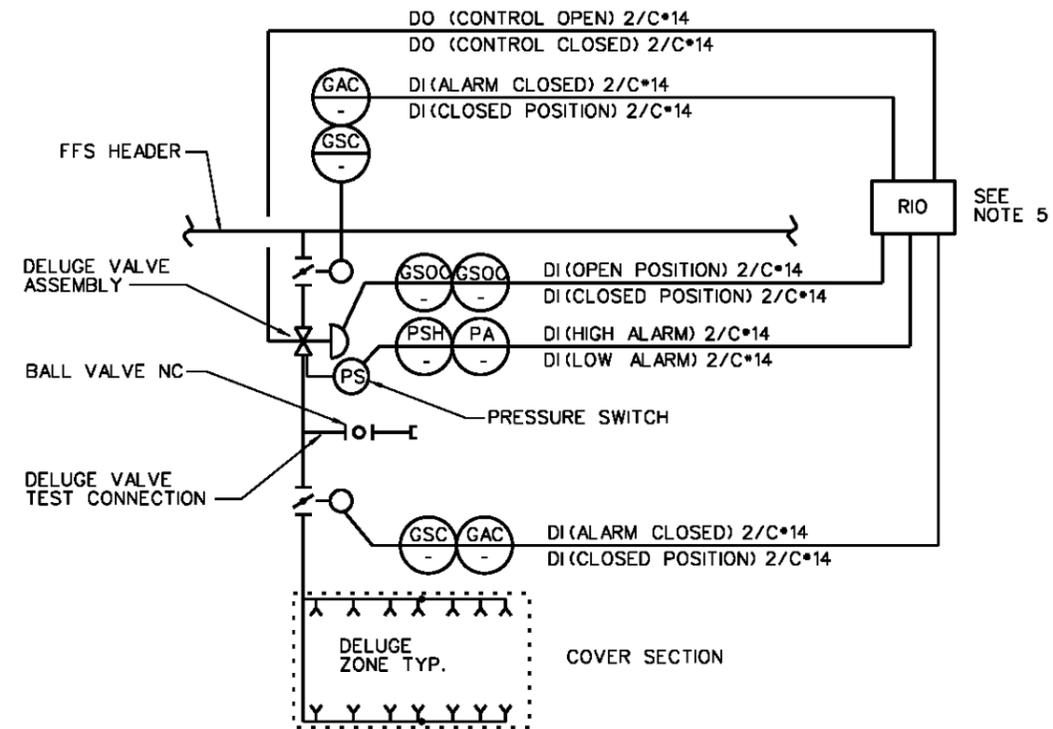


TYPICAL JET FAN MCC WIRING DIAGRAM



TYPICAL JET FAN RISER DIAGRAM

JET FAN SCADA POINTS						
	CONTROL	INDICATION	ALERT	ALARM	LOCATION	NOTES
FAN ON FORWARD	X				MCC RIO	
FAN OFF	X				MCC RIO	
EMERGENCY RUN	X	X	X	X	MCC RIO	
INBOARD VIBRATION		X	X	X	TUNNEL RIO	
OUTBOARD VIBRATION		X	X	X	TUNNEL RIO	
PHASE A TEMP		X	X	X	TUNNEL RIO	
PHASE B TEMP		X	X	X	TUNNEL RIO	
PHASE C TEMP		X	X	X	TUNNEL RIO	
FAN RUNNING FORWARD		X			TUNNEL RIO	
FAN STOPPED		X		X		NOTE 4
FAN NOT AVAILABLE		X		X		NOTE 4
MCP TRIPPED		X		X	MCC RIO	
FAN IN LOCAL		X	X		MCC RIO	
CONTROL PWR AVAILABLE		X			MCC RIO	



TYPICAL DELUGE VALVE  
SCADA MONITORING & CONTROL

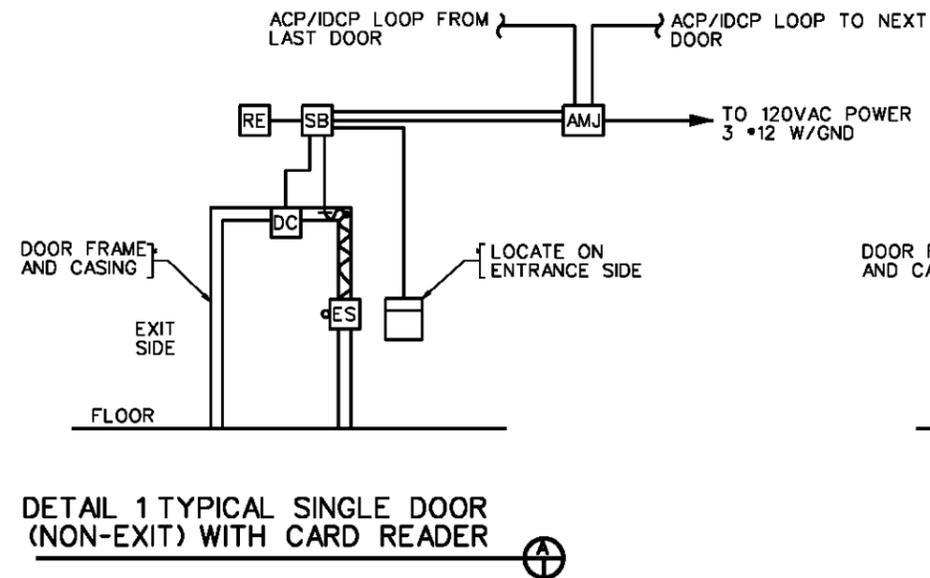
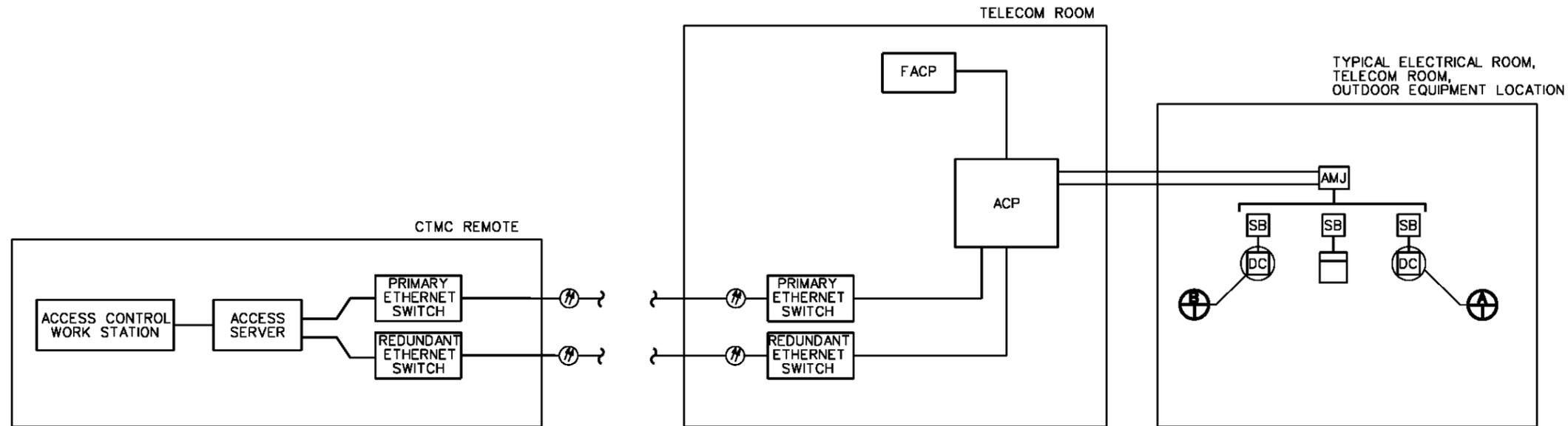
LEGEND:

- (M) JET FAN MOTOR
- (TE) TEMPERATURE SENSOR
- (YE) VIBRATION SENSOR
- (AFS) AIR FLOW SWITCH
- (JB) NEMA 4X JUNCTION BOX
- (RIO) REMOTE I/O CABINET

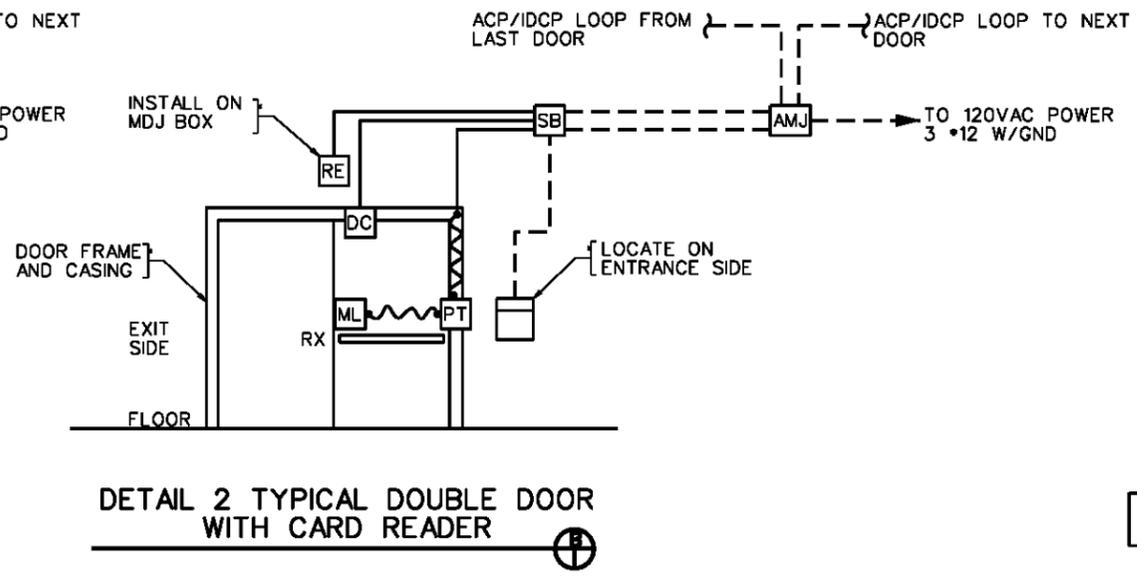
NOTES:

1. JUNCTION BOX PROVIDED WITH FAN. DASHED LINES INDICATE WIRING FROM FAN DEVICES TO JUNCTION BOX PROVIDED WITH FAN.
2. DURING AN EVENT IN THE COVER THE "EMERG RUN" CONTACT WILL BE ENERGIZED TO BYPASS OVERLOAD CONTACTS WITHIN MOTOR STARTER UNIT. SOFTWARE SCENARIOS SHALL IGNORE ALL VIBRATION, TEMPERATURE AND OTHER ASSOCIATED I/O THAT WOULD OTHERWISE SHUT DOWN THE JET FAN UNDER NORMAL OPERATING CONDITIONS.
3. PROVIDE AUXILIARY DEVICE CONTACTS OR CONTROL RELAY, WITH CONTACTS TO PROVIDE POINTS FOR CONTROL AND MONITORING FOR SCADA.
4. INDICATION IS A BOOLEAN "OR" OF DATA POINTS AND DOES NOT REQUIRE ANY FIELD WIRING TO THE RIO CABINET.
5. 2/C\*14 CABLES SHOWN ROUTED IN COMMON 1/2" FROM RIO CABINET TO EACH VALVE.

**Access Control and Intrusion Detection Riser Diagram  
(Appendix A Sheet E-018)**



**DETAIL 1 TYPICAL SINGLE DOOR (NON-EXIT) WITH CARD READER**



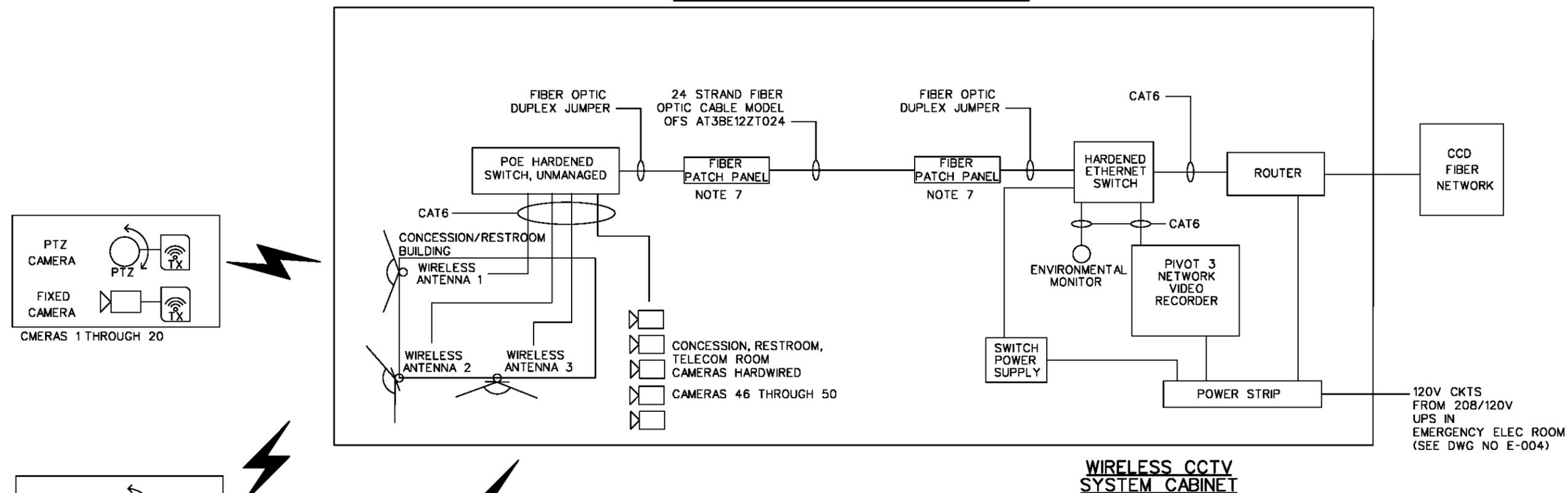
**DETAIL 2 TYPICAL DOUBLE DOOR WITH CARD READER**

**LEGEND:**

- ACP ACCESS CONTROL PANEL
- AMJ ACCESS READER MODULE JUNCTION BOX
- CARD READER
- DC DOOR CONTACT
- ES ELECTRIC STRIKE
- ML MORTISE LOCK
- PT POWER TRANSFER
- RE REQUEST TO EXIT MOTION SENSOR
- SB SECURITY TERMINAL BOX
- IC INTERCOM
- FACP FIRE ALARM CONTROL PANEL

Wireless CCTV Riser Diagram  
(Appendix A Sheet E-020)

CONCESSION BUILDING/TELECOM ROOM



WIRELESS CCTV SYSTEM CABINET

NOTES:

1. THE CONTRACTOR SHALL COORDINATE AND SCHEDULE SERVICE INSTALLATIONS AND CONNECTIONS FROM THE PROPOSED TERMINATING CABINET WITH CABLE OR LEASED LINE COMMUNICATIONS SERVICE. COORDINATE WITH CDOT FOR CIRCUIT TYPES AND LOCATIONS.
2. THE INSTALLER SHALL PROVIDE AND INSTALL ALL REQUIRED EQUIPMENT FOR THE WIRELESS CCTV COVER PARK SYSTEM.
3. INTERNET SERVICE PROVIDER TO CONFIGURE A STATIC IP ADDRESS FOR THE CABLE/DSL MODEM/ROUTER FOR REMOTE ACCESS TO THE NVR AND IP CAMERAS. COORDINATE WITH CDOT FOR IP ADDRESSES.
4. REFER TO E-019 FOR LOCATIONS OF WIRELESS CAMERAS AND EQUIPMENT.
5. 120V POWER TO CCTV CAMERA WIRELESS TRANSMITTERS PROVIDED BY EXISTING LIGHT POLES.
6. BASIS OF DESIGN IS FOR GENERAL SURVEILLANCE OF MULTI-USE FIELD, CENTRAL PLAZA, EVENT LAWN, TOT LOT AND SPLASH PAD, CONCESSION/RESTROOM BUILDING, EAST SIDE COMMUNITY SPACE, CLAYTON ST COVER AND STREETSCAPE, COLUMBINE ST COVER AND STREETSCAPE, AND 46TH AVENUE STREETSCAPE. COVERAGE BASED ON 15 FOOT CAMERA MOUNTING HEIGHT WITH A FIELD OF VIEW OF 60 FEET WIDE BY 30 FEET HIGH AT A DISTANCE OF 50 FEET FROM THE CAMERA.
7. RF STUDY TO BE PERFORMED BY CONTRACTOR PRIOR TO THE INSTALLATION OF WIRELESS CAMERA EQUIPMENT. FIBER OPTIC CABLE AND FIBER OPTIC PATCH PANELS MAY NOT BE REQUIRED BASED ON RF STUDY.

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## 5. CCMS Interface Logic and Development Plan

The detailed logic and development plan for the Command Control and Monitoring System (CCMS) software, as well as interfaces to the Cover MEP systems, integration of select elements to the Colorado Transportation Management System (CTMS) software, and interfaces to the maintenance and management systems and Project ITS, as defined in the Project Agreement Schedule 10, Section 12, will be developed during final design and documented in the Detailed Design Document (DDD). The purpose and scope of this document is to provide detailed Design information in fulfillment of the requirements for the CCMS system deployed for the Cover.

The DDD provides system level overview and architecture descriptions, detailed design descriptions, and assembly/installation drawings. The DDD describes the system design in sufficient detail to assure that, as designed, the system satisfies all requirements, specifically showing how the design aligns with technical requirements contained within the Requirements Traceability Matrix. This document also serves as a technical reference for system engineers, software developers, and support personnel involved in the implementation, administration, maintenance, expansion, and enhancement of the CCMS throughout the life of the Cover.

The contents of the DDD include the following major topic sections, based on development for similar past projects:

- **Section 1 Introduction:** Describes the purpose and scope of the document, and provides helpful information for using the document.
- **Section 2 System Overview:** Establishes overall system design goals, identifies major system functions, describes physical deployment of major hardware elements and logical deployment of major software elements, defines system operating modes and transitions, and describes the fault tolerance features of the system (reliability, redundancy, fault detection, failover).
- **Section 3 Hardware Architecture:** Identifies and specifies the CCMS equipment, defines physical relationships among equipment elements, and specifies internal and external physical/electrical equipment interfaces.
- **Section 4 Network Architecture:** Describes the physical and logical configuration of the CCMS LAN architecture.
- **Section 5 Software Architecture:** Identifies and describes software subsystems, components and databases, and shows overall logical relationships, including the structure of data networks. Custom software functions requiring standard module modification or new module development are also described.
- **Section 6 Application Configuration:** Describes CCMS configuration elements, configuration requirements sources, configuration implementation methods, and the design document provided as a supplement to DDD
- **Section 7 System Performance:** Presents analyses and calculations of expected system resource utilization and performance of the servers, workstations, and networks relative to CCMS System Requirements Specification.
- **Section 8 System Maintenance and Support:** Summarizes the maintenance and support activities required to sustain effective operation of the system through its supportable design life.

- **Appendix A System Drawings:** Includes hardware assembly and installation drawings, depicting in detail the equipment locations, rack layouts, installation arrangements, equipment interconnections, and cable schedules.
- **Appendix B Top Level Configuration Tables:** Includes the top-level configuration tables for each system interface.
- **Appendix C Software Design Descriptions:** Contains the Software Design Description (SDD) documents, describing the design of software components that require development, modification, or enhancement to meet the CCMS requirements. Each description shows the functional relationship of software components, defines data stores, describes data interfaces, and defines internal processing.
- **Appendix D IP Address Allocations:** Contains a list of the network IP Address assignment used as the basis of the CCMS design.
- **Appendix E Data Warehouse Tables:** Provides a listing of data warehouse tables and data fields.

## 6. Proposed Ventilation System

The ventilation system is a longitudinal system, directing vehicle emissions, or smoke and heat from a vehicle fire, along the length of the Cover section in the direction of vehicle travel. Mechanically induced airflow is created in the Cover by means of jet fans installed near the entry portal at both ends of the Cover. The ventilation system is activated in response to high pollution levels, or during a fire emergency.

### 6.1 SYSTEM REQUIREMENTS

KMP designed the ventilation system to achieve the following general objectives:

- Monitor air quality (AQ) inside the Cover and, when necessary, generate airflow using fresh air to dilute pollutant concentrations to the allowable levels established within the design criteria.
- Disperse vitiated air out the portal.
- In the event of a fire incident, manage the movement of smoke and heat to establish a tenable egress path for occupants, and access for emergency services personnel.
- Provide suitable conditions for maintenance operations.

### 6.2 DESIGN CRITERIA

KMP has developed the following ventilation design criteria based on the Project Agreement.

### Ambient and Background Conditions

Quantity/Parameter	Details	Source
<b>Temperature</b>	Conduct design based on an ambient temperature of 100 deg F	PA 12.13.6.a
<b>Pressure</b>	84,465 Pa (Cover elevation is 5,250 ft. above sea level)	PA 12.13.6.b and Reference 6
<b>Wind</b>	Worst case headwind not exceeded 5% of the time (95th percentile), wind magnitude is determined to be approximately 6 m/s, or a portal pressure of 20 Pa.	PA 12.13.6.c and Reference 7
<b>Background pollution</b>	CO = 5 ppm NO <sub>2</sub> = 0.08 ppm The NO level will be based on NO <sub>2</sub> /NO <sub>x</sub> = 0.1	Reference 7
<b>Pollution levels in the Cover</b>	CO = 120 ppm NO = 15 ppm NO <sub>2</sub> = 1 ppm PM = 0.007 m <sup>-1</sup>	PA Table 12-1

### Fire Design Parameters

Quantity/Parameter	Details	Source
<b>Potential FHRR</b>	Maximum potential Fire Heat Release Rate (FHRR)	120 MW PA 12.14.3.a
<b>Convective FHRR</b>	The ventilation system is designed based on a 120 MW FHRR with the Fixed Firefighting System (FFFS) operating to provide cooling. The resultant FHRR in the PA is 30 MW; this is verified with Computational Fluid Dynamics (CFD) as detailed below.	30 MW PA 12.14.3.c
<b>Critical velocity</b>	With no FFFS in operation, critical velocity (V <sub>c</sub> ) is computed based on the NFPA 502 equations for a two-lane configuration. The two-lane configuration approach is based on published conclusions [Reference 7], good agreement of CFD results with the NFPA 502 equations at large FHRR values [Reference 5], and a CFD analysis of the critical velocity for a configuration 32-m wide and 6-m high tunnel (case reference C70-01-04) which demonstrated a critical velocity in the range of 3.0 m/s to 3.5 m/s.	Analysis
<b>FFFS impact and critical velocity</b>	A CFD model with an FFFS operating at 0.15 gpm/ft <sup>2</sup> was conducted (WBP-02-60). The model had an FHRR of 100 MW. An upstream velocity of 2.5 m/s was able to control smoke. According to the simulation the energy balance downstream of the fire was equivalent to approximately 50% absorbed by water (50 MW), 34% radiation (34 MW), and the remainder 26% (26 MW) was transported via conduction and convection. Temperature rise due to fire at the exit of the Cover was 42 degrees C (exit temperature 62 degrees C, based on an ambient condition in the analysis of 20 degrees C), equating to a convective heat flow of approximately 25 MW. The parameters of the 1D model were adjusted as follows to account for this and achieve a temperature rise approximately of the same value: FHRR = 30 MW, convective heat transfer coefficient at the walls (0.01 kW/m <sup>2</sup> /K, typical range 0.01-0.02 kW/m <sup>2</sup> /K), 0% radiative heat fraction, and critical velocity of 2.5 m/s.	Analysis
<b>Pressure drop due to fire</b>	$P_1 - P_2 = \frac{\rho_1 V_1^2}{2} \left[ \frac{2T_2}{T_1} - 2 \right]$	SES equations



### 6.3 JET FANS/MOTORS AND JET FAN SUPPLIER

The following section identifies typical jet fan parameters. Since no specific fan/motor manufacturer has been identified at this time, the selection of a particular manufacturer will occur after Project award. Potential qualified fan manufacturers may include Clarage Fan Company, Witt and Sohn, and Howden North America.

The following jet fan parameters, based on preliminary analysis and design, reflect minimum requirements. KMP will confirm the jet fan parameters during final design:

- Fan characteristics:
  - Thrust = 390 lbf
  - Outlet velocity = 6,908 fpm
  - Power (motor) = 100 horsepower (hp)
  - Temperature rating = 482 degrees F
  - External diameter = 62 inches (in)
- Nine jet fans per bore (total of 18). Allows for one fan to be out of service.
- Fans are configured at the entry portal of each bore (eastbound and westbound), evenly spaced over the width of the roadway with 2-ft.-9-in. minimum spacing from the outer walls.
- Total ventilation capacity accounts for the beneficial impacts of the FFFS on smoke management:
  - FFFS water application rate 0.15 gpm/ft<sup>2</sup>
  - Reduction in critical velocity for smoke control due to the FFFS operation and subsequent cooling
  - Reduction in heat impacts downstream due to FFFS operation and subsequent cooling
  - Approximate convective heat portion controlled by the ventilation = 30 MW
- A preliminary one-dimensional calculation [Reference 8] was conducted for fan performance, and CFD analysis for interaction of the FFFS and ventilation (refer to Section 14) included:
  - Friction impacts (wall friction, lighting, cameras, signs, and vehicles)
  - Adverse external wind (as the Project Agreement requires)
  - Pressure drop/loss (due to the fire)

The table below presents the results of the analysis:

#### CFD Analysis Results

Case	Details and results		Other notes
<b>C70-02-14</b>	Downhill scenario, accounting for the FFFS, FHRR 30 MW, 0% radiation, adverse portal wind (pressure coefficient of 0.8), wall friction factor 0.04. All other parameters as per the case above, with no FFFS operating (C70-02-13). Eight jet fans required + one for redundancy Based on fan parameters as stated above.	1 (131 ft.) : 539 fpm 2 (329 ft.) : 543 fpm 3 (494 ft.) : 553 fpm 4 (821 ft.) : 561 fpm 5 (920 ft.) : 551 fpm Vc = 492 fpm	Uses conservative system sizing parameters for portal wind and wall friction.

## 6.4 MONITORING EQUIPMENT

Monitoring equipment in the ventilation design includes AQ monitoring equipment and jet fan instrumentation.

**Air Quality Monitoring System:** The ventilation design for AQ monitoring incorporates the conditionally approved KMP ATC 66 using a performance standard in lieu of the proposed prescriptive requirements with a total of four monitoring locations, two in each bore. One monitor location is positioned near the exit portal, the other positioned approximately at the midpoint within the Cover. The AQ monitors are installed in-situ and provide continuous monitoring of carbon monoxide, nitrogen oxide, nitrogen dioxide, and visibility. The monitors also measure air speed, air flow direction, and temperature as per the conditions of the ATC approval. The AQ monitors report via the Supervisory Control and Data Acquisition (SCADA) system to the CTMC. When emission levels exceed preset limits, the ventilation system is activated.

**Fan Condition Monitoring:** Each jet fan will be equipped with sensors to monitor key equipment conditions: fan vibration and motor winding temperature. When these two critical conditions exceed preset limits, the SCADA system will send an alarm to the CTMC.

## 6.5 INTERFACES TO OTHER SYSTEMS

Interfaces include:

- **Structural design:** jet fan assembly mounting
- **Cover systems such as lighting, FFFS, signage, CCTV, variable message sign (VMS):** impacts ventilation system performance (number of fans) due to “friction factor” parameter
- **Control Center (CTMC):** initiate jet fan operation (automatic/manual) in the event of a fire or high emission levels
- **Traffic clearance envelope:** space proofing of fans and components
- **Electrical:** jet fan power and controls

## 7. Proposed Fixed Firefighting System

### 7.1 PROPOSED FIXED FIREFIGHTING SYSTEM (FFFS) TYPE

The proposed Cover FFFS is an automatic deluge sprinkler system providing water spray capability over predetermined zones, and covering the entire roadway surface area. The water spray is characterized as standard spray, providing effective suppression and control for the variety of fuel types, fire geometries, and shielding conditions possible in the Cover environment. Deluge zone lengths meet the requirements of the Project Agreement. KMP proposes using standard sprinkler system components, piping, valves, and appurtenances as much as possible for ease of maintenance over the life of the Cover.



## 7.2 BASIS OF DESIGN

The Project Agreement requires installation of an FFFS in the Cover section. The FFFS is a multi-zone deluge sprinkler type system. A linear heat detection system automatically initiates the FFFS within the Cover in response to fires detected via the traffic monitoring or other notification systems. The Cover operator can also remotely initiate the FFFS from the CTMC. In addition, trained firefighting personnel can manually operate the FFFS from the local control room.

## 7.3 DESIGN CRITERIA

The fundamental design criteria document used in the conceptual design of Cover fire protection systems is the Project Agreement, Schedule 10, Section 12.14. The primary national standard used for FFFS in road tunnels is *NFPA 502, Standard for Road Tunnels, Bridges, and Other Limited Access Highways*, 2017 Edition. Specific requirements for the deluge system are also taken from the current edition of *NFPA Standard 13, Standard for the Installation of Sprinkler Systems*. The AHJ for the Project is the City of Denver Fire Department, which has a review role during the final design and commissioning of the system.

## 7.4 FFFS REQUIREMENTS

Based on municipal water supply hydraulic data, a single water supply is required to meet the flow and pressure requirements of the system. Key features of the system are:

- 12-in. water supply connection at Steavenson Place. Water supply is provided with a 10-in. backflow preventer enclosed in an accessible vault to be located during final design.
- Continuously charged supply piping network consisting of a 12-in. underground main header connected to the single water supply at Columbine Street.
- 3,750 gpm maximum water demand.
- Water application density of 0.15 gpm/ft<sup>2</sup>.
- A system of 10 individually controlled, 100-ft. long deluge zones for both the eastbound and westbound roadways.
- Water supply demand based on capacity to activate any two zones simultaneously.
- A normally dry zone supply piping network consisting of 6-in. maximum discharge piping downstream from each deluge zone control valve, distributed to supply branch pipelines over roadway, consisting of pendant sprinkler nozzles running parallel to the roadway near ceiling height.

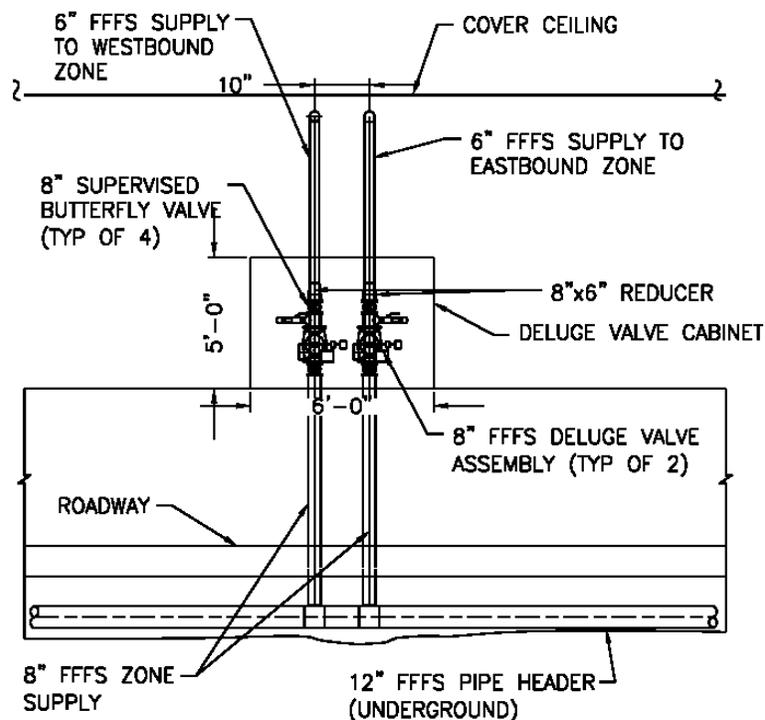
## 7.5 WATER SUPPLY

Water is delivered to the Cover FFFS through an underground (buried) pipe network. Based on coordination, Denver Water Department gave preliminary concurrence for a direct connection to the 36-in. water transmission line along Columbine Street adjacent to the west portal. The water supply to the FFFS system has many benefits, including a reduced number of water connections needed to supply the system, less piping and material needed, and reduced construction and maintenance costs. Having the FFFS system connected to such a large transmission pipeline allows the standpipe system to be unaffected by the additional water demand. Results of the preliminary hydraulic and fill time calculations provide the basis for the pipe sizes and configuration of the system outlined in the preliminary design.

The FFFS system is connected to the 36-in. municipal water supply line with a single 12-in. water main. The 12-in. water main connection is routed to an accessible vault, located at grade, where it connects to the FFFS through a backflow preventer as required by Denver Water Department. The specific size and location of the vault is determined during final design. A 12-in. water supply main from the vault to the FFFS within the Cover will be buried below the I-70 roadway, near the center dividing wall of the eastbound bore.

Below is an elevation view showing the proposed configuration of the FFFS piping, and a typical individual deluge zone valve arrangement within the Cover section.

**Typical FFFS Deluge Valve Layout**





## 7.6 PRELIMINARY FFFS HYDRAULIC MODEL

Preliminary hydraulic analyses were performed to determine flow and pressure demands on the municipal water supply, and to estimate preliminary sizes for the FFFS piping, valves, and other components. The hydraulic analyses are based on hydraulic data provided by Denver Water Department, and were performed using Engineered Software's Pipe-Flow Professional 15 program. Pipe-Flow is capable of performing complex open flow hydraulic calculations for a variety of system types and design conditions. It uses the Hazen-Williams formula as required by NFPA 13.

Per the requirements of the Project Agreement, the FFFS must be designed so that any two of the deluge zones can be activated simultaneously. Each deluge zone is modelled to provide coverage of the full width of the roadway, at an operating density of 0.15 gpm/ft<sup>2</sup>.

Based on the above requirements, the required water demand for the FFFS is 3,750 gpm. The analysis determined that the pressure and flow required at the most remote head is 23 psi at 52 gpm. The required flow and pressure meets NFPA 13, using the operating basis for the extended open pendant sprinkler head (TYCO model TY5237 K=11.2), for Group I Ordinary Hazard (0.15gpm/ft<sup>2</sup>). The total coverage of these heads is 16'x16' or 256 sq.ft.

Inputs/Assumptions:

- Water supply hydraulic residual data was not available for the Denver Water Department 36-in. transmission line at Columbine Street. The hydraulic input data was therefore based on the largest measured static pressure and flow data received from Denver Water Department for hydrants in the area of the Cover between Columbine Street and Clayton Street.
- The hydraulic input data used in this analysis was taken at 48<sup>th</sup> Avenue and York Street (*Hydrant 12132 - Static 87 psi and residual 62psi at 4278 gpm*). Use of this data is an appropriate assumption since this waterline is fed from the 36-in. transmission line (as are all waterlines in the area).
- To be conservative, a 10 psi reduction in static pressure was applied since the time of day that these flows were recorded is unknown. Therefore, the final static pressure used in the analysis is 77 psi. The analysis reasonably assumes that there is enough flow for the entire FFFS without a drop in pressure due to the connection to a large volume of water.
- The system supply pressure drop across the required backflow preventer is assumed to be 11.55 psi at 3750 gpm. Pressure drop curve data used is based on a Watts Series 709DCDA 10-in. double check backflow preventer.
- The system supply pressure drop across the deluge zone control valve is assumed to be 5.5 psi at 2,000 gpm using a K Value of 3.4. Losses due to all system check valves, elbows, and fittings are assumed using industry standard K values provided in Pipe-Flow.
- All underground piping is assumed as A-53 ductile iron pipe, and above ground piping is assumed as galvanized Schedule 40 Carbon steel pipe. The C-values for the piping used in the analysis are 140 and 120, respectively.
- The deluge sprinkler heads chosen for the analysis have a K value equal to 11.2.

- All piping elevations and lengths were based on civil/structural preliminary drawings. All elevations will be confirmed during final design.

### 7.7 PUMPING SYSTEM

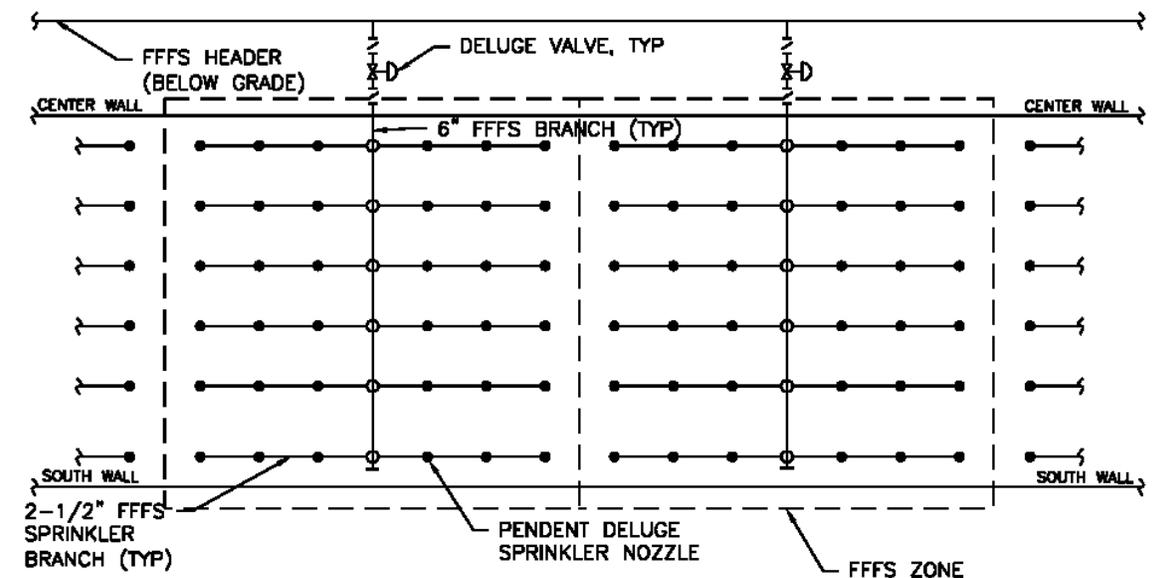
The results of the hydraulic model show that costly and complex fire pumps are not required because the municipal water supply is sufficient to meet the flow and pressure demand of the FFFS. This Project Agreement requirement is therefore not provided in the proposed design.

### 7.8 PIPELINE SYSTEM

Underground (buried) piping material for the FFFS system from the municipal utility 36-in. water supply to each deluge valve feed riser is a 12-in. ductile iron main pipeline with restrained joint fittings. This material has good hydraulic performance characteristics, and a cement lining with a high tolerance against corrosion. The use of restrained joints eliminates the need for thrust blocks, and significantly reduces the possibility of pipeline failure.

Exposed branch piping downstream of each deluge valve and throughout the over-roadway distribution network is hot-dipped galvanized steel with grooved couplings. These materials are commonly used in sprinkler application for ease of construction and installation, corrosion resistance, and durability. While galvanized coatings reduce corrosion development in piping systems, this network of FFFS piping systems is normally dry, which can pose a greater risk for internal corrosion than wet pipe systems due to the abundance of air/oxygen in the system while the pipe is empty. It is therefore critical that the system is designed to be completely and effectively drained after use, and that all dry piping is sufficiently sloped to assure good drainage.

FFFS Zone Piping System Layout





The climate in Denver dictates that all water filled piping exposed to the outdoors is protected from freezing. This can be done by limiting exposure to outdoor temperatures or by employing a mechanical pipe heating system (heat tracing/insulation). Since heat tracing systems require regular maintenance and testing, and have a limited lifetime, every effort was made to limit the amount of heat tracing and insulation required in the Cover's FFFS design. Our approach is to reduce wet pipe exposure by keeping it buried as extensively as practical, and to minimize the length of wet riser piping between the buried supply main and each individual deluge valve. Since all network piping downstream of the deluge valves (zone distribution piping up to and over the roadway) is normally dry, no freeze protection is required for those sections of pipe.

## 7.9 DELUGE CONTROL VALVES

Deluge sprinkler systems discharge water through a system of open spray nozzles simultaneously over a given coverage zone. In this application the zones are specified to be 100 ft. in length longitudinally, covering the full width of the roadway. Water is supplied from the public utility in a wet pipe arrangement to 20 automatic deluge valves. Deluge valve actuation allows water to discharge into the normally dry distribution piping network (piping over the roadway), and through the open spray nozzles. Typically, control of the deluge valve is automatic, responding to inputs from a fire detection system (see Section 13 for further detail). For the Cover, both automatic and manual control of the deluge valve are provided, so that a deluge valve can also be opened by a signal from the local fire alarm control panel (FACP) or from the CTMC. Zone actuation is limited to two zones at any given time.

Traditional fire protection deluge valves featured a mechanical or electrical activation device that allowed remote actuation; however, such valves then have to be closed manually directly at the valve itself. This type of operation is impractical for this Cover system because of the need for flexibility of operation should the initial zone activated not be correct or other operational adjustments are needed as the fire develops. KMP's design includes deluge zone control valves with a remote on/off function as well as a local on/off function. This allows system adjustments to be made by the Cover operator remotely at the CTMC, and/or by firefighting personnel at the scene.

Deluge valves are provided with test-isolation connections that allow regular demonstration of system availability, without causing significant disruption to traffic. NFPA requires annual testing of deluge systems. In typical arrangements, this requires tunnel closures to facilitate deluge valve activation, resulting in drenching a given section of tunnel (or covered roadway). In contrast, our proposed test-isolation connection isolates piping downstream of the deluge valve and routes water flow to a test hose connection. This allows full activation tests of the system by both local and remote means, and verifies that the deluge valve opened on command. The inspector can observe deluge valve function by verifying water flow to the test connection. This approach has been accepted by AHJs on other projects as a substitute for full discharge testing, and will be pursued for the Cover FFFS system.

Deluge valves, hose valves, supply piping, and other components of the fire protection system are protected from mechanical damage, fire damage, or tampering. It is anticipated that each deluge valve cabinet will contain two valve assemblies to minimize penetrations in the center dividing wall, and reduce visual impact of the system. Each deluge valve can be isolated from the main water supply by isolation valves on either side to allow for maintenance. Isolation valves include tamper switches to alert CTMC operations if the isolation valves have been closed.

## 7.10 DELUGE NOZZLES

Deluge nozzles used in the Project will be off-the-shelf type sprinkler heads, similar to those used in buildings, supplied without the fusible link to allow for deluge applications. All heads are pendant type to ensure complete drainage, and conform to Group I Ordinary Hazard occupancy (0.15 gpm/ft<sup>2</sup>). Extended coverage heads are proposed to reduce the extent of piping. The spacing of the deluge nozzles was preliminarily determined based upon the manufacturers published data for coverage, pressure, and the geometry of the covered area at their respective locations. The pendant sprinkler heads each cover a 16-ft. x 16-ft. area. The entire deluge system distribution piping network and nozzles will be located outside the vehicle clearance envelope.

## 7.11 LOCAL CONTROL FACILITIES

The FFFS system should not require any pressure assistance from the fire department pumper trucks, based on the results of the preliminary hydraulic analysis. However, fire department connections to the FFFS will be provided at each portal to allow the fire department pumper truck to pressurize the system manually if needed.

The local FACP for the Cover FFFS system is located in the Cover concession/restroom building. Room location will be coordinated with the AHJ during final design.

## 7.12 ELECTRICAL EQUIPMENT

Emergency electrical circuits are distributed throughout the Cover to power each deluge valve and the FFFS heat trace system. Monitoring and control of the deluge valves, tamper switches, and heat trace elements are via the SCADA system.

## 7.13 FFFS CONTROL SYSTEM

The FFFS system is equipped with deluge valves capable of being operated either automatically or manually. Manual control is available both locally and remotely (at the CTMC). Semi-automatic operation of the deluge valves occurs when the linear fire detection system in the Cover section activates. This detection system activation signals the FACP as to the specific location of the fire within the Cover. The FACP alerts the Cover operator at the CTMC of a fire and relays the fire location information to the system control software, which is preprogrammed to operate the appropriate two deluge zones for that specific fire location. The control software system is programmed with a short time delay (adjustable) to allow for the Cover operator to abort the deluge valve release if the fire is not confirmed.



Manual operation of the deluge valves is available remotely to the Cover operator located at the CTMC. The system control console allows the Cover operator to open or close any deluge zone valve individually or as preprogrammed zones specific to a fire location. Remote operation is also available from the local FACP, located in the Cover concession/restroom building.

Manual operation of each individual deluge valve is also available locally from the roadway within the Cover. The valves will include pressure switches that will confirm to the operator the actual valve position (open or closed). The deluge valves will be located in secure recessed cabinets along the center wall to allow onsite control by fire department or maintenance personnel.

### **7.14 INTERFACES TO OTHER SYSTEMS**

The FFFS interfaces directly with the SCADA system to provide deluge valve control and monitoring. The SCADA interface allows for the FFFS to indirectly interface with the linear heat detection (LHD) system. This indirect interface occurs through the interfacing of the fire alarm control panel with the CTMC operating software. The CTMC operating software contains pre-programmed modes of control for the FFFS, depending upon the location of the fire incident as reported by the FACP.

### **7.15 PROPOSED FFFS SUPPLIER**

KMP will include this topic in the Final Cover Design Baseline Report.

## **8. Fire Detection and Alarm System**

An automatic Fire Detection and Alarm System (FDAS) will be installed in accordance with the provisions in NFPA 72, including fire alarm control panels. The Cover fire detection system incorporates linear heat detection technology, and is capable of locating a vehicle fire to within a longitudinal distance of 25% of the length of a single FFFS zone. The fire detection system is integrated with the FFFS and the Cover Ventilation System (CVS) to ensure effective and timely response to a fire to meet the performance requirements for the FFFS and other safety systems.

Manual pull stations are placed along the Cover roadway area with spacing in accordance with NFPA 502. Ancillary spaces, such as the telecom room, normal electrical room, and emergency electrical room are provided with automatic detection devices connected to the FACP.

## 9. Standpipe System

### 9.1 STANDPIPE SYSTEM TYPE

This section describes the KMP standpipe system as presented to the Department in conditionally approved ATC 71. A semi-automatic dry fire standpipe system is proposed to provide a pre-pressurized water supply for firefighter use at designated points along the roadway within the Cover. The proposed standpipe system is a Class-I system as defined by NFPA 14, with 2.5-in. fire hose valves located in recessed hose valve cabinets spaced at 200-ft. intervals along the length of the Cover. The hose valve cabinets are alarmed to detect tampering.

### 9.2 BASIS OF DESIGN AND DESIGN CRITERIA

The fundamental design criteria used in the conceptual design of the Cover fire protection systems are from the Project Agreement, Schedule 10, Section 12.20. The primary national standard for fire standpipe systems is *NFPA 502, Standard for Road Tunnels, Bridges, and Other limited Access Highways*, 2017 Edition. Specific requirements for the standpipe system are taken from the current edition of *NFPA 14, Standard for the Installation of Standpipe and Hose Systems*. Additional design input may come from the AHJ, which has a consultative role during final design and commissioning of the standpipe system.

### 9.3 STANDPIPE REQUIREMENTS

The AHJ has stated that the standpipe system must be capable of being fed from a hydrant located adjacent to the roadway at both ends of the Cover section. Key NFPA requirements for the standpipe system are:

- 750 gpm maximum standpipe demand and 100 psi minimum residual pressure at the most remote hose valve(s).
- Hose valve stations located a maximum 275 ft. apart, such that no location within the protected area is more than 150 ft. from the standpipe connection.
- Two remotely located fill points with fire department connections and municipal hydrants.
- Maximum fill time less than 10 minutes.

### 9.4 WATER SUPPLY AND STANDPIPE HYDRAULIC MODEL

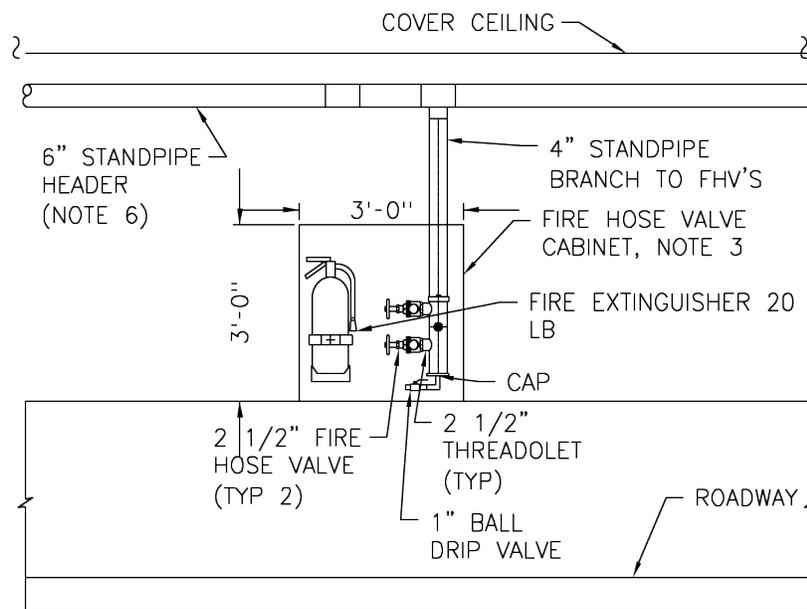
The minimum demand for the standpipe system is defined in NFPA 502 and NFPA 14. The system must be capable of providing 750 gpm at 100 psi residual pressure at the hose valve station, which is the most hydraulically remote station in the system.

The standpipe system requires connections for fire department pumper trucks at either Cover portal to ensure the adequate pressurization of the system. The fire department pumper trucks are able to connect to a hydrant located in the median immediately outside each portal. The portal hydrants connect to 6-in. municipal water services located at Columbine Street and Clayton Street for the west and east portals. Specific locations of hydrants will be coordinated during final design.

The proposed standpipe system includes a semi-automatic fill feature with a standpipe deluge valve that allows the normally dry standpipe to be filled either locally at each Cover entrance portal, or remotely opened by an operator via SCADA. The water supply provided to fill the standpipe is from the 12-in. FFFS supply. The deluge supply valve is located in a secure cabinet at the west portal, with valve control panels located at both the west and east entrance portals for local activation by the fire department. The results of the preliminary hydraulic and fill time calculations provide the baseline for the pipe sizes and configuration of the system.

The main header of the standpipe system is located near the ceiling of the Cover adjacent to the center dividing wall on the westbound side. The figure below is an elevation view of the wall separating the eastbound and westbound roadways within the Cover section, and shows the proposed configuration of the standpipe piping at a typical hose valve cabinet.

### Standpipe at Hose Valve Cabinet



Preliminary hydraulic analyses were performed to determine flow and pressure demands on the municipal water supply, and to establish preliminary fill time estimates based on hydraulic data provided by Denver Water Department. The fill time analyses were performed using Engineered Software's Pipe-Flow Professional 15 program. The standpipe system is designed so that any three fire hose valves can be used simultaneously. With three hose valves activated, the required water demand is 750 gpm. The flow and pressure requirements at the most remote valve must meet NFPA 14 requirements of 750 gpm at 100 psi residual pressure. Based on the hydraulic data provided by Denver Water Department, the resulting fire department boost pressures required are as follows:

- The standpipe requires a minimum boost from the fire department pumper truck of 100psi at the west portal FDC. This boost pressure, plus the municipal pressure, results in a pressure of 100psi at the most remote fire hose valve.
- The standpipe requires a minimum boost from the fire department pumper truck of 90psi at the east portal FDC. This boost pressure, plus the municipal pressure, results in a pressure of 100psi at the most remote fire hose valve.
- The estimated fill time from the west or east portal is calculated to be approximately one minute at average velocity of 15 ft./sec. This meets NFPA 502 required fill time of less than 10 minutes.

#### Inputs/Assumptions:

- FFFS connection to the 36-in. water supply on Columbine Street is not proposed for standpipe pressurization. Instead, KMP proposes a more practical design to connect the portal hydrants to the existing street hydrant systems in the area near either end of the Cover. The hydraulic data was taken at Hydrant 6347, which is supplied by a 6-in. municipal water main, as the basis of design for west and east portal hydrant capacity (static 71 psi and residual 6 psi at 1264 gpm).
- Hydraulic data for Hydrant 6347 provides a conservative assumption because it represents the lowest flow and pressure of hydrants in the area. In addition, a 10 psi reduction in pressure was taken into account, since the time of day that these flows were recorded is unknown.
- The fire hose valves chosen for the analysis have a K value equal to 1.5. All check valves, elbows, and fittings use industry standard K values provided in Pipe-Flow.
- All underground piping is A-53 ductile iron, and above ground piping is galvanized Schedule 40 Carbon steel. The C-values used in the analysis are 140 and 120, respectively.
- Pipe sizes are based on the preliminary fire protection drawings.

## 9.5 PIPE SYSTEM

Underground (buried) piping materials for the standpipe water supply service between the 6-in. municipal supply and the deluge fill valve at the Cover portal are ductile iron with restrained joint. As described previously, this material has good hydraulic performance characteristics, and a cement lining with a high tolerance against corrosion. The use of restrained joints eliminates the need for thrust blocks. All standpipe piping installed within the Cover uses the same hot-dipped galvanized steel with grooved couplings, as proposed for the FFFS. All standpipe piping is sufficiently sloped or pitched to assure complete drainage after usage. The proposed standpipe system is normally dry, and therefore will not require freeze protection.



## 9.6 FIRE HOSE VALVE CABINETS AND APPURTENANCES

Each standpipe fire hose valve recessed cabinet consists of two, 2.5-in. fire hose valves, and a portable fire extinguisher. There is a total of 10 valve cabinets, five each on the westbound and eastbound roadways. Two additional cabinets are provided for the standpipe fill valve at the west portal and control switch valve box at the east portal.

Fire department connections (FDCs) are located at the roadway at either end of the Cover. Specific locations of FDCs and municipal water supply hydrants will be based upon agreement with the City of Denver Fire Department.

## 9.7 FIRE PROTECTION SYSTEM MODEL

KMP will include this topic in the Final Cover Design Baseline Report.

## 9.8 FIRE PROTECTION SYSTEM SUPPLIER

KMP will include this topic in the Final Cover Design Baseline Report.

## 10. CCTV Camera System

Work for the CCTV system complies with the Project Agreement Schedule 10, Section 12.15.8, Closed Circuit Television, and Section 14.5.14 Security Cameras.

The KMP design provides pan, tilt and zoom (PTZ) CCTV cameras with wash/wipe facilities and associated transmission equipment in the Cover. The CCTV pictures transmit to the control console in the Cover Telecom Room, and link to the CCMS for operational monitoring, and recording capability. Recordings from all CCTV cameras will be made and retained for a minimum of 30 calendar days before being overwritten (unless specifically marked for retention by an operator) to allow for the analysis of any incidents. CCTV video is also transmitted to the CTMC for backup recording.

Cameras provide for 100% coverage within the Cover with all cameras in their “home” position with no blind spots. Cameras are mounted over the travel lanes in groups of three, the middle camera of each group being a thermal camera. One camera will be located over the outside lane, one over the center of the general purpose lanes, and one over the managed lanes.

Camera video streams and control are integrated into both the CCMS and CTMC camera viewing and control software. CTMC currently uses NiceVision (Qognify) camera control and viewing software. A NiceVision (Qognify) software server will be provided at the CCMS for real-time camera viewing and control. PTZ controls of the CCTV cameras are provided for both the control console in the Cover telecom room and the CTMC.

A vehicle detection system within the Cover provides the following information and functions:

- Traffic speed and flow data (integrated into the CTMS software)
- Detection and alarm for a single stationary vehicle in the Cover
- Detection and alarm for congested traffic flow in the Cover
- Detection and alarm for congested traffic flow downstream of the Cover
- Detection and alarm for a vehicle traveling in the wrong direction within or approaching the Cover

The Cover Park area has full security camera coverage that monitors the entrances and exits in the park area from the perimeter streets and sidewalks, public congregating and meeting areas, the exterior of the concession building (including exterior views of the doors to the building restrooms and electrical spaces supporting the Cover systems), as well as the outdoor electrical distribution equipment near the east portal. These cameras have a signal transmitter for wireless connectivity, with distributed wireless access points that network back to an interface located in the concession building's telecom room for connectivity to the CCD fiber network.

## 10.1 CCTV CAMERA SYSTEM TYPE

All CCTV cameras installed will meet the following minimum requirements:

- Digital and Ethernet-based
- All-in-one color surveillance dome camera unit (Ingress Protection [IP] 66 and NEMA 4X rating)
- Pan, 22-degree tilt, and zoom operation
- Minimum 32X optical zoom and 12X digital zoom
- Minimum illumination of no less than 0.3 lux
- H.264 video stream or current standard used by the Department at the time of installation
- Compatible with the current CCTV camera standard used by the Department at the time of installation
- Full 360-degree overview with one-click PTZ

Video-Based Automatic Incident Detection (AID) parameters:

- Detect 95% of incidents involving stopped vehicles, slow vehicles, slow traffic, pedestrians on the roadway, wrong way vehicle, and debris
- Detect incidents and provide an alarm in less than 30 seconds
- Upon the detection of an incident, the AID system records video at a rate of at least fifteen frames per second for a period of 60 seconds
- Operator can view any part of the Cover interior with color PTZ cameras
- Upon release of PTZ control, AID system resumes incident detection analysis within 30 seconds
- Cover cameras are positioned every 250 ft. under the Cover; default PTZ orientation is to face downstream, with traffic flow

The exact location of each camera is determined through the above criteria tempered by the presence of signs, or other objects, which may obstruct view of the target roadway area

AID analyzers/servers are installed in a hot/redundant configuration. There are two sets of AID servers with either analyzers or processor cards, with each set able to process AID information for the 30 Cover cameras.

## 10.2 CCTV CAMERA SYSTEM MODEL

Cover CCTV cameras will be Cohi, Helios, 396HD, 720P. 30X or approved equal. AID will be Citilog, Media Tunnel hardware and software package, or Trafficon Flux hardware and software package.



### 10.3 CCTV CAMERA SYSTEM SUPPLIER

KMP will include this topic in the Final Cover Design Baseline Report.

## 11. Operator Interface Systems

### 11.1 MAINTENANCE MANAGEMENT INFORMATION SYSTEM (MMIS)

The Command Control and Monitoring System (CCMS) provides interfaces to the operations, maintenance, and management system and to the Project ITS utilizing the Jorgensen Asset Maintenance Management System (JAMMS). A full description of the MMIS can be found in Appendix I. These interfaces will permit:

- The CCMS to report and manage faults to the MMIS
- The CCMS to demand control actions from the Project ITS, including:
  - Request the complete closure of traffic in either direction
  - Request the complete closure of traffic in both directions
  - Request entrance ramp closure upstream of Cover entry portal
  - Request emergency traffic clearance signal plan on traffic-signalized junctions downstream of the Cover exit portal

### 11.2 OTHER SYSTEMS

KMP will include this topic in the Final Cover Design Baseline Report.

## 12. Monitoring and Control System

Work for this section complies with Schedule 10, Section 12.16 of the Project Agreement.

A CCMS is provided and installed to provide a comprehensive fault monitoring and management facility for all electrical and mechanical systems installed in the Cover, as well as to facilitate roadway operation and management. The CCMS design includes provisions to integrate the Project ITS and the Cover ITS to support the CCMS. This enables the CCMS to interface with the operation and management of the I-70 Mainline as a whole, including either bore of the Cover and the associated ramp management systems. All systems interface controls are designed and installed by KMP's integrator.

Cover operations staff continuously monitor and control the Cover MEP systems. Monitoring redundancy is provided via a dedicated communications line running to the Havana Maintenance Yard providing a live, view only feed to operations staff. A KMP operator, who will co-locate with the Department's ITS staff at the CTMC, will be responsible for the remote control and monitoring of the Cover MEP systems. KMP's operator will assist with courtesy patrol dispatch, general traffic, roadway, weather, construction and special event management, Active Traffic Management (ATM), and managed lane system monitoring and operations.

KMP staff will train Department staff to provide redundancy with operator duties. The Department will provide one location for KMP's operator at the CTMC. KMP provides all software, licensing, and remote access to all Cover MEP System elements for control and monitoring. All Cover MEP system functionality, monitoring, and control can be performed remotely from the CTMC.

The Cover is controlled and managed primarily from the CTMC to interact with the CCMS to ensure the safety of all users within the Cover. A secondary local Cover control console is located in the telecom room where the operators can interact with the CCMS as a fallback operations room if the system at the CTMC is unavailable. The CCMS is based upon a programmable logic computer (PLC)-based SCADA system.

This PLC architecture is consistent with industry standards for roadway tunnels in the United States, using equipment suitable for a resilient and reliable industrial control environment. Specifically, the proposed design uses primary and standby PLC processors in separate racks configured in a hot standby arrangement, allowing for automatic, uninterrupted switchover of the control program between processors; there are two redundant I/O communications networks to each field I/O drop, driven off of these processors. These PLC hubs are physically separated in different cabinet locations.

The CCMS includes the ability to monitor the status of the Cover MEP systems and provide facilities to:

- Override automatic operation of the CVS
- Override automatic operation of the power distribution system
- Override automatic operation of the lighting system
- Override automatic operation of the FFFS
- Override automatic operation of the Lane Use Signal (LUS), Dynamic Message Sign (DMS), and ramp meters
- Control operation of the radio rebroadcast systems
- Control operation of the voice alarm and public address system
- Monitor status of the fire main system
- Monitor status and manage alarms from the AID system
- Monitor status and manage alarms from the Fire Detection system
- Monitor status and manage alarms from the dividing wall doors
- Monitor plant room systems including heating, ventilation, and air conditioning (HVAC), lighting, intruder alarm, fire alarm, FFFS, etc.
- Monitor the status and manage alarms from all environmental and other sensors
- Monitor the status of the power distribution system
- Request, via an appropriate interface, specific actions from the traffic management systems (including automatic responses to state changes and alarms from the systems being monitored)



The CCMS integrates with the Project ITS to allow operators to manage and coordinate the operation of the I-70 Mainline in the Cover and along both approaches. KMP is responsible for any integration necessary, including any required CTMS and Cognify software modifications. These include:

- LUS
- DMS
- Communications systems
- CCTV
- Ramp metering systems
- Vehicle detection systems

## 12.1 PROPOSED MONITORING AND CONTROL SYSTEM OPERATION

The CCMS allows the Cover operations staff to monitor the operation of the Cover.

Work for this section complies with Schedule 10, Section 12.17 of the Project Agreement. Included in this proposed system design is conditionally approved ATC 37.2, Cover Electrical System.

### 12.1.1 VENTILATION

- The CCMS allows the Cover operations staff to monitor the operation of the CVS. It is possible to monitor the current status of all ventilation fans on a single screen using a pictorial representation. From this screen it is possible to determine the detailed status of individual fans and fan controllers.
- The CCMS provides the ability for the operator to override the normal automatic operation of the CVS, either as a whole or just specific fans. In an emergency, automatic and manual settings on the CVS are overridden by a predefined emergency ventilation plan.
- The CCMS has the ability to raise an alarm to the operator if any element of the CVS becomes faulty. It raises a second alarm if the fault will cause the Cover to operate below the agreed minimum operational threshold.

### 12.1.2 LIGHTING

- The CCMS provides the Cover operations staff the ability to monitor the operation of the lighting system in the Cover. Staff can monitor the current status of the entire lighting system and determine the status of individual lighting elements on a single screen using a pictorial representation.
- The Cover operator is able to override the normal automatic operation of the lighting control system via the CCMS. In an emergency, manual settings on the lighting control system are overridden by a predefined emergency lighting plan.
- The CCMS raises an alarm to the operator if any element of the lighting system becomes faulty. It raises a second alarm if the fault will cause the Cover to operate below the agreed minimum operational threshold.

### 12.1.3 FIRE MAIN

- The CCMS monitors the current status of the fire main systems for both the FFFS and the standpipe system including trace heating, valve tampers, and water pressures. The CCMS monitors FFFS fire main water pressure within the Cover. The CCMS raises an alarm to the operators if the pressure is outside predefined limits.

### 12.1.4 FIXED FIREFIGHTING SYSTEM

- The CCMS monitors the current status of the FFFS, and presents the current status of the FFFS to the Cover operators on a graphical user interface (GUI).
- The CCMS raises an alarm if any element of the FFFS becomes faulty. It raises a second alarm if the fault will cause the Cover to operate below the agreed minimum operational threshold.
- The CCMS allows the Cover operator to selectively operate the FFFS based upon the fire location reported by the fire detection system.

### 12.1.5 RADIO REBROADCAST SYSTEM

- At the AHJ topic meeting held on January 25, 2017, the Denver Fire Department expressed that reliable radio communication in the event of an emergency is of the utmost importance to their emergency response and operations. The CCMS monitors the status of all radio rebroadcast systems, and presents this to the Cover operators via a graphic user interface. The CCMS raises an alarm to the operator if any element of the radio rebroadcast system becomes faulty, and raises a second alarm if the fault will cause the Cover to operate below the agreed minimum operational threshold.
- The CCMS allows the Cover operator to broadcast predefined emergency safety announcements into the Cover and its immediate approaches through a voice break-in facility in the domestic radio rebroadcast system. The CCMS will recommend the specific message to be broadcast based upon the information available within the CCMS.

### 12.1.6 VOICE ALARM / PUBLIC ADDRESS SYSTEM

- The CCMS monitors the status of the voice alarm and public address system, and presents this to the Cover operators via a GUI. The CCMS raises an alarm to the operator if any element of the voice alarm and public address system becomes faulty, and raises a second alarm if the fault will cause the Cover to operate below the agreed minimum operational threshold.
- The CCMS allows the Cover operations staff to broadcast predefined emergency safety announcements into the Cover and its immediate approaches through a system of public address loudspeakers. The CTMC broadcasts the message based upon the information available within the CCMS.

## 12.1.7 FIXED FIREFIGHTING SYSTEM

- The CCMS monitors the status of the AID system, and presents this to the operators via a GUI. The CCMS raises an alarm to the operator if any element of the AID system becomes faulty, and raises a second alarm if the fault will cause the Cover to operate below the agreed minimum operational threshold.
- The CCMS monitors the AID system for incidents. If an incident is detected, the CCMS alerts the operator and recommends appropriate actions to be taken.

## 12.1.8 FIRE DETECTION AND ALARM SYSTEM

- The CCMS monitors the status of the fire detection and alarm system and presents this to the Cover operators via a GUI. The CCMS raises an alarm to the operator if any element of the fire detection system becomes faulty. It raises a second alarm if the fault will cause the Cover to operate below the agreed minimum operational threshold.
- The CCMS monitors the fire detection system for indications that fire may be present, and if a fire is detected, the CCMS alerts the operator and recommends the actions to be taken. If no response is received from the operator within a predetermined time limit, the recommended action is automatically applied.
- The automated fire detection system is supplemented with manual fire alarm call points situated at both portals, at every dividing wall door, and at all emergency panels. The operation of the manual call points and the automated fire detection systems is coordinated by the FACP and monitored by the CCMS. The FACP permits the fully automated control of the fire and life safety systems by the CCMS, but also allows local manual override facilities.
- The fire detection systems have a direct connection to the fire department station/control room, as well as the Cover Control Center.

## 12.1.9 PLANT ROOM SYSTEMS

- The CCMS monitors the status of all plant room equipment such as the HVAC, lighting, intruder alarm, or building fire alarm, and present this to the Cover operators via a GUI. The CCMS raises an alarm to the operator if any element of the plant room equipment becomes faulty.

## 12.1.10 POWER DISTRIBUTION SYSTEM

- The CCMS monitors the status of the power distribution system, and raises alarms to the operators in the event of any faults in the power distribution system. The CCMS also monitors the status of the uninterruptible power supply (UPS) system and raises alarms if the Cover systems are being powered solely from the UPS. The CCMS raises an alarm if the incoming main power supply has failed. It raises a second alarm if both normal and emergency power systems have failed, and in such case recommends the closure of the Cover.

#### 12.1.11 POWER SUPPLY TO CCMS AND ITS EQUIPMENT

- A UPS supplies all CCMS and ITS equipment as NFPA 70 requires. This UPS is sized to sustain the operation of all critical systems for a minimum of five minutes, allowing ample time for emergency power source activation.

#### 12.1.12 RAMP METER SYSTEM INTERFACE

- The CCMS directly interfaces with the ramp meter at the westbound Vasquez Boulevard entrance ramp. This interface permits the CCMS to close the approach to the Cover and expedite the flow of traffic downstream of the Cover in the event of an incident.

#### 12.1.13 TEMPORARY COVER SYSTEMS OPERATION DURING CONSTRUCTION

- KMP construction phasing calls for temporarily placing bidirectional traffic in the westbound lanes of the Cover section. Cover systems are constructed and installed within the westbound lanes prior to opening to traffic. In addition, all systems are fully tested and commissioned to assure full functionality. Further implementation details and commissioning plans will be developed in coordination with the AHJ prior to the start of Cover construction.

## 13. Hydraulic and Pneumatic Calculations

### 13.1 HYDRAULIC CALCULATIONS

See Section 7, Proposed Fixed Firefighting System, and Section 9, Proposed Standpipe System, of this Draft Cover Design Baseline Report for discussions of hydraulic calculations and hydraulic models.

### 13.2 PNEUMATIC CALCULATIONS

Pneumatic calculations are not required because no pneumatic systems are planned.

## 14. Computational Fluid Dynamics

### 14.1 COMPUTATIONAL FLUID DYNAMICS (CFD) ANALYSIS PROCESS

CFD analysis will be conducted during final design for the following elements of the design:

- CVS and FFFS integrated performance
- FFFS ability to prevent/minimize fire spread
- Jet fan installation coefficients
- Recirculation of smoke/pollution at the Cover portals



## 14.2 CFD MODEL

The CFD model Fire Dynamics Simulation (FDS) Version 6 is utilized for scenarios involving CVS and FFFS integrated performance. FDS is validated for many different scenarios, including tunnel fires, and it is widely accepted in the industry. FDS is particularly useful for modeling the FFFS and ventilation because it incorporates all of the major physics associated with these elements, including turbulence, multi-phase flow (water droplets), radiation, and fire.

The CFD software ANSYS Fluent is utilized for scenarios involving jet fan installation coefficients. This software is used because it includes a turbulence model that is well suited to predict jet fan flow dynamics, complex (non-rectangular) geometry can be modeled, and the geometry can easily accommodate a large-scale domain.

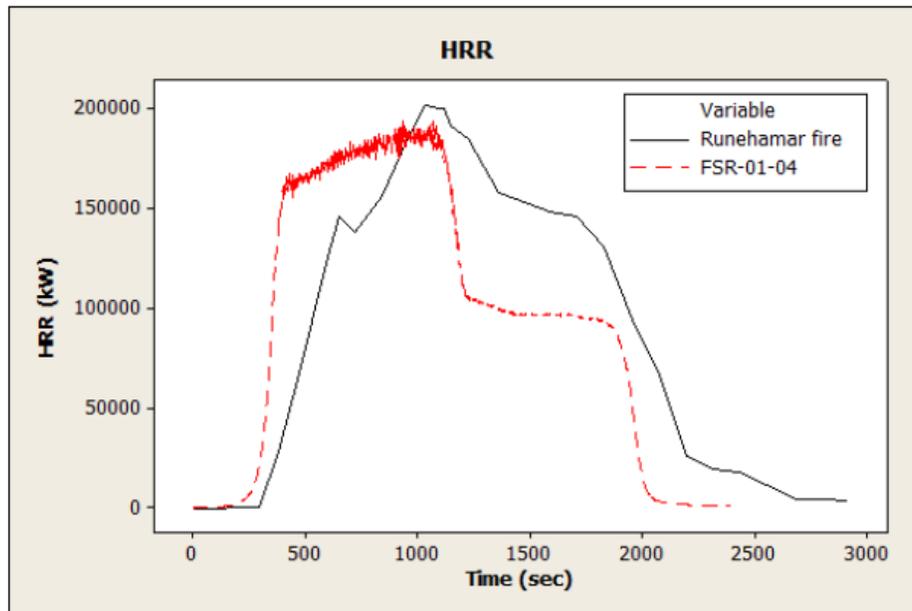
## 14.3 CFD CASES: FFFS PERFORMANCE FOR FIRE SPREAD

CFD models demonstrate the ability of the FFFS to prevent fire spread. Key elements of the models include:

- The ignition temperature approach to fire spread is applied, where the fire spreads to an adjacent target once that target reaches a given temperature. Once the adjacent target ignites, it releases heat at a predefined release rate.
- Fire suppression for the adjacent target is computed based on an empirical approach to fire suppression. The fire heat release rate (FHRR) of the adjacent fire load is reduced in proportion to the mass flux of water that reaches the burning surface. The amount of heat reduction is based on an empirical constant.
- The proposed approach for demonstrating FFFS performance with CFD is a simulation with a potential 120 MW FHRR with an ultra-fast growth rate, using a target positioned near the primary fire. The analysis should demonstrate that a certain water application rate can minimize fire spread to the extent that any additional fire (adjacent targets) is negligible with respect to the design capacity of the system.

Validation of a model for the methods proposed above relies on the ability of the CFD model to accurately represent heating and cooling of the air and surrounding targets. There are several examples in available literature that document validation of CFD software where the FFFS is involved [Reference 3]. The figure below provides an example result for a CFD model versus a full-scale test of a configuration of wood pallets in a tunnel [Reference 4].

### Fire Heat Release Rate: CFD Results Compared with Experiment Data [Reference 4]



Preliminary results in relation to fire spread include the following:

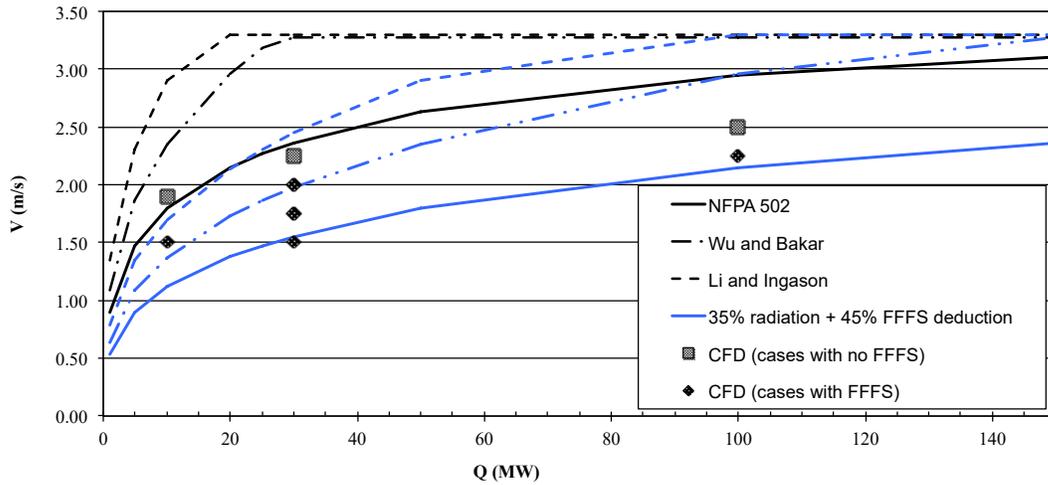
- No FFFS operating:
  - Time of fire ignition on adjacent target: 400s
  - FHRR at time of fire ignition: 30 MW
- FFFS operating at 0.15 gpm/ft<sup>2</sup>:
  - Time of fire ignition on adjacent target: 720s
  - FHRR at time of fire ignition: 96 MW

#### 14.4 CFD CASES: VENTILATION PERFORMANCE

One advantage of the FFFS is the substantial cooling that it provides. For the emergency ventilation system design, this cooling can help reduce the amount of airflow necessary to establish the critical velocity needed to control the flow of the heat and smoke. This reduced airflow requirement helps minimize the number of fans required, reduces the potential of fan destruction due to heat, and provides improved conditions for motorist egress and first responders.

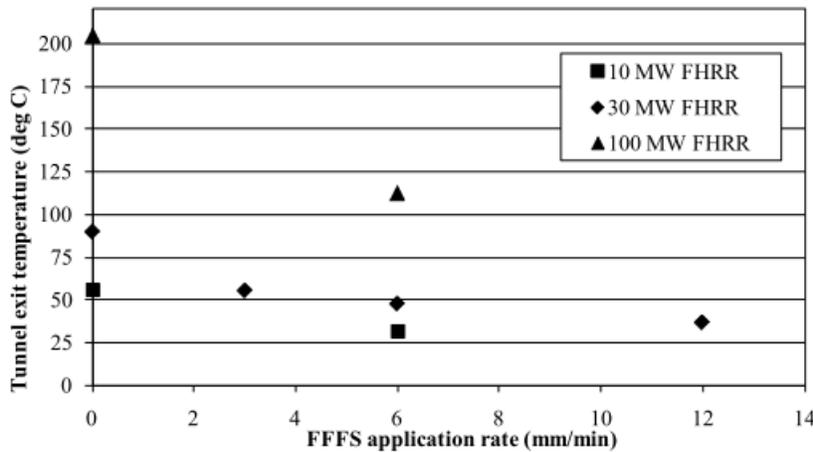
CFD simulations were conducted using FDS 6. The FFFS is modelled in a manner that allows the water to evaporate and cool surroundings, but fire suppression is not modelled. This methodology greatly reduces uncertainty surrounding the ability of the CFD model to predict fire suppression, which is still a research topic rather than a practical application of CFD [Reference 3]. Typical results from this analysis for critical velocity prediction are provided below, and compared with empirical equations for critical velocity without an FFFS operating [Reference 5].

#### Critical Velocity – Comparison of CFD Results and Published Equations [Reference 5]



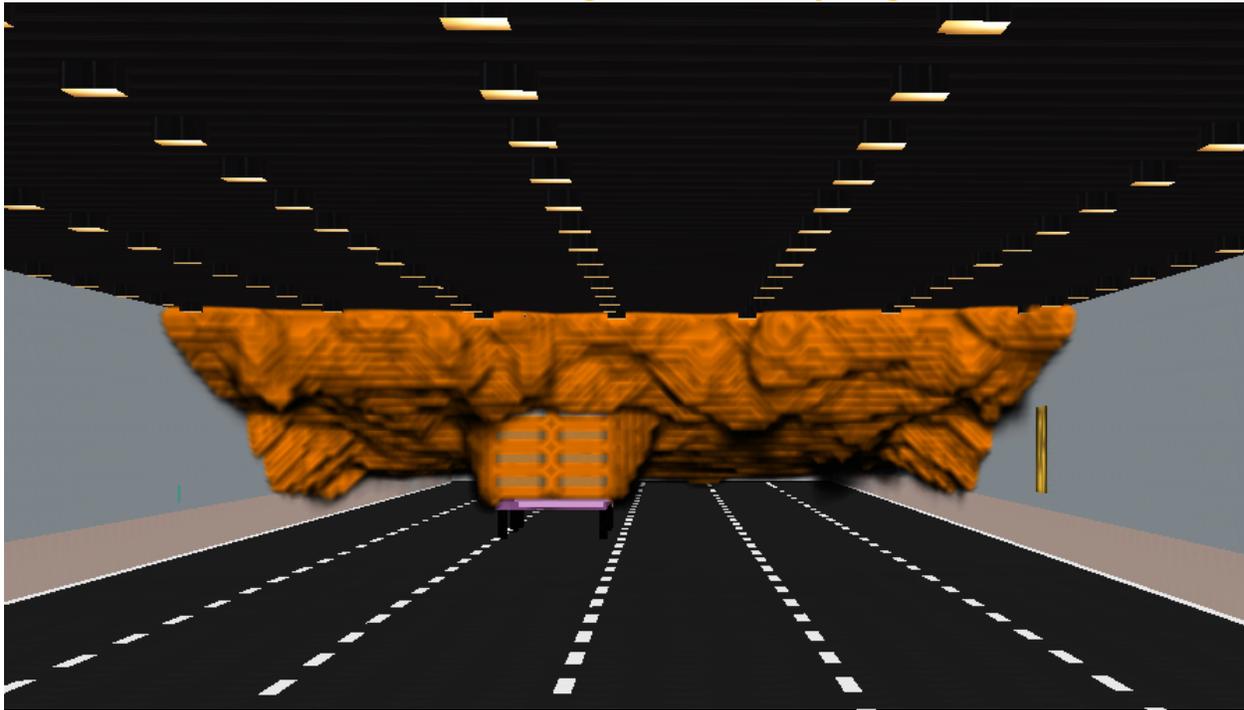
CFD results can also be used to show reduced downstream temperatures that the system has to manage, which will reduce the subsequent buoyant forces the system must overcome [Reference 5].

### Temperatures Downstream with Different FFFS Water Application Rates [Reference 5]



A CFD model was conducted for the Cover configuration to confirm the velocity for smoke control in the wide roadway configuration (reference case WBP-02-60). The model showed that with a water application rate of 0.15 gpm/ft<sup>2</sup> an upstream velocity of 2.5 m/s was sufficient to control smoke for a 100 MW FHRR.

### CFD Result Demonstrating Smoke Back-layering Control



#### 14.5 CFD CASES: JET FAN INSTALLATION

A series of CFD models were conducted with ANSYS Fluent to check the jet fan installation factors. This analysis was conducted due to the wide configuration of the Cover, which is a non-standard installation condition and hence required verification. For jet fans installed at each Cover entry portal, the installation factor was determined to be 0.9 (reference calculation C70-01-11), which is consistent with typical manufacturer data.

#### 15. Cover Ventilation System

See Section 6, Proposed Ventilation System, of this Draft Cover Design Baseline Report for Cover Ventilation System (CVS) design process and derivation.

#### 16. Proposed Approach to Demonstrating FFFS Performance

The following describes the intended purpose of the Cover FFFS, the proposed approach to meeting system performance goals, and the design basis. Supporting information based on previous analysis and design of FFFS in other road tunnels is provided. The main purpose of this section is to clearly define all of the critical parameters needed to develop the FFFS design. These parameters are critical because they affect system design components such as water demand, piping, pumps, drainage, valve requirements, and operations.

The critical FFFS parameters are as follows:

- **Water application rate:** 0.15 gpm/ft<sup>2</sup>



- **FFFS zone dimensions:** Zone length 100 ft. covering the entire width of the roadway and shoulders.
- **Fire detection and FFFS zone activation:** Two zones activated simultaneously; AID followed by manual activation of the FFFS by a trained operator; relies on 24/7 human monitoring of the facility.
- **System type:** Conventional deluge, standard droplet diameter (average droplet diameter of 1,200  $\mu\text{m}$ ).
- **Performance:** System performance is demonstrated via comparison to previously conducted full-scale test and CFD models; the goal is to verify the convective FHRR that the ventilation system needs to manage, and that the FFFS can minimize fire spread.

KMP's approach to, and features of, the FFFS offers the same benefits as the Project Agreement:

- **Water application rate:** CFD analysis is used to demonstrate CVS effectiveness with the FFFS operating and the ability of the FFFS to minimize fire spread. The CFD approach is described in Section 14. The outcome of the approach will be a verification of the system performance for the water application rate of the design.
- **Testing:** Performance of the system will be demonstrated with CFD modeling. Comparison with previous full scale testing will be made.
- **Commissioning:** The FFFS and related systems will be fully commissioned prior to opening of I-70 beneath the Cover. A Full Scale System Test Report will log all results and be provided to the Department within two weeks of testing and commissioning.
- **FFFS zones:** Two zones are proposed for activation.
- **FFFS type:** A conventional deluge system is proposed, resulting in minimized maintenance costs over the life of the Cover.
- **Ventilation:** The ventilation system is designed to take advantage of the cooling effect provided by the FFFS. The resultant design has a reduced critical velocity for smoke control, and reduced impact of heat on the jet fans, resulting in fewer jet fans compared to a case without an FFFS.

### 16.1 DESIGN PURPOSE AND WATER APPLICATION RATE

KMP designs and installs the FFFS to serve the full length of both sides of the Cover roadway as per the Project Agreement. The FFFS will be designed to achieve the following objectives in the event of a vehicle fire in the Cover:

- Control the fire and limit peak heat release rate and smoke production
- Reduce temperatures in the vicinity of the fire to aid self-rescue operations
- Reduce temperatures in the vicinity of the fire to reduce likelihood of fire spread
- Maintain conditions that are reasonable for fire department intervention

The design objectives provided in the Project Agreement are typical for any FFFS. CFD analysis of the ability of the FFFS to prevent fire spread, as described in Section 14.3, will be used to demonstrate that the general FFFS performance objectives are met.

The Project Agreement also provides a quantitative performance objective in terms of the FHRR reduction (120 MW reduced to 30 MW convective). The primary impact of this objective is on the Ventilation System design. If the FHRR of the fire is reduced to 30 MW of convective heat, this effectively reduces the heat load that the longitudinal ventilation must manage. CFD analysis, as described in Section 14.4, is used to demonstrate that this performance requirement is met.

In summary, the key design objectives of the FFFS, to be demonstrated with analysis, are as follows:

- Ability to contain the fire to the initial fire incident; that is, to prevent or minimize the spread of the fire to other vehicles
- Ability to control smoke back-layering for a given FHRR with the FFFS operating

Water application rate is arguably the most critical parameter for the FFFS performance, and the analysis using CFD will demonstrate the system's ability to achieve the above two objectives with a water application rate of 0.15 gpm/ft<sup>2</sup>. For comparison purposes, KMP team members have successfully designed and constructed an FFFS with a water application rate of 0.15 gpm/ft<sup>2</sup> at Midtown Tunnel in Virginia, which is constructed and open to traffic. Preliminary CFD results provided in Section 15.3 support the water application rate of 0.15 gpm/ft<sup>2</sup>.

## 16.2 ZONE DIMENSIONS AND ACTIVATION APPROACH

The dimensions of the FFFS zones, number of zones activated, and general approach to activating the system are important parameters because they affect the overall system demand, system hydraulics, and valve requirements. The following principles are applied:

- **Traffic:** FFFS should only be activated after halting traffic. It is critical that the system is not activated while there is live traffic due to substantial visibility reduction.
- **Manual operation:** Because the FFFS should only be activated when traffic is halted, a system time delay is provided for operator override prior to automatic system activation.
- **Zones:** The Project Agreement calls for a design that allows for the simultaneous activation of two FFFS zones, each 100 ft. long. With this approach, the operator selects the zone serving that area of the roadway where the fire occurs, based on confirmation via the CCTV system. The zone immediately upstream of the selected zone is pre-programmed to activate concurrently.

## 16.3 DETECTION SYSTEMS

Early detection of an incident is critical. Detection generally occurs by the operator identifying a fire using the AID system installed as part of the CCTV system. This allows the operator to determine the exact location of the fire and, if necessary, manually activate the appropriate FFFS zones. This proposed concept is based on the following:

- The AID will detect a stopped vehicle or accident, likely well before a fire is large enough to initiate an alarm through the automatic detection system.
- The operator can confirm there is a fire situation, identify the exact location of the fire, and halt traffic operations prior to activating the FFFS.



The concept of relying on the operator to be responsible for fire detection based on 24-hour supervision is permitted by NFPA 502 Section 7.4.3, which states, “Closed-circuit television (CCTV) systems with traffic-flow indication devices or surveillance cameras will be permitted for use to identify and locate fires in tunnels with 24-hour supervision.”

A linear heat detector (LHD) is also proposed, but automatic activation of the FFFS or the ventilation system will not occur in response to the LHD. In most fire situations, the LHD will rarely activate before the Cover operator is informed by other means. The technology will be used to support the operator, who will be monitoring the Cover section on a 24-hour basis. In this context the operator, through the CCTV system and AID, is able to detect a fire incident much sooner than an automatic detection system such as an LHD can. The operator can then assess the fire and determine if activation of the FFFS is warranted. The LHD provides the operator with an accurate identification of the FFFS zone where the fire is located.

## 17. Analysis of Safety Functions for all Fire and Life Safety Systems

Required redundancy, reliability, and fire rating of circuits are shown on the drawings. Specifically, power is maintained to elements indicated with the fire rated (FR) notation using fire rated cable and a phenolic fiberglass conduit system. For this system, RSCC Vitalink 300 RHW-2 cable and/or Draka “Lifeline” cable is utilized.

Efforts to maintain operation with redundancy, routing, and configuration methods includes the following:

- Fiber back-bone is maintained through redundant feeds coming into the telecom room from both sides of the dividing wall
- CCMS RIO network through primary and redundant I/O networks in a loop
- Separate feeds for westbound and eastbound CCTV
- Separate feeds for westbound and eastbound DMS and LUS
- Separate feeds for westbound and eastbound telephones
- Primary and standby CCMS PLC processors and servers
- Primary and redundant backbone Ethernet switches at the telecom room and CTMC

## 18. Proposed Approach to Passive Fire Protection

In addition to the standpipe and FFFS available for use and activation in the event of a fire emergency within the Cover, the Cover structure itself is designed so that all primary structural concrete and steel elements are protected from any significant or irreversible damage that may result from a fire.

Passive fire protection of the Cover structure is provided in accordance with NFPA 502 Section 7.3. KMP will coordinate with the AHJ to establish the appropriate time-temperature curve to be considered for potential exposure to the Cover structure. The structural design of the Cover utilizes a thickened structural concrete for the ceiling beams that is specifically designed to prevent excessive spalling by adding polypropylene fibers to the mix, and to ensure that the temperature of the steel reinforcement within the concrete does not exceed 482 degrees F when exposed to the duration and peak temperature of the accepted time-temperature curve.

Concrete finish wall panels along the length of the Cover roadway are designed and installed to protect the vertical structural elements such as the retaining walls and center piers, as well as to protect the Cover’s electrical power/control circuits and fire protection systems piping.

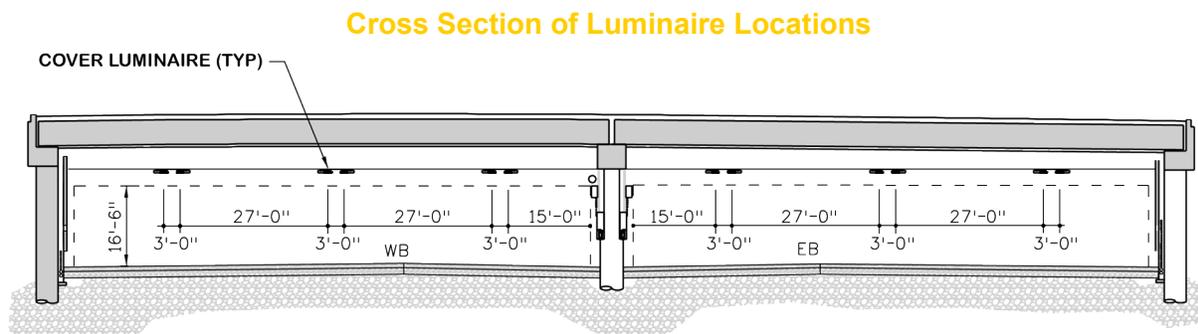
## 19. Lighting

This section describes the proposed preliminary lighting design for uni-directional operation in each six lane bore of the Cover section. The design speed is 60 mph, corresponding to a safe stopping distance of 570 ft. The ceiling is low and horizontal, and mounting height is constrained. The portal height is 22.7 ft. based on a preliminary elevation developed for the jet fans.

Schematic design for both r-1 and r-3 surfaces was completed. Based on the results, the preliminary design is conservatively based on r-3 surface, corresponding to the likely surface and to the greater number of luminaires for producing the required luminance values.

### 19.1 LUMINAIRE LAYOUT

All luminaires are ceiling mounted in three rows along each Cover bore. Luminaires will be located at approximately 16, 46, and 76 ft. from the center wall surface as indicated in the cross-section diagram below. The rows are double rows for the threshold zones extending 540 ft. in from each portal and single rows for all other zones. Mounting height is 17.5 ft. and the spacing between luminaires along rows is 3.5 ft.



For this preliminary design, the layouts for the two Cover bores are nearly identical, with matching locations, luminaire patterns, and quantities.

### 19.2 LUMINAIRE SPECIFICATION

Preliminary design is based on Holophane TunnelPass series, with LED sources, for luminaires. Final design will consider both daytime and nighttime operations.

### 19.3 LUMINANCE REQUIREMENTS

The lighting design follows the minimum design criteria presented in the Project Agreement:



### Lighting Criteria for Cover

Criteria	Value
Posted Speed	55 mph
AADT	Greater than 15,000
Cyclists	No
Wall reflectance	70/5020
Cladding height	9.8 ft
Maximum threshold luminance	26 cd/ft <sup>2</sup>
Transition Zone 1	26-10.6 cd/ft <sup>2</sup> average
Transition Zone 2	10.6-4.6 cd/ft <sup>2</sup> average
Exit zone	To be agreed
Daytime Interior zone	0.9 cd/ft <sup>2</sup> average
Night Time Luminance	Min 0.3 cd/ft <sup>2</sup>
Uniformity ratio avg/min	2.0/1
Uniformity ratio max/min	3.5/1
Veiling illuminance ratio	0.3

The threshold luminance, interior daytime, and interior nighttime luminance values were established as 280 cd/m<sup>2</sup> (~26 cd/ft<sup>2</sup>), 9.7 cd/m<sup>2</sup> (0.9 cd/ft<sup>2</sup>) and 3.2 cd/m<sup>2</sup> (0.3 cd/ft<sup>2</sup>), respectively. Maximum uniformity ratio values are set to 2.0:1 and 3.5:1 and the veiling luminance ratio will be limited to 0.3 maximum. All values are for maintained conditions.

The corresponding luminance profile was established in accordance with RP-22-11. The maintained luminance values for the two threshold zones (Lth) and three transition zones (Ltr) are shown in the table below, along with the Interior Day and Interior Night values. Cover length of 999 ft., and threshold length of 526 ft. are the dimensions used for calculations.

### Maintained Luminance Values

Zone	Luminance	Distance (ft)
		Step method
Lth1	280 cd/m <sup>2</sup>	394
Lth2	197 cd/m <sup>2</sup>	132
Ltr1	114 cd/m <sup>2</sup>	176
Ltr2	42 cd/m <sup>2</sup>	176
Ltr3	23 cd/m <sup>2</sup>	124
Int-Day	9.7 cd/m <sup>2</sup>	1,002
Int-Night	3.2 cd/m <sup>2</sup>	1,002

## 19.4 LIGHT LOSS FACTOR

The light loss factor (LLF) is set at 0.55 to 0.60, based on similar tunnel lighting applications in Colorado. KMP will establish a cleaning schedule during final design with input from the Department, the AHJ, and KMP O&M staff.

## 19.5 LIGHTING MODEL

A model of the Cover section was developed in AGI lighting design software based on preliminary roadway design. The model includes walls with 30% reflective surface up to 10 ft. There is one calculation zone of 40 to 50 ft. along the roadway, and 72 ft. across in each lighting zone, near the middle, for each bore. There is an additional calculation zone for each portal. These AGI calculations use RP-22-11 conditions and r-3 roadway surfaces.

## 19.6 PRELIMINARY DESIGN ANALYSIS

The preliminary design is based on the AGI model. The results are tabulated below, along with the maintained and corresponding initial luminance criteria.

**AGI Model: Preliminary Design Analysis Results**

	Criteria	LLF		Full On		
		Lavg maint	0.55 init	0.6 init	Lavg init	A/m
<b>Portal</b>	280	509	467	493	2.2	3.4
<b>Th1</b>	280	509	467	513	1.9	2.7
<b>Th2</b>	197	358	329	360	2.1	3.2
<b>Tr1</b>	114	207	190	212	1.9	2.8
<b>Tr2</b>	42	76	70	72	1.6	2.2
<b>Tr3</b>	23	42	39	47	1.6	2.4
<b>Int Day</b>	9.7	17.6	16.2	18.1	1.8	2.7

These values, including average luminance (Lavg), are in cd/m<sup>2</sup> and calculated using the Full Radiosity procedure in AGI. KMP performed separate calculations for “Full On” and “Interior Daytime,” using either all luminaires or “only Type A” luminaires, at full power.

## 19.7 EMERGENCY LIGHTING

For the preliminary design, the interior daytime/nighttime luminaires—all Type A (CLN\_6)—are designated as emergency lighting. At full power, for every calculation zone this system produces 25 foot-candles (fc) average, with uniformity better than 2:1 avg/min and 3:1 max/min.



### 19.8 PRELIMINARY LUMINAIRE QUANTITIES

Luminaire quantities shown below are from the design model.

#### Westbound Luminaire Quantities

Stations		Dist	Luminaires Per Row			Luminaires Per Row			Total
Begin	End		Type A	Type B	Type C	Type A	Type B	Type C	All
2041+71	2037+66	405	14	15	179	42	45	537	624
2037+66	2036+35	131	4	5	42	12	15	126	153
2036+35	2034+54	181	7	6	30	21	18	90	129
2034+54	2032+78	176	6	13	0	18	39	0	57
2032+78	2031+69	109	3	5	0	9	15	0	24
<b>TOTALS</b>		<b>1002</b>	<b>34</b>	<b>44</b>	<b>251</b>	<b>102</b>	<b>132</b>	<b>753</b>	<b>987</b>

#### Eastbound Luminaire Quantities

Stations		Dist	Per Row			Total			All
Begin	End		Type A	Type B	Type C	Type A	Type B	Type C	
2031+69	2035+74	405	15	14	179	45	42	537	624
2035+74	2037+05	131	4	5	42	12	15	126	153
2037+05	2038+86	181	7	6	30	21	18	90	129
2038+86	2040+62	176	6	13	0	18	39	0	57
2040+62	2041+71	109	3	5	0	9	15	0	24
<b>TOTALS</b>		<b>1002</b>	<b>35</b>	<b>43</b>	<b>251</b>	<b>105</b>	<b>129</b>	<b>753</b>	<b>987</b>

### 19.9 COVER LIGHTING CONTROL SYSTEM

The Cover lighting control system uses a narrowband power line based two-way communication Power-Line Carrier system between the LED luminaires and lighting controllers connected to the dedicated lighting electrical panels. A luminaire control module (LCM) is integral to the luminaire, installed by the luminaire manufacturer. The LCM is capable of two-way communication to a lighting control server (LCS) that allows access, control, and monitoring of the lighting system. The LCS is connected to an IP-based application, and is able to support control and asset management of all the connected devices. The luminaires are controlled in groups to dynamically dim supplemental daytime lighting via a signal from dedicated exterior luminance (L20) sensors, interior illuminance monitoring sensors, and inputs from the CCMS.

### 19.10 SITE SPECIFIC CONDITIONS

KMP will include this topic in the Final Cover Design Baseline Report.

### 19.11 LIGHTING SOURCE

KMP will include this topic in the Final Cover Design Baseline Report.

### 19.12 EMERGENCY LIGHTING

Emergency lighting consists of a subset of the general lighting fixtures being provided power by an independent, segregated emergency power source running through a fire survival cable network that will provide power for a minimum duration of two hours. The emergency lighting level is greater than 1 ft. cd (10.8 lux), enables wayfinding, and provides 10 ft. cd (108 lux) illumination at escape exits.

### 19.13 LIGHTING CONTROL SYSTEMS

KMP will include this topic in the Final Cover Design Baseline Report.

## 20. Signing

Various identification signage and graphics along the roadways within the Cover clearly demark the following:

- Direction and distance to nearest exit or entrance to area of safety
- Location of cross-passage doors providing exit to area of safety
- Standpipe system hose valve cabinets
- Fixed firefighting system deluge valve cabinets
- Fixed firefighting system zone locations
- Emergency telephones
- Fire alarm pull stations

Uniform signage and graphics will be developed to concisely direct motorists and emergency responders to the life safety and fire protection elements in the case of an emergency. Signage and graphics for emergency egress will be per NFPA 502 and based on *NCHRP Guidelines for Emergency Exit Signs and Marking Systems for Highway Tunnels*. Signage and graphics for other safety elements and features will be developed in coordination with the AHJ.

The photograph below, taken in the Midtown Tunnel in Virginia, provides a conceptual view of the Cover center wall and the specific types and organizational placement of identification signage and graphics that NFPA 502 requires. KMP Team members designed and constructed the Midtown Tunnel, currently in operation.

## Conceptual Egress Signage



All signage material is porcelain enamel on steel, complying with *Specification for Architectural Porcelain Enamel on Steel for Exterior Use*, Porcelain Enamel Institute, specifically PEI S-100(65) inorganic coating bonded to metal by fusion at temperatures above 1400 degrees Fahrenheit. This material specification ensures that the signage is washable and able to endure the severe environment of the Cover.

### 20.1 EMERGENCY EGRESS SIGNAGE

Reflective Distance-to-Exit signs are installed along both walls of each side of the roadway within the limits of the Cover. These signs are located every 82 ft. in accordance with NFPA 502. The sign graphics are based on the internationally recognized “running man” graphic, and denote the distance to the nearest exit or area of safety in either direction. Emergency lighting fixtures are positioned to coincide with the location of the Distance-to-Exit Signs to ensure their visibility. The figure below shows a typical distance-to-exit sign required by NFPA 502 and in the *NCHRP Guidelines for Emergency Exit Signs and Marking Systems for Highway Tunnels*.

#### Emergency Egress Signage



Due to the relatively short length of the Cover, emergency egress for motorists to an area of safety is generally assumed to be outside of the Cover portals. However, three cross-passage locations connecting the eastbound and westbound roadways will be provided. These cross-passages will be located with one near each portal and one at the approximate center of the Cover. While these cross-passages are primarily for the use of emergency responders to access an incident on the roadway from the non-incident roadway, they will also serve as an optional emergency egress for motorists in case escaping to the area of safety outside of the Cover portals is not possible.

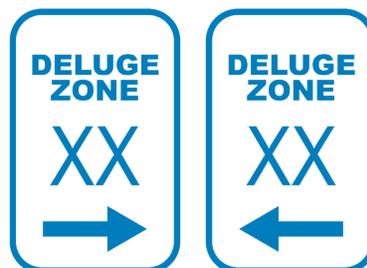
To ensure fire separation between the eastbound and westbound roadways within the Cover, the cross-passages are fitted with a 2.5-hour fire-rated door. A continuously illuminated triangulated exit sign is provided above each cross-passage doorway. This sign is triangulated to be visible from both the upstream and downstream sides of the exit.

## 20.2 FIXED FIREFIGHTING SYSTEM AND STANDPIPE SYSTEM SIGNAGE

Conspicuous identification signage will be developed for all operational components of both the FFFS and the dry standpipe system.

For the FFFS, zone identification signage, which identifies the area limit of coverage for each FFFS zone, will be developed in coordination with the AHJ. FFFS zone limit identification signs will be triangulated so they are visible from both upstream and downstream directions and will be affixed within the Cover section so as to be visible to the Cover operator via CCTV as well as from the roadway. The figure below shows typical deluge zone limit signage.

### Deluge Zone Limit Signage



Each deluge zone valve cabinet located along the center wall of the Cover is also affixed with a unique and conspicuous identification sign, which coordinates with the coverage limit signage.

For the standpipe system, identification signage is affixed to the fire department connections (FDCs) located at either portal. FDC signage also includes the system “boost” pressure required from that location. The figure below shows an example of coordinated graphics identifying hose valve cabinets and fire extinguishers co-located within the Cover section.

### Valve and Extinguisher Cabinet Signage



## 20.3 EMERGENCY TELEPHONE AND FIRE ALARM PULL STATION SIGNAGE

Emergency telephones and fire alarm pull stations are provided throughout the length of the Cover specifically for motorist use in an emergency. Because they must be easily distinguishable, internationally recognizable, uniform graphics are used at each emergency phone and fire alarm pull station.

The following figures show typical internationally used signs for an emergency telephone, and a fire alarm pull station.

### Emergency Telephone Signage



### Fire Alarm Pull Station Signage



## 21. ITS and Communications System

Work for this section complies with Schedule 10, Section 12.15 of the Project Agreement.

### 21.1 COMMUNICATIONS SYSTEM

A communication system is provided for the Cover to inform the users, members of the public, emergency services personnel, and the Department. The communication system comprises the following three sub-systems:

- Emergency roadside telephones
- Radio rebroadcast
- Voice alarm/public address

#### 21.1.1 EMERGENCY ROADSIDE TELEPHONES

- Emergency roadside telephones will be provided in both bores. The telephones connect directly to a telephone on the Cover operator's desk. An additional telephone is provided at the CTMC, and it is possible for the CTMC operator to pick up incoming telephone calls from the Cover in the event that the Cover operator at the CTMC is unable to answer the call. The system is designed such that if an Emergency call is not answered within 10 seconds, all control room telephones ring, and the first operator to pick up the call is connected to the Cover Emergency telephone. This time period is adjustable by a suitably accredited system operator.

#### 21.1.2 RADIO REBROADCAST

- The radio rebroadcast is in accordance with NFPA 72.
- Allows emergency services personnel to communicate by radio with their commanders and one another while inside the Cover.
- Allow O&M staff to communicate by radio with their operations center and with one another while inside the Cover.
- Allow all users in the Cover to make and receive cellular telephone calls.
- Allow users to receive domestic radio broadcasts using their in-car radios; these radio broadcasts will be processed within the Cover roadway management system to allow the broadcast program to be interrupted and replaced with an appropriate emergency public safety message.

#### 21.1.3 VOICE ALARM / PUBLIC ADDRESS

- The voice alarm and public address system are designed and installed in accordance with NFPA 72, and allow Cover operations staff to make emergency public safety announcements in the Cover. The voice alarm and public address system reproduces messages that can be heard by the public.



- The functionality and priority of the system will be determined during final design. It is possible for the list of available messages, and the priority level of that message when selected by the operator, to be changed by a suitably accredited system operator.

## 21.2 DATA COMMUNICATIONS SYSTEM

A data communication system is provided to facilitate reliable, high bandwidth, fault tolerant communications to all equipment throughout the Cover. It is integrated with the ITS infrastructure to provide reliable communications to the CCMS. This is provided by means of a single high reliability fiber-optic based Ethernet network. Fault tolerance is provided by means such as a 'self-healing' ring network topology or Ethernet Ring Protection Switching (ERPS). A fiber optic cable, separate from the ITS backbone cable, is provided to communicate with all Cover system devices. This fiber optic cable connects to the ITS backbone at the CCMS. Physically diverse, redundant communications paths are provided between the CCMS and the CTMC. One path will be west along I-70 to the CTMC, and routed through the node buildings as necessary. The other path will be along I-70 east to I-225 and to the CTMC, routed through the node buildings as necessary. Fiber strands are allocated along each path for Cover communications.

Critical equipment is provided with IP connections to two different (redundant) Ethernet switches, and all Ethernet switches are resistant to the effects of MAC address 'flapping' and broadcast storms. Security of the systems and those connected to it (including but not limited to the Department's ITS system) are in accordance with ISO 27001. Ethernet switches are manufactured by Ciena and the same field and aggregation switch types as per Project Agreement Schedule 10, Section 3, ITS and Tolling Equipment. Continuous DSRC communications are also provided within the Cover section as required by Project Agreement Schedule 10, Section 3.

## 21.3 LANE-USE SIGNALS (LUS)

The Cover ITS includes LUS mounted on gantries at the entry portal of each bore. The LUS are controlled by the Project ITS and integrated into the Active Traffic Management (ATM) system. The Project ITS system will interface with the CCMS such that if CCMS detects a condition likely to be a danger to users, then the Cover can be closed using the portal signals controlled by the Project ITS. Portal LUS will be of same model, manufacture, and type as the ATM LUS specified in Schedule 10, Section 3, ITS and Tolling Equipment.

## 21.4 DYNAMIC MESSAGE SIGNS

Dynamic message signs (DMS) controlled directly by the Cover ITS and CCMS will be provided at both Cover entry portals. The DMS are of the same manufacture and model as the full-color, full-matrix DMS specified in Project Agreement Schedule 10, Section 3, ITS and Tolling Equipment, and will be capable of displaying messages with wording or graphics as approved by the Department at final design. The DMS will be used to inform drivers of full or partial closure of the I-70 Mainline in the Cover or, more generally, of conditions ahead. The system design includes the capability to change the message set for the DMS from the CTMC.

## 21.5 CLOSED CIRCUIT TELEVISION

See narrative in Section 10, CCTV Camera System.

## 21.6 RAMP METER SYSTEM INTERFACE

The CCMS directly interfaces with the ramp meter at the westbound Vasquez Boulevard entrance ramp and eastbound Brighton Boulevard entrance ramp. This interface permits the CCMS for the Cover to close the approach to the Cover and expedite the flow of traffic downstream of the Cover in the event of an incident.

## 21.7 AUTOMATIC INCIDENT DETECTION SYSTEM

See narrative in Section 10.1, CCTV Camera System Type.

## 22. Drainage

Per Schedule 10, Section 12 of the Project Agreement, the Project requires a drainage system along the full length of the Cover to collect runoff that would result from discharge of the FFFS. The Department made revisions to the Project Agreement requirements based on information provided in KMP ATC 60, Cover Drainage System. Other discharges that are part of this drainage system include standpipe fire suppression systems, water washing operations, and spills of hazardous substances from fuel tanks should an automobile or truck accident occur within the limits of the Cover.

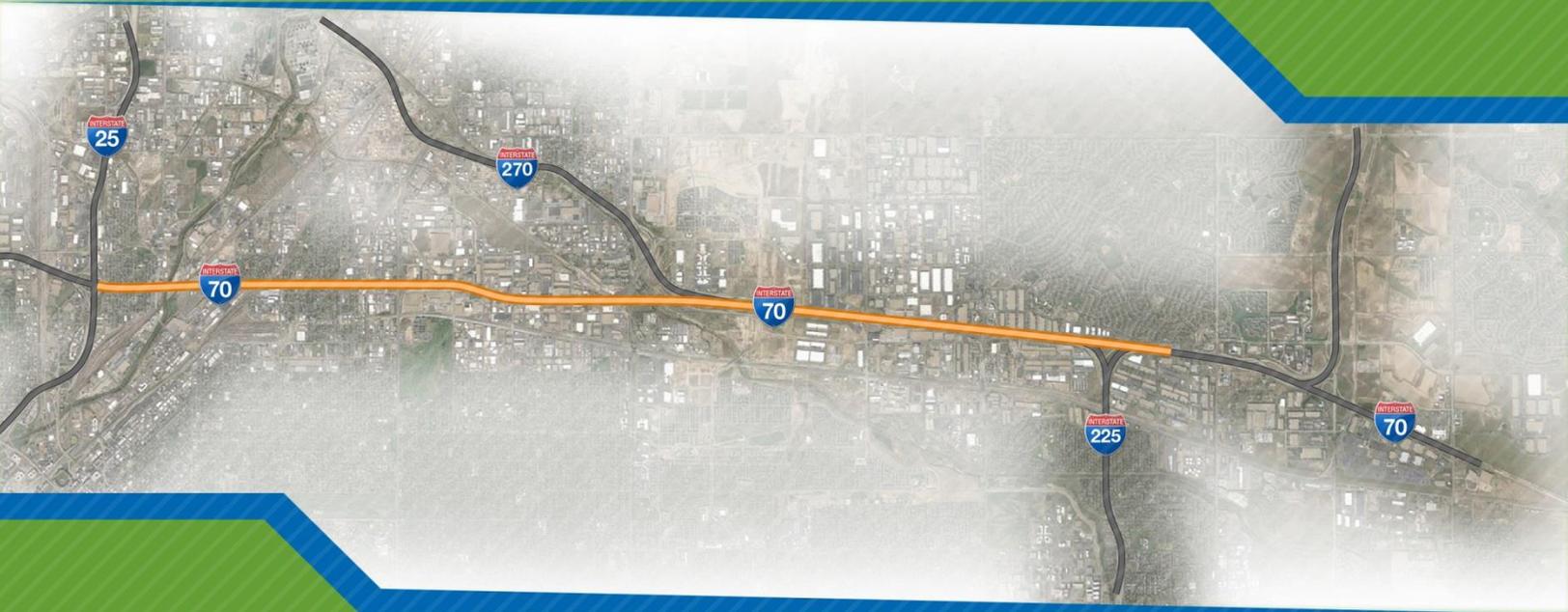
The Cover drainage system will monitor drainage effluent for levels of contamination. The drainage effluent will be automatically diverted to a holding tank when levels of contamination become too high to continue to the downstream drainage system. In order to “isolate” the drainage system for the Cover area, the KMP design will capture runoff from the I-70 mainline prior to the Cover by installing a series of inlets on the upstream (east) end of the Cover. Contamination levels will be monitored at the downstream end of Cover drainage system (west end of the Cover). Monitoring will be done with a check valve type system within a manhole structure. If levels are within the acceptable range, the check valve will allow the flow to continue downstream to the I-70 mainline drainage system. Potential hazardous substances would be captured and collected in a 500-gallon tank and subsequently pumped out and brought to a hazardous waste facility for disposal.



# Central 70 Project

Alternative Technical Concept Submission

ATC 37.2



Submitted to:  
Colorado Bridge Enterprise  
High Performance Transportation Enterprise  
c/o Colorado Department of Transportation



Detailed ATC Submission

## ANNEX 3: ALTERNATIVE TECHNICAL CONCEPT SUBMISSION FORM

**Proposer Name:** Kiewit-Meridiam Partners

**Date:** February 22, 2017

**Central 70 Project RFP: ATC Submission No. 37.2**

**Alternate Cover Electrical System Requirements**

### A. Background Information

1. Type of Submission

Conceptual ATC

Detailed ATC

2. Prior Submission

None (initial submission of ATC)

Previously Submitted as Conceptual ATC

Previously Submitted as Detailed ATC

3. Explanation of Reason for Resubmission

*KMP is resubmitting the Detailed ATC to address the items requested on the conditional approval of Conceptual ATC 37.0, subsequent rejection of previously conditionally approved ATC 37.1 and results of discussions from AHJ meeting on January 25, 2017.*

4. Request for Discussion at One-on-One Meeting

Meeting Requested

Meeting Not Requested

### ATC 37.2 Benefits

- ✓ Practical Design
- ✓ Equal or better performance and reliability
- ✓ Optimize the scope
- ✓ Optimize operations and life cycle maintenance costs
- ✓ Reduces community impacts
- ✓ Approximate cost savings of \$2.5 million

### B. General ATC Submission Requirements

#### 1. Overview Description

This information **has been** amended since the submission of the previous version of this ATC. In an effort to provide the Procuring Authorities with an innovative, flexible, and cost effective design solution, Kiewit-Meridiam Partners (KMP) proposes to revise the requirements for the electrical system associated with the Cover. The purpose of this ATC is to provide a compliant electrical system design that is appropriate for the nature of this urban Cover structure.

KMP proposes to provide emergency power through the use of an uninterruptable power supply (UPS) and an on-site, stand-alone generator. UPS will be provided with a single UPS unit to service both tunnel emergency lighting and safety systems with 5-minute battery backup to override a momentary outage during transfer from normal to emergency source. Regarding redundant and/or reliable control, KMP proposes to remove the reference to IEC 61508 because this standard is not used in industry practice in the United States and is not applicable to tunnels.

Through proven engineering practice, KMP will deliver an efficient design for the Cover electrical system while minimizing unnecessary or operationally complex systems that are

included in the Project Agreement (PA). This compliant design will provide significant cost savings for the Project and will result in an electrical system that will ensure reliable functionality and deliver public safety during an emergency event. The single most important consideration in development of this concept is an analysis to ensure the safety of the workforce, public, and first responders responsible for protecting the community in emergency situations.

KMP understands that approval of these design concepts requires collaboration with the Authority Having Jurisdiction (AHJ) and subsequently presented the design concepts directly to the AHJ in an Individual Topic Meeting on January 25, 2017. Feedback from that meeting indicated that the AHJ had no objections or concerns with the revised design concept. Following the presentation, the Procuring Authorities requested the ATC be resubmitted. KMP acknowledges the requirement to further coordinate the design with the AHJ during the final design phase of the Project.

## 2. Relevant RFP Requirements

This information *has not been* amended since the submission of the previous version of this ATC.

This ATC proposes revisions to the requirements in Schedule 10, Section 12.11 (Cover Design Baseline Report), 12.17 (Cover ITS and Communications System) and Section 12.18 (Electrical Systems) of the PA.

## 3. Rationale

This information ***has been*** amended since the submission of the previous version of this ATC.

The purpose of this ATC is to provide a compliant electrical system design that is appropriate for the nature of the Cover structure. The proposed design uses one utility (electrical power) source for normal operations and an on-site, stand-alone, emergency generator in an outdoor enclosure for the emergency source. Power distribution equipment will be located in outdoor enclosures and within separate, dedicated rooms for normal and emergency electrical systems within the concession building, providing a more efficient, streamlined power distribution system, while meeting the requirements of NFPA 502 and NEC Section 700.

This ATC proposes to use a UPS system that serves both tunnel emergency lighting and the safety systems for power. The UPS will have a protection time of 5 minutes to override momentary outage during transfer of the power system from the normal to emergency source. This change from 120 minutes protection time currently required in the PA will provide significant system efficiencies resulting in substantial cost savings to the Project while delivering ample protection time for emergency power systems to engage. Centralizing these types of loads to one UPS system provides for a consolidated approach to the design with a battery plant that is suitable for the anticipated outage that may occur during transfer between the two sources.

NFPA 502 does not have requirements that the control system be subject to IEC 61508, and only indicates that tunnels have redundant facilities for the purpose of control and monitoring. Tunnels in the United States do not follow the IEC 61508 standard. US tunnel applications typically use primary and redundant PLC processor and power supply combination hubs configured in hot standby backup for uninterrupted control and monitoring. Typically, these PLC hubs are in physically separate cabinet locations from each other.

This ATC directly aligns with the following Project Goals:

- **Protect the Safety of the Workforce and Public:** First and foremost, KMP is committed to protecting the safety of the workforce, public, and first responders. The proposed ATC would not be pursued if it did not provide reliable power to the ventilation and fire life safety systems, which can be proven through good engineering practice.
- **Optimization of Scope:** This ATC will optimize scope through meeting the Project Goals and requirements while reducing construction schedule and cost.
- **Optimization of the Life Cycle Maintenance Costs:** The proposed electrical system will result in reduced long term maintenance costs.
- **Minimize Impacts:** This ATC results in a reduction of the footprint required for the utility vaults. Given the tight right-of-way constraints in the vicinity of the Cover, the reduction in footprint will assist in minimizing impacts to the nearby communities.

## 4. Impacts

This information *has not been* amended since the submission of the previous version of this ATC.

This ATC does not present any potential adverse safety, environmental, social, economic, community, traffic, operations and maintenance, or third party impacts.

## 5. Cost and Benefits Analysis

This information *has not been* amended since the submission of the previous version of this ATC.

Preliminary estimates indicate that this ATC will result in a construction cost savings of \$2 million. Additionally, this ATC will decrease cost in the O&M term by approximately \$500,000.

**Total cost savings for this ATC is anticipated to be approximately \$2.5 million.**

## 6. Schedule Analysis

This information *has not been* amended since the submission of the previous version of this ATC.

While localized construction durations will be reduced, further schedule analysis is required to determine if there will be any significant schedule savings to the overall Project.

## 7. Conceptual Drawings

This information ***has been*** amended since the submission of the previous version of this ATC to include additional attachments.

**Attachment A:** Proposed electrical and UPS system one-line diagram

**Attachment B:** Proposed CCMS PLC and Network Architecture

**Attachment C:** Tracked changes to Schedule 10 Section 12 of the Project Agreement

## 8. Past Use

This information *has not been* amended since the submission of the previous version of this ATC.

Projects throughout the country have implemented elements of this proposed electrical system; however, each project must be designed to meet its unique needs and the requirements of the

local AHJ. This ATC will provide an electrical system design that is appropriate for the nature of this urban Cover structure which will be proven through good engineering practice.

## 9. Additional Information

This information *has been* amended since the submission of the previous version of this ATC to address the items included in the response to ATC 37.0 and ATC 37.1.

### **ATC 37.0 Comment #1**

*IEC 61508 is an internationally accepted standard. Please provide to what standard(s) KMP proposes in respect to redundancy and reliability of controls.*

#### **KMP Response:**

KMP is proposing to design the Cover CCMS PLC system to the Standards shown below:

- ANSI 37.1 Definition, Specification and Analysis of Systems Used for Supervisory Control and Data Acquisition, and Automatic Control
- NEMA IA2.1 Programmable Controllers - General Information
- NEMA IA2.2 Programmable Controllers - Equipment Requirements and Tests
- NEMA IA2.3 Programmable Controllers - Programming Languages
- NEMA IA2.4 Programmable Controllers – Part 4: User Guidelines.
- NEMA ICS1 Industrial Control and Systems General Requirements
- NEMA ICS1.1 Safety Guidelines for the Application, Installation and Maintenance of Solid State Control

KMP's intent is to implement a PLC architecture that is consistent with industry standard for roadway tunnels in the US through the use of equipment suitable for a resilient, reliable, and industrial control environment. Specifically, the proposed design is to use primary and standby PLC processors in separate racks, configured in a hot standby arrangement for automatic, uninterrupted switchover of the control program between processors, along with 2 redundant I/O communications networks to each field I/O drop, driven off of these processors as shown on the attached **Attachment B**.

### **ATC 37.0 Comment #2**

*Provide a power supply reliability analysis to demonstrate that the design meets the required level of safety meeting the PA requirements, US standards, US Codes of Practice, Guidance from Professional Bodies such as PIARC, and current technologies and practices in the US and internationally.*

#### **KMP Response:**

This comment pertained to the previously submitted ATC 37.1 alternate use of a separate utility service as the emergency source. The AHJ's experience with this approach for a different facility was found to be not as reliable as an on-site stand-alone generator which is preferred by the AHJ. Subsequent to ATC 37.1, our design approach has changed for this element to where an on-site stand-alone generator is now proposed for use as the emergency source, compliant with NFPA 502 and NEC Section 700.

KMP presented this approach directly to the AHJ in a confidential One-on-One Meeting on January 25, 2017. The AHJ indicated that this was acceptable and did not express any further

concerns from the AHJ's perspective. The AHJ did indicate that further coordination would be required with the city planning department for the final location of the generator. The Procuring Authority allowed the ATC to be resubmitted.

### **ATC 37.0 Comment #3**

*Provide examples of where this concept has been used in the past.*

#### **KMP Response:**

This comment pertained to the previously submitted ATC 37.1 alternate of using a separate utility service as the emergency source. The AHJ's experience with this approach for a different facility was found to be not as reliable as an on-site stand-alone generator which is preferred by the AHJ. Subsequent to ATC 37.1, our design approach has changed for this element to where an on-site stand-alone generator is now proposed for use as the emergency source, compliant with NFPA 502 and NEC Section 700.

### **ATC 37.1 Disapproval**

*Subsequent to sending the response to this ATC on September 12, 2016, the Procuring Authorities met with the AHJ regarding the concept presented in this ATC. The AHJ is not willing to approve this concept. Prior experience indicates that system reliability is a major problem with electrical systems designed in the manner presented in this ATC. A topic meeting has been scheduled with the AHJ for the end of January. If there is any feedback at the meeting that impacts this ATC, the ATC may be resubmitted for reconsideration.*

KMP presented the design concepts within this ATC directly to the AHJ in a confidential One-on-One Meeting on January 25, 2017. Feedback and results from that meeting indicated that the AHJ had no objections or concerns with the design concepts after presentation, to which the Procuring Authorities requested the ATC be resubmitted. KMP acknowledges the requirement to further coordinate the final design with the AHJ during the final design phase of the Project.

Specifically, the AHJ's concern with ATC 37.1 was with using the second utility source as the emergency source to comply with NFPA 502 and the NEC section 700. The AHJ indicated that this approach had been used before for different facilities and that it was not found to be as reliable as an on-site stand-alone generator which is preferred by the AHJ. KMP addressed this concern by explaining that since submission of the previous ATC, an on-site stand-alone generator was now proposed for use as the emergency source. This approach is compliant with NFPA 502 and NEC Section 700. The AHJ indicated that this was acceptable and did not express any further concerns.

## **C. Detailed ATC Requirements**

### **1. Risks**

There are no changes or additional risks to the Procuring Authorities, CDOT, the State, or third parties associated with implementation of the ATC.

### **2. Handback**

There are no significant changes in Handback procedures and/or the Handback Requirements associated with this ATC. This ATC will eliminate the need for the Department to maintain generators following handback.

### 3. Right-of-Way

No additional right-of-way is required to implement this ATC.

### 4. List of Required Approvals

There are no additional third party and Governmental Approvals, including any Design Exception, associated with this ATC.

### 5. Proposed Drafting Revisions

KMP has included the **Attachment C** with tracked changes for the changes in the sections listed above

a) RFP Requirements that are Inconsistent with Proposed ATC

KMP requests that the following sections be revised for the exclusive use by KMP upon acceptance of this ATC.

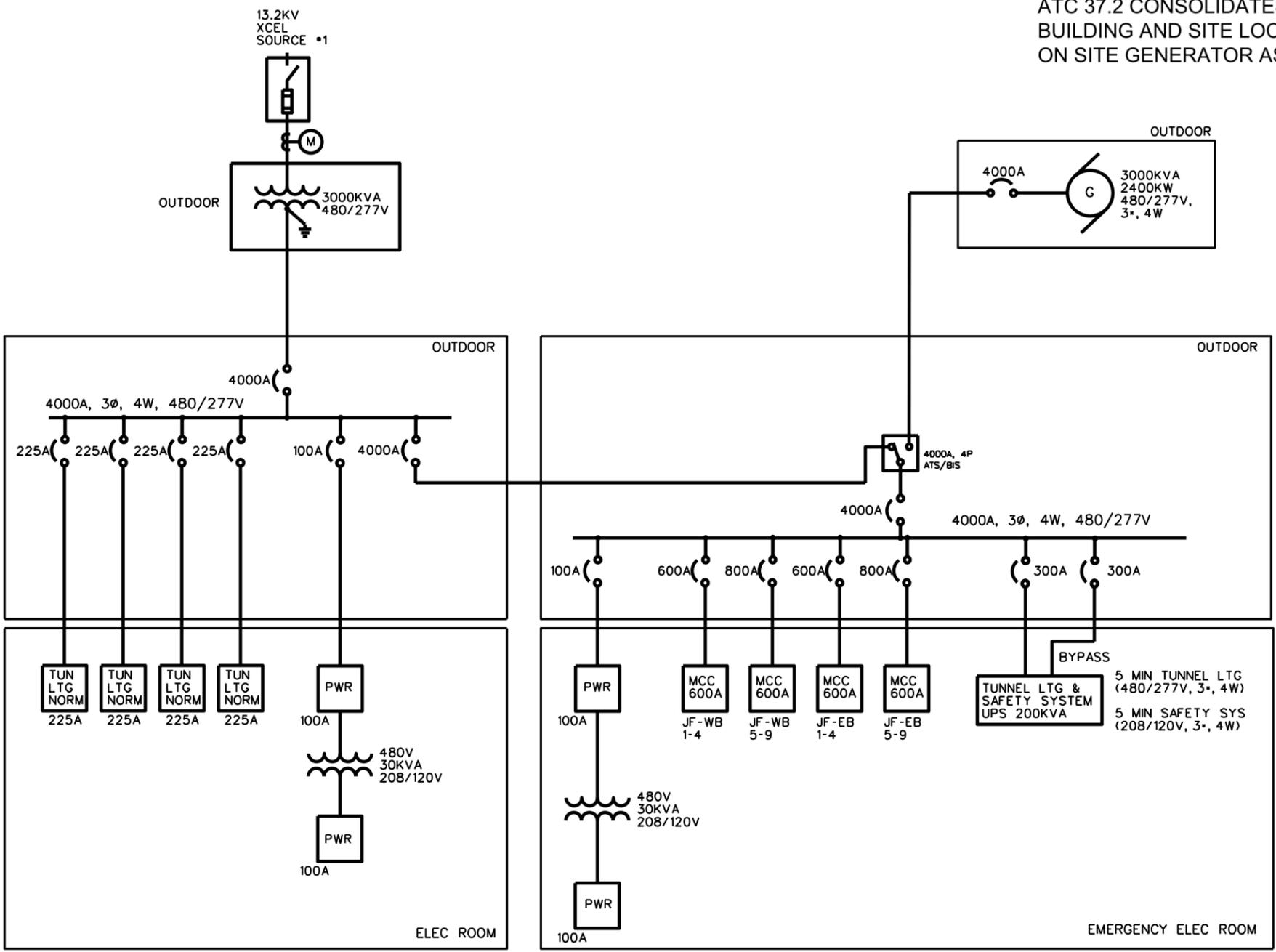
1. Section 12 of Schedule 10 of the PA

b) Proposed Revisions to address Inconsistencies

KMP has included **Attachment C** with tracked changes for the changes in the section listed above.



**NOTE:**  
 ATC 37.2 CONSOLIDATES EQUIPMENT INTO 1 SERVICE BUILDING AND SITE LOCATIONS, WITH STANDALONE, ON SITE GENERATOR AS EMERGENCY SOURCE.



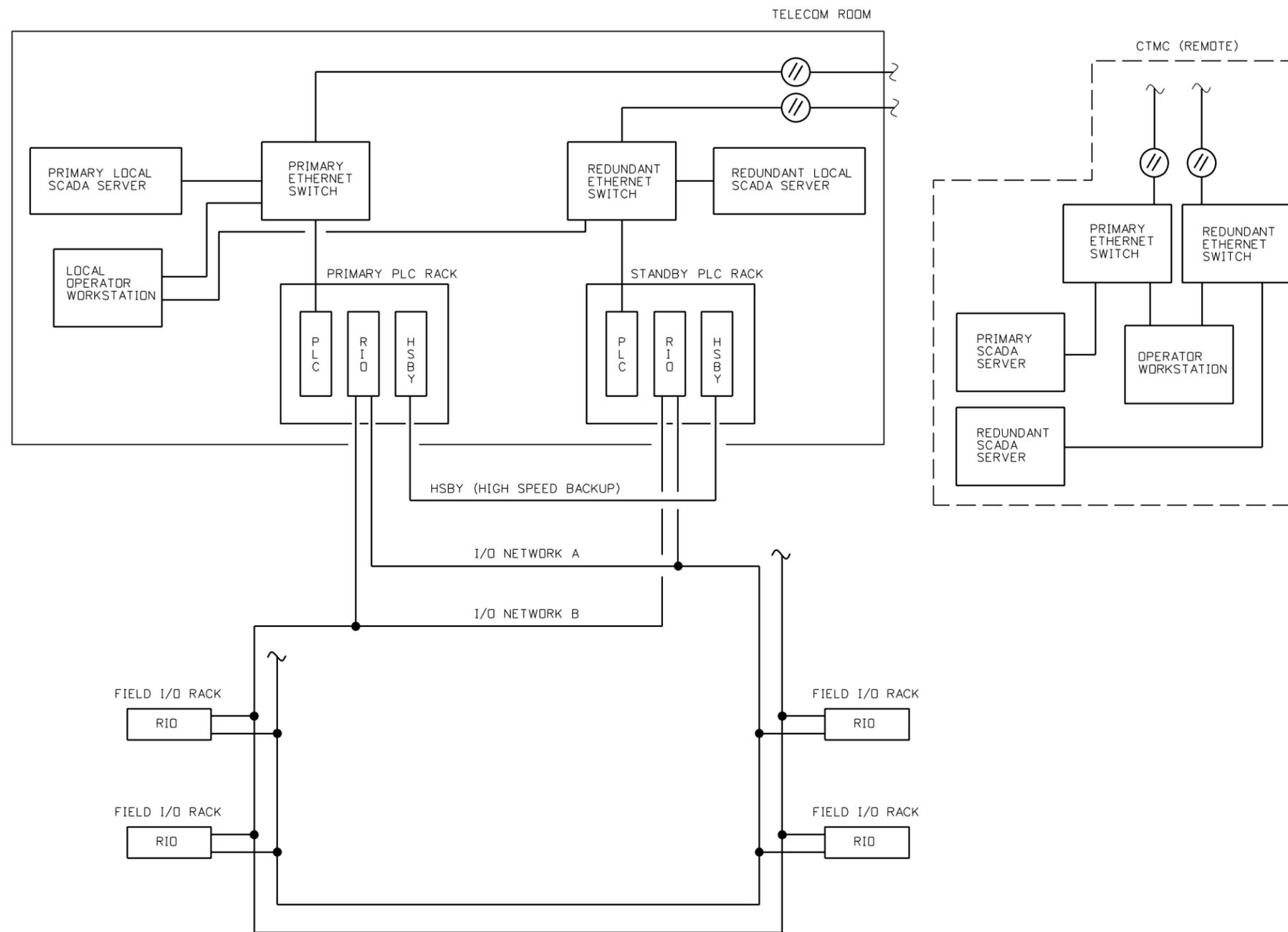
REFERENCE	SECTION	PAGE
B.7	CONCEPTUAL DWGS	3

ALTERNATIVE TECHNICAL CONCEPT  
**COVER ELECTRICAL SYSTEMS**

ATTACHMENT A

ATC NUMBER  
**37.2**

SHEET NUMBER 1 OF 1



**LEGEND**

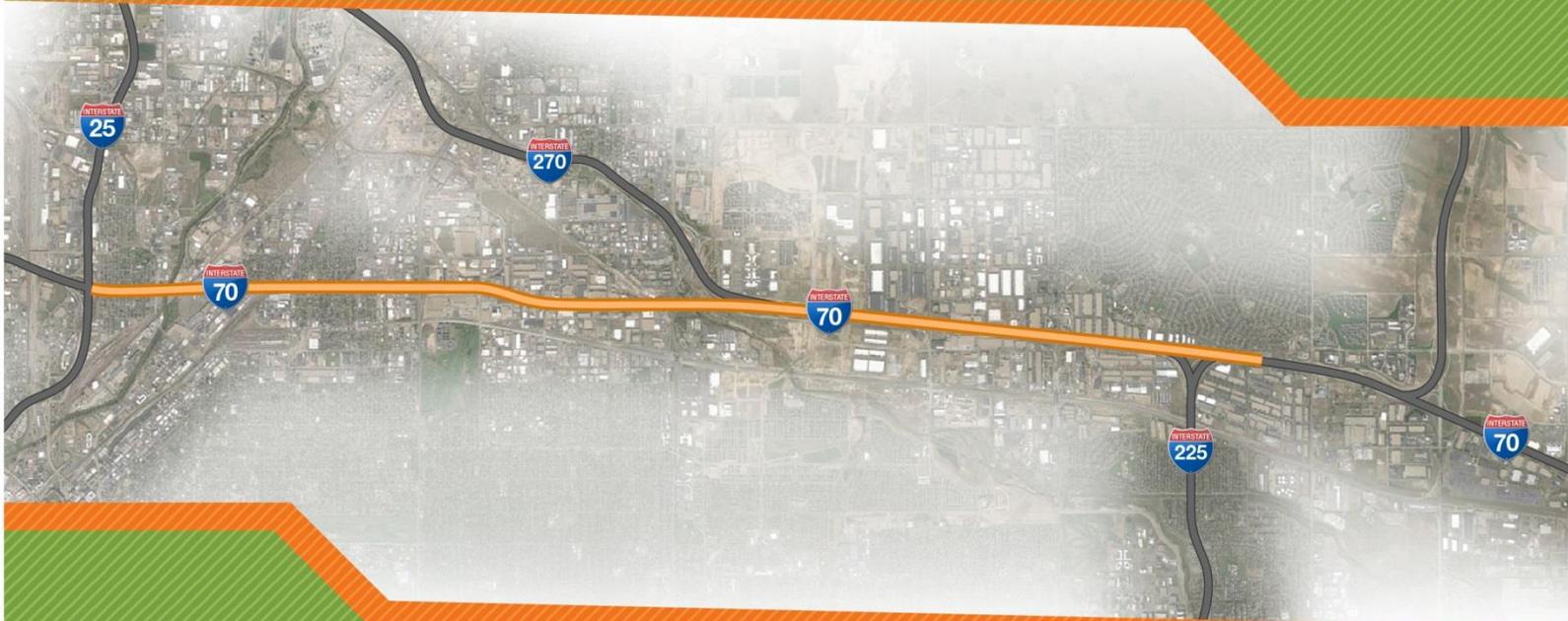
- P  
L  
C PROGRAMMABLE LOGIC CONTROLLER
- R  
I  
O REMOTE I/O NETWORK COMMUNICATIONS MODULE
- H  
S  
B  
Y HIGH SPEED COMMUNICATIONS BACKUP MODULE

REFERENCE	SECTION	PAGE
B.7	CONCEPTUAL DWGS	3
B.8	PAST USE	4

# Central 70 Project

Attachment C – Tracked Changes to Section 12 of Schedule 10

ATC 37.2



Submitted to:  
Colorado Bridge Enterprise  
High Performance Transportation Enterprise  
c/o Colorado Department of Transportation



Detailed ATC Submission

February 22, 2017

- b. Proposed ventilation system type and supplier;
  - i. Proposed ventilation design process; and
  - ii. Approach to derivation of design adverse cover portal pressure condition;
- c. Proposed FFFS type and supplier;
- d. Fire detection system type, model and supplier;
- e. CCTV camera system type, model and supplier;
- f. Operator interface system;
- g. Monitoring and control system;
- h. Proposed system operation;
- i. Hydraulic and pneumatic calculations;
- j. Computational Fluid Dynamics (CFD) analysis process, model, cases and assumptions;
- k. Proposed approach to demonstrating FFFS performance;
- l. ~~Analysis of the safety functions for all fire and life safety systems as prescribed in IEX61508-1; Proposed approach to passive fire protection as prescribed in NFPA 502, Section 7.3~~
- m. Lighting and signing;
- n. ITS; and
- o. Drainage.

#### **12.12. Emergency Response Plan**

- 12.12.1. The Developer shall prepare an Emergency Response Plan (ERP), as described in NFPA 502. The Developer shall conduct coordination meetings with the Department and stakeholders including City of Denver Fire Department, to discuss the details of the Cover MEP System operation and Emergency procedures. Such meetings shall be held at various stages of design development including draft and final stages. Additional stakeholders are to be determined by CDOT and the AHJ. The ERP shall be submitted by the Developer to the Department for Acceptance at the same time as the Final Cover Design Baseline Report.
- 12.12.2. The Developer shall update the ERP and submit no later than 60 Calendar Days prior to opening of the Cover, or any part thereof, for Acceptance by the Department.

#### **12.13. Ventilation**

##### **12.13.1. Scope**

A Cover MEP System shall include a Cover Ventilation System (CVS). The scope of the CVS specification is limited to the ventilation of the Cover over I-70 Mainline only and excludes any plant room or service building ventilation systems.

##### **12.13.2. System Requirements**

The CVS shall be of longitudinal concept comprising jet fans. The system shall be developed for the following two principal operating modes:

- a. Normal and congested operations: in situations where the traffic induced airflow is insufficient to maintain vehicle emitted pollutants to within acceptable levels, additional airflow will be generated by the ventilation system; and
- b. Emergency operations: in the event of an Emergency incident, the ventilation system shall be operated to control the smoke and hot gasses and shall discharge the smoke and gases via the exit Portal.

- vii. Control the operation of the radio rebroadcast systems;
  - viii. Control the operation of the voice alarm and public address system;
  - ix. Monitor the status of the fire main system;
  - x. Monitor the status and manage alarms from the AID system;
  - xi. Monitor the status and manage alarms from the Fire Detection system;
  - xii. Monitor the status and manage alarms from the cross bore doors;
  - xiii. Monitor Plant Room systems including heating, ventilation, and air conditioning (HVAC), lighting, intruder alarm, fire alarm, FFFS etc;
  - xiv. Monitor the status and manage alarms from all environmental and other sensors;
  - xv. Monitor the status of the power distribution system; and
  - xvi. Request, via an appropriate interface, specific actions from the traffic management systems (including automatic responses to state changes and alarms from the systems being monitored).
- c. The CCMS shall be integrated with the Project ITS to allow the operators to manage and co-ordinate the operation of the I-70 Mainline in the Cover and along both approaches. The Developer shall be responsible for any integration necessary, including any required CTMS and Qognify software modifications. These include:
- i. LUS;
  - ii. DMS;
  - iii. Communications Systems;
  - iv. CCTV;
  - v. Ramp metering systems; and
  - vi. Vehicle detection systems.
- d. The CCMS shall be based upon a programmable logic controller (PLC) based Supervisory Control and Data Acquisition (SCADA) system. Configuration shall use primary and redundant PLC processor and power supply combination hubs configured in hot standby back up for uninterrupted control and monitoring. These PLC hubs shall be in physically separate cabinet locations from each other. These PLC hubs shall be connected to remote I/O (input/output) cabinets using fault tolerant, redundant, remote I/O communications links for a distributed I/O approach. Interfaces to systems both in the Cover, on the I70 Mainline and on the surface streets may be required.
- e. The Developer shall provide Cover operations staff to continuously monitor and control the Cover MEP System. Such staff shall:
- i. be co-located with CDOT ITS staff at the CTMC;
  - ii. be responsible for the remote control and monitoring of the Cover MEP System; and
  - iii. assist with Courtesy Patrol dispatch, general traffic, roadway, weather, construction and Special Event management, ATM, and Tolloed Express Lane system monitoring and operations.

CDOT ITS staff will cross-train Developer operations staff to assist with operator duties beyond the Cover MEP System (refer to Section 12.8 for Developer training requirements). CDOT will provide one seating area with a desk and computer for housing at the CTMC. Developer shall provide software, licensing, and remote access to all Cover MEP System

b. Cable Management System

A full cable management system will be provided in the cornice on each side of the roadway and on the soffit on the centerline of the roadway. The cable management system will be provided using open high corrosion resistance stainless steel cable tray, trunking or conduit.

c. Cabling Requirements

Cables installed in the Cover shall be constructed using low smoke and fume insulation. Cables containing halogens will not be permitted in the Cover. Cabling for essential and life-safety systems shall be constructed from fire survivable materials.

## 12.18. Electrical Systems

### 12.18.1. Basis of design

The Developer shall design, provide, install, test and commission all electrical power systems in accordance with the appropriate NFPA standards or other such applicable standards and specifications of the AHJ. The Developer shall allow attendance at all performance testing and demonstrations by the Department and relevant Local Agencies or appointed representatives. The Developer shall undertake all necessary surveys and investigations to validate its design including, but not limited to utility surveys, investigations, enquiries with relevant Governmental Authorities and for obtaining all necessary Governmental Authorities.

### 12.18.2. Design Criteria – Electrical Power

- a. The Developer shall verify with the AHJ whether the requirements of NFPA 502 – Chapter 12 Electrical Systems (clause 12.1.5) are to be incorporated into the design.
- b. The electrical systems shall be designed to support life safety operations, fire Emergency operations, and normal operations. The electrical systems shall be designed to allow for routine maintenance without disruption of traffic operation.
- c. ~~The main electrical distribution shall be configured, interconnected and controlled to allow all services to the Cover to remain operational in the event of a single power supply transformer failure in the substation at either end of the Cover.~~ The main electrical distribution shall be configured, interconnected and controlled to allow all services to the Cover to remain operational in the event of the utility power supply transformer failure at the end of the Cover.
- d. Main low voltage switchboards shall be configured with interlocking switchgear to allow for Emergency standby generator installation to be connected to serve all essential services supplies to the Cover.
- e. Diesel generator shall be provided for backup purposes in order to run the Cover in the event of a failure of the utility electrical supply.

### 12.18.3. Design Criteria – Emergency Power

a. Emergency Standby Generator

Emergency Power shall be provided by an Emergency standby generator in accordance with Article 700 of NFPA 70. (For Emergency and standby power systems as NFPA 110).

b. The following systems shall be connected to the Emergency power system:

- i. Emergency lighting;
- ii. CCMS and ITS;
- iii. Exit signs;
- iv. Emergency communications;
- v. Cover drainage monitoring;

- vi. Emergency ventilation;
  - vii. Fire alarm and detection;
  - viii. Closed-circuit television or video; and
  - ix. FFFS.
- c. Emergency Power Circuits
- Emergency circuits installed in the Cover and ancillary areas shall remain functional for a period of not less than one hour, for the anticipated fire condition.
- d. Emergency circuits shall comprise one of the following:
- i. Fire-resistive cables;
  - ii. Circuits embedded in concrete that are protected by a two-hour fire barrier system; and
  - iii. By the routing of the cable system external to the roadway using diversity in system routing as approved, such as separate redundant or multiple circuits separated by a one hour fire barrier, so that a single fire or Emergency event will not lead to a failure of the system.
- e. Emergency Power UPS System
- i. ~~Two separate UPS systems shall be provided with each of the services buildings located near each end of the Cover. One of these will feed the lighting system whilst the other will feed the remaining safety critical plant. Single UPS system shall be provided within the emergency electrical room. UPS system shall jointly serve the lighting system and the remaining safety critical plant.~~
  - ii. Single UPS system shall be provided within the emergency electrical room. UPS system shall jointly serve the lighting system and the remaining safety critical plant.
  - iii. The UPS specification shall be developed based on the following;
    - A. ~~Three phase, on-line, double-conversion, static-type, UPS unitys with 120 minute battery Autonomy; Three-phase, on-line, double-conversion, static-type, UPS units with 5 minute battery Autonomy to override momentary outage during transfer from normal to emergency source;~~
    - B. 20% Spare capacity;
    - C. N+1 parallel redundant configuration; and
    - D. External wraparound bypass unit

#### 12.18.4. Design Criteria – Containment

Containment shall be provided throughout the Cover for all cabling services. Separate containment systems shall be provided for power and control/communications cabling, segregated in line with Good Industry Practice. Armored cables shall be run on cable trays with non-armored cables run in trunking or conduit to suit the required routing. Control and communications cables shall be run in conduit.

#### 12.18.5. Design Criteria – Cabling

All cables and associated materials shall be insulated or clad using low smoke, zero halogen (LSOH) materials and where required, certain cables will be fire survivable cables.

### 12.19. Lighting

#### 12.19.1. Scope



DATE: March 13, 2017  
TO: Kiewit-Meridiam Partners (KMP)  
FROM: Anthony DeVito P.E. Central 70 Project Director  
Nicholas Farber, Central 70 Project  
SUBJECT: Central 70 - Detailed Alternative Technical Concept (ATC) Response  
Kiewit-Meridiam Partners - ATC No. 37.2

Dear Mr. Dionisio:

Your Team's ATC Submission Form for Detailed ATC 37.2 has been reviewed by the Procuring Authorities. Detailed ATC 37.2 proposes to provide a compliant electrical system design that is appropriate for the nature of the urban Cover structure.

In accordance with the Instructions to Proposers ("ITP"), the Procuring Authorities will use reasonable efforts to provide a Proposer with the following written feedback on a ATC Submission within 15 Working Days following the later of (x) the date the relevant ATC Submission was submitted and (y) the One-on-One Meeting at which such submission is discussed. Below is the final response from the Procuring Authorities for your Detailed ATC:

- 1. unconditional approval;
- 2. conditional approval, subject to modifications and/or conditions;  
 Re-submission required     Re-submission not required
- 3. disapproval, with or without guidance that such ATC can be re-submitted under any circumstance;
- 4. notification that the incorporation of the proposed ATC in the Proposer's Proposal is already permitted under the terms of the RFP, and therefore does not qualify as an ATC (and will not be treated as such for purposes of Section 3.4 of Part C of the ITP).
- 5. subject to compliance with the confidentiality requirements set out in Section 3.4 of Part C of the ITP, the Procuring Authorities are considering amending (for the benefit of all Proposers) the terms of the RFP that are the subject-matter of the proposed ATC.

The ATC is approved with the following conditions:

Conditions of approval:

1. The proposed modifications to remove the reference to IEC 61508 are not acceptable to the Procuring Authorities. The Project control systems shall remain subject to compliance with IEC 61508.
2. The battery autonomy of the UPS systems shall be at least long enough to allow the generator to start and stabilize. Additionally, the design shall consider the time required to safely shut down the tunnel in the event that the generator does not start. If selected as the Preferred Proposer, Developer shall be required to submit information demonstrating compliance with these requirements for Acceptance by the Procuring Authorities.



3. The Developer shall solely be responsible for any Governmental Approvals required to implement this ATC. In particular, approval from the AHJ will be required.

The approval of this Detailed ATC by the Procuring Authorities does not constitute an approval of specific drafting modifications to the RFP necessary to incorporate this ATC into the Project Agreement pursuant to Section 7.2.1.c of Part C of the ITP, which modifications shall be agreed by the Procuring Authorities and the Proposer (each acting reasonably) following issuance of a Notice of Award to such Proposer.

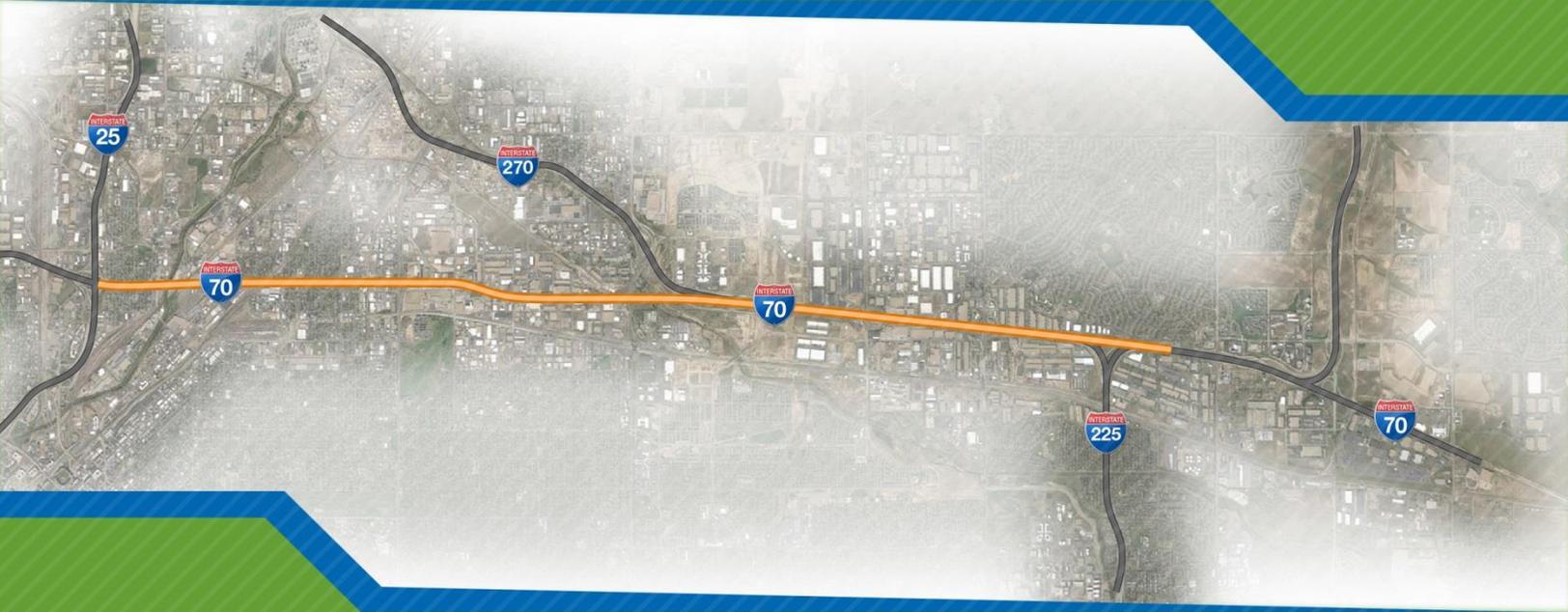




# Central 70 Project

Alternative Technical Concept Submission

ATC 66.0



Submitted to:  
Colorado Bridge Enterprise  
High Performance Transportation Enterprise  
c/o Colorado Department of Transportation



Detailed ATC Submission

## ANNEX 3: ALTERNATIVE TECHNICAL CONCEPT SUBMISSION FORM

**Proposer Name:** Kiewit-Meridiam Partners

**Date:** January 24, 2017

**Central 70 Project RFP: ATC Submission No. 66.0**

**Cover Air Quality Monitoring**

### A. Background Information

1. Type of Submission
  - Conceptual ATC
  - Detailed ATC
2. Prior Submission
  - None (initial submission of ATC)
  - Previously Submitted as Conceptual ATC
  - Previously Submitted as Detailed ATC
3. Explanation of Reason for Resubmission  
N/A
4. Request for Discussion at One-on-One Meeting
  - Meeting Requested
  - Meeting Not Requested

### ATC 66.0 Benefits

- ✓ Allows for Greater Design Flexibility
- ✓ Equal or Better Performance
- ✓ Optimizes Lifecycle and Maintenance Costs
- ✓ Minimizes Impacts
- ✓ **Over \$250,000 in Cost Benefit**

### B. General ATC Submission Requirements

#### 1. Overview Description

In effort to provide the Procuring Authorities with an innovative, flexible, and cost effective design solution, Kiewit-Meridiam Partners (KMP) proposes to utilize a performance standard in lieu of the proposed prescriptive air monitoring requirements detailed for the Cover section of the Project Agreement (PA). Schedule 10, Section 12.13.10 of the PA requires monitoring of carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), visibility, air speed, air flow direction, and temperature in the Cover section utilizing a specific number of sensors - fourteen (14) sensors. This ATC proposes to reduce the prescriptive quantity of sensors, yet achieve the same result as current PA requirements through adherence to the proposed performance standard.

Implementing a performance standard to monitor air quality will allow KMP to optimize design through an equal, or better solution. Significant cost savings over the term of the Project will result from implementation of this ATC. The single most important consideration in development of all concepts is to ensure the safety of the workforce and public. This ATC has been analyzed thoroughly to ensure the proposed PA revisions reduce maintenance without posing any adverse impact on the ability to continuously monitor air quality within the Cover.

#### 2. Relevent RFP Requirements

Schedule 10, Section 12.13.10.e requires a total of eight sampling points (four per bore). Section 12.13.10.h requires six air speed monitors, two in each bore and four outside of the

Cover (effectively at each portal). It is recommended that Section 12.13.10 be reworded as a performance based standard focused on air quality.

### 3. Rationale

KMP is proposing to use a performance standard to provide air quality monitoring equal to the requirements currently prescribed in the PA while reducing the quantity of air quality sensors. The number of sensors asked for in the PA is excessive for a facility of this length where longitudinal ventilation is employed (eight inside the tunnel for vehicle emissions, and then another six monitors for air speed inside and outside of the Cover). The proposed performance standard will provide demonstration of adequate performance through the following:

- Sensors to measure CO, NO<sub>2</sub>, and visibility inside the Cover (to control air quality levels).
- Fan equipment sensors to register air flow and direction of fan operation (to verify that ventilation is operational), making velocity and temperature measurement sensors unnecessary.
- Analysis to demonstrate likely pollution level during normal free flowing traffic, full congested traffic (stopped) with and without external wind.

This will result in reduced maintenance, reduced systems integration requirements, and simplified programming and operation. This Concept directly aligns with the following Project Goals:

- **Protect the Safety of the Workforce and Public:** First and foremost, KMP is committed to protecting the safety of the workforce and public. The proposed Concept reduces the time and frequency of maintenance, inspection and testing of sensors over the term of the project, thus reducing worker exposure to vehicular traffic.
- **Optimize Operating and Life Cycle Maintenance Costs:** The proposed ATC will substantially reduce the O&M requirements associated with the system's rigorous maintenance requirements, simplify system commissioning, and reduce significant rehabilitation/replacement costs.
- **Optimize the Scope:** Reducing the quantity of air quality sensors provides a more efficient Project scope while maintaining an equivalent level of air quality monitoring.
- **Minimize Impacts to the Traveling Public:** Potential lane restrictions and impacts to the traveling public are minimized by reduced maintenance time.
- **Ensure Reliable Travel Speeds:** As described above, this alternative concept will reduce maintenance time under the Cover, resulting in more reliable travel speeds over the term of the project.

### 4. Impacts

This ATC presents no potential adverse environmental, social, economic, community, traffic, safety, operations and maintenance or third party impacts.

### 5. Cost and Benefits Analysis

Preliminary cost estimates indicate that the cost savings of this ATC will exceed **\$250,000**.

## 6. Schedule Analysis

This ATC has no impact on the construction schedule; however, maintenance durations will be reduced over the term of the project.

## 7. Conceptual Drawings

**Attachment A:** Tracked changes to Section 12 of Schedule 10

## 8. Past Use

The new Midtown Westbound tunnel in Norfolk, Virginia, is 4,198 feet long and utilizes four air quality sensors. The Port of Miami tunnel is 4,200 feet long and it utilizes four air quality sensors per bore. Both tunnels are operational with no known issues with regard to air quality sensors.

## 9. Additional Information

N/A

### Detailed ATC Requirements

#### 1. Risks

There are no changes or additional risks to the Procuring Authorities, CDOT, the State or third parties associated with implementation of the ATC.

#### 2. Handback

There are no changes in handback procedures and/or the Handback Requirements associated with this ATC.

#### 3. Right-of-Way

No additional Right-of-Way is required to implement this ATC.

#### 4. List of Required Approvals

No change in the approvals is required to implement this ATC.

#### 5. Proposed Drafting Revisions

a) RFP Requirements that are Inconsistent with Proposed ATC

Schedule 10 Section 12.13.10

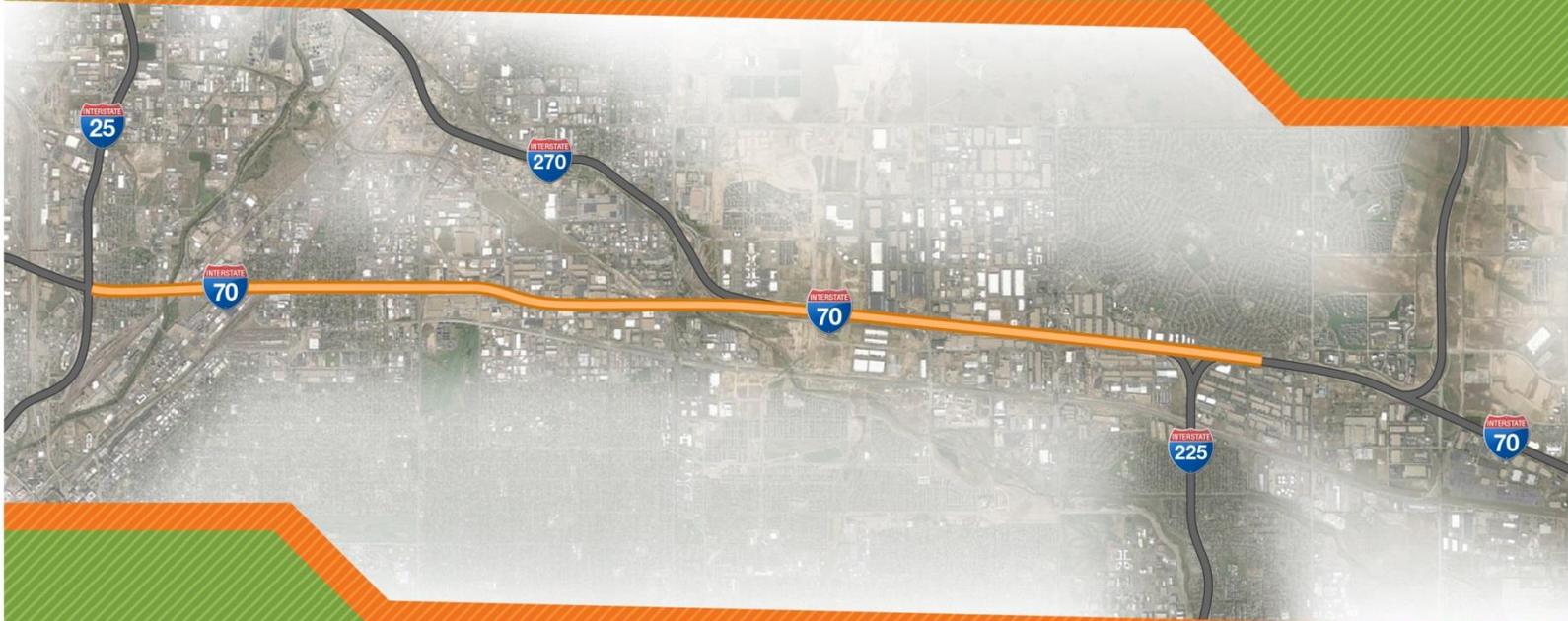
b) Proposed Revisions to address Inconsistencies

A copy of the proposed changes to the Project Agreement is attached.

# Central 70 Project

Attachment A – Tracked Changes to Section 12 of Schedule 10

ATC 66.0



Submitted to:  
Colorado Bridge Enterprise  
High Performance Transportation Enterprise  
c/o Colorado Department of Transportation



Detailed ATC Submission

January 24, 2017

a minimum period of one hour. The Developer shall include a manufacturer's type test certificate showing that the design meets these requirements as part of its design submittal.

- h. The whole fan assembly shall be waterproof and capable of withstanding water spray from maintenance washing vehicles and the FFFS. A drain fitting with cap shall be located in the lowest part of the fan housing, if not self-draining by manufacturers design.

#### 12.13.8. Jet fan motors

The jet fan motors shall conform to the following requirements:

- a. Suitable for use in the corrosive atmosphere;
- b. Suitable for use with soft starters;
- c. Be totally enclosed fan ventilated cage rotor type;
- d. Protected motor enclosure;
- e. Lifting lugs or eyes shall be provided; and
- f. Capable of being run in an inclined position, not greater than 15° from the horizontal with no detrimental effects.

#### 12.13.9. Ventilation Control System

A ventilation control system (VCS) for the CVS shall be integrated into the CCMS to:

- a. Permit interface between the operator and CVS equipment components;
- b. Provide automatic ventilation control in normal operations, ensuring the Cover is maintained within required environmental conditions that can be adjusted when required;
- c. Operate in real time to provide live monitoring, control and fault reporting of the CVS equipment;
- d. Provide real time indication of status and alarm conditions at various operator locations;
- e. Interface with and provide data transfer between related systems;
- f. Provide a secure interface between the CVS equipment and the automatic incident/fire detection systems in the event of fire in the Cover; and
- g. Minimize effects and constraints on tunnel operations through automatic reconfiguration modes in the event of plant failure or routine maintenance activities.

#### 12.13.10. Monitoring Equipment and System

Monitoring equipment shall be provided for the continuous monitoring of air quality Visibility, CO, NO<sub>2</sub>, air speed, air flow direction and temperature in the Cover and:

- a. At a minimum, sensors shall be provided to measure CO, visibility, and NO<sub>2</sub> within the cover in each direction of travel, and there shall be a back-up sensor for each quantity being measured (i.e. minimum of four sensors, assuming one self-contained sensor can measure CO, visibility and NO<sub>2</sub>);
- b. Sensors to measure airspeed, air flow direction and temperature inside and outside of the Cover shall be provided unless the Contractor can demonstrate that these quantities are not essential to control of air quality conditions or smoke movement in the Cover;
- ~~a-c.~~ For pollution monitoring, a logical method for control shall be developed for normal, maintenance and congested operations and to safeguard the fans from frequent switching;
- ~~b-d.~~ Pollutant and visibility monitors shall be located adjacent to the traffic lanes in the Cover, at locations where the worst level is anticipated; The location of sampling points shall avoid dilution by air circulation from the Portals;

- ~~e.e.~~ All monitoring equipment shall be calibrated to represent the average air quality for a 15-minute rolling average within the Cover;
- ~~d.f.~~ Monitoring system shall be provided to facilitate operational data to be recorded and stored for analysis. Data to be recorded shall include pollution levels (at least CO, visibility and NO2), Cover air speed, fan operations and alarm states, and if air speed, direction and temperature sensors are required that data shall be recorded also;
- ~~e.~~ For the measurement of pollutants, at least two sampling points shall be provided at each side of the each bore of the Cover (eight in total). The location of sampling points shall avoid dilution by air circulating from the Portals;
- ~~f.g.~~ Monitoring stations shall be located and configured so as to provide data to drive the VCS for the management of pollutants in the Cover to acceptable limits;
- ~~h.~~ Monitoring equipment shall not be installed near to jet fan inlets and outlets so as to affect the performance of the CVS; and
- ~~g.i.~~ Contractor shall provide analysis of anticipated air quality quantities in the Cover (CO, visibility, NO2, air speed, temperature) under peak hour flowing traffic, fully congested conditions (stopped traffic) with and without an external wind blowing. For each scenario Contractor shall use the analysis to compute the worst pollution level likely and to demonstrate that the monitoring equipment will provide adequate notification to prevent air quality criteria being violated.
- ~~h.~~ Six air speed and direction monitors shall be installed: two in each bore of the Cover to provide information to the operator on the flow speed and direction of air inside the Cover and two outside the Cover near to each Portal at a location suitable to provide information on external ambient wind conditions to the operator. Proposed locations shall be detailed in the Developer's Fire System Performance Report.

#### 12.13.11. Interfaces to Other Systems

- a. Command, Control and Monitoring System  
The CCMS shall read and display the status and settings of all fans and control equipment. The operator shall be able to control the ventilation on a per bore basis using a series of pre-configured plans on the CCMS.
- b. Fixed Fire Fighting System  
The CVS shall work in tandem with FFFS. The CVS shall be designed to be operated in a way that minimizes the impact on the effectiveness of the FFFS.
- c. Fire Detection and Alarm System  
The CVS shall interface to the fire detection and alarm system to determine the location of any active fire detections.
- d. Pollution Monitoring System  
The VCS shall interface with the pollution monitoring system via the CCMS, so that ventilation rates in the Cover can be set automatically, according to dilution requirements.

#### 12.13.12. Computational Fluid Dynamics Model

Effective performance in operation of the combined FFFS and the CVS shall be demonstrated through analysis with a CFD model and comparison to full scale fire test data relevant to the proposed design. The CFD model shall be validated for the proposed performance of the CVS and FFFS based on prior full scale tests of the proposed systems considering ambient conditions listed in Section 12.13.6.

#### 12.13.13. Report contents



DATE: March 3, 2017

TO: Kiewit-Meridiam Partners (KMP)

FROM: Anthony DeVito P.E. Central 70 Project Director  
 Nicholas Farber, Central 70 Project

SUBJECT: Central 70 - Detailed Alternative Technical Concept (ATC) Response  
 Kiewit-Meridiam Partners - ATC No. 66.0

Dear Mr. Dionisio:

Your Team’s ATC Submission Form for Detailed ATC 66.0 was reviewed by the Procuring Authorities prior to the February One-on-One Meetings and an initial response was sent to you on February 9, 2017. As discussed during the February One-on-One Meeting, the Procuring Authorities committed to provide a final response to your Detailed ATC.

Detailed ATC 66.0 proposes to utilize a performance standard in lieu of the proposed prescriptive air monitoring requirements detailed for the Cover section of the Project Agreement.

In accordance with the Instructions to Proposers (“ITP”), the Procuring Authorities will use reasonable efforts to provide a Proposer with the following written feedback on a ATC Submission within 15 Working Days following the later of (x) the date the relevant ATC Submission was submitted and (y) the One-on-One Meeting at which such submission is discussed. Below is the final response from the Procuring Authorities for your Detailed ATC:

- 1. unconditional approval;
- 2. conditional approval, subject to modifications and/or conditions;
  - Re-submission required       Re-submission not required
- 3. disapproval, with or without guidance that such ATC can be re-submitted under any circumstance;
- 4. notification that the incorporation of the proposed ATC in the Proposer’s Proposal is already permitted under the terms of the RFP, and therefore does not qualify as an ATC (and will not be treated as such for purposes of Section 3.4 of Part C of the ITP).
- 5. subject to compliance with the confidentiality requirements set out in Section 3.4 of Part C of the ITP, the Procuring Authorities are considering amending (for the benefit of all Proposers) the terms of the RFP that are the subject-matter of the proposed ATC.

Following our discussions at the One-on-One Meeting, the Procuring Authorities have not changed their initial response to your above mentioned Detailed ATC Submission. The ATC is approved with the following conditions:

Conditions of Approval:

- 1. The proposed modifications to Section 12.13.10.b that would permit the Contractor to forgo measurement of airspeed, air flow direction, or temperature under certain circumstances are not



acceptable to the Procuring Authorities. The sensors to measure airspeed, air flow direction and temperature inside and outside of the Cover will be required.

2. The Developer shall be solely responsible for any additional Governmental Approvals required to implement this ATC. In particular, approval from Denver Environmental Health will be required.

The approval of this Detailed ATC by the Procuring Authorities does not constitute an approval of specific drafting modifications to the RFP necessary to incorporate this ATC into the Project Agreement pursuant to Section 7.2.1.c of Part C of the ITP, which modifications shall be agreed by the Procuring Authorities and the Proposer (each acting reasonably) following issuance of a Notice of Award to such Proposer.

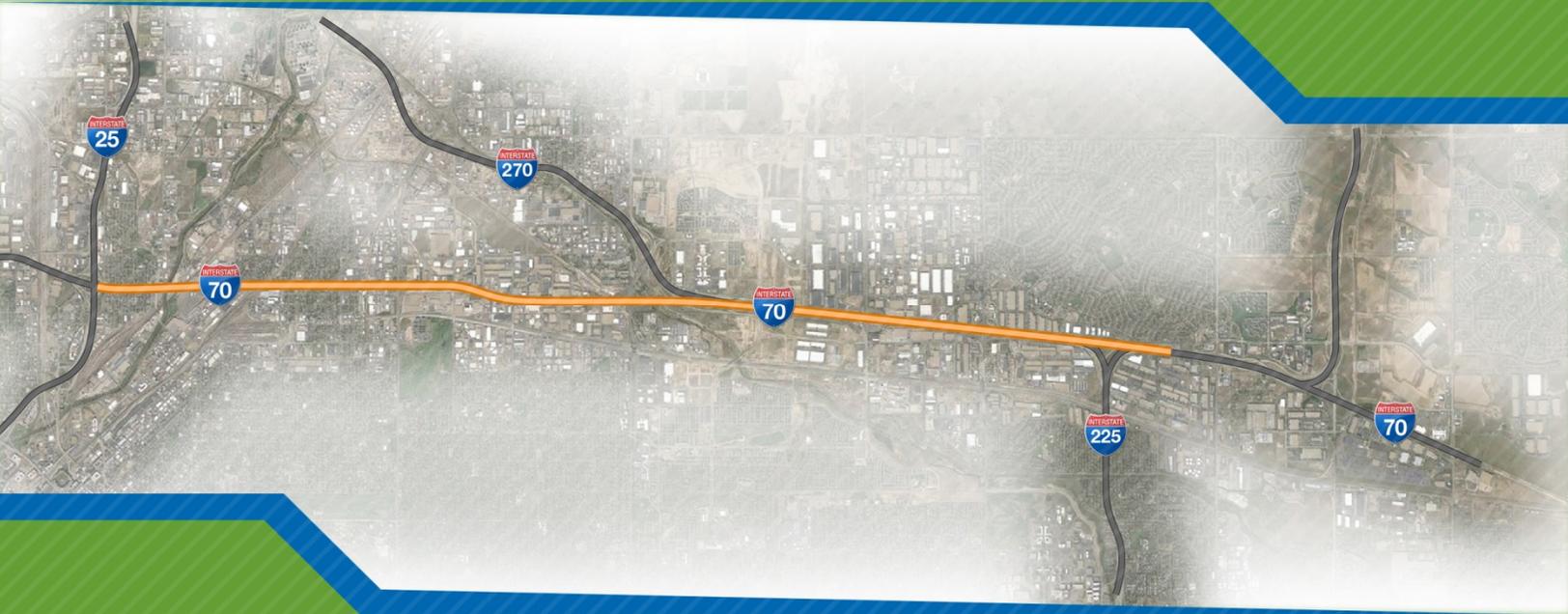




# Central 70 Project

Alternative Technical Concept Submission

ATC 71.0



Submitted to:  
Colorado Bridge Enterprise  
High Performance Transportation Enterprise  
c/o Colorado Department of Transportation



Detailed ATC Submission

## ANNEX 3: ALTERNATIVE TECHNICAL CONCEPT SUBMISSION FORM

**Proposer Name:** Kiewit-Meridiam Partners

**Date:** March 24, 2017

**Central 70 Project RFP: ATC Submission No. 71.0  
Alternate Cover Standpipe System Requirements**

**A. Background Information**

1. Type of Submission
  - Conceptual ATC
  - Detailed ATC
2. Prior Submission
  - None (initial submission of ATC)
  - Previously Submitted as Conceptual ATC
  - Previously Submitted as Detailed ATC
3. Explanation of Reason for Resubmission  
N/A
4. Request for Discussion at One-on-One Meeting
  - Meeting Requested
  - Meeting Not Requested

### ATC 71.0 Benefits

- ✓ Equal or better performance and reliability
- ✓ Optimize the scope
- ✓ Optimize operations and life cycle maintenance costs
- ✓ **Approximate cost savings of \$600,000**

**B. General ATC Submission Requirements**

**1. Overview Description**

In an effort to provide the Procuring Authorities with an optimized and cost effective design solution, Kiewit-Meridiam Partners (KMP) proposes to revise the requirements for the standpipe system associated with the roadway Cover structure. The purpose of this ATC is to propose an NFPA 502 compliant standpipe system design that is commensurate with the fire protection needs for the roadway Cover structure as well as the long term maintenance goals of the Project.

KMP proposes to provide a single standpipe system designed to service both the eastbound and westbound bores. Service to both bores using a single standpipe will be achieved by locating a series of fire department hose connection stations along the center wall (and at each cross bore door) that can be easily accessed by fire fighters from either bore depending on the location of the fire incident. This alternative standpipe system design concept is proposed in lieu of the Project Agreement (PA) requirement which prescribes two separate standpipe systems, one for the eastbound bore and one for the westbound bore. The proposed design consists of valve-controlled cross-connections between the two systems and fire hose connections on both walls within each bore.

KMP's proposed code compliant alternative design concept will provide significant initial and life-cycle cost savings for the Project and will result in a more efficient standpipe system capable of providing long term reliability and functionality.

KMP understands that approval of this design concept will require collaboration with the Authority Having Jurisdiction (AHJ). The concept was previously discussed with the AHJ during the One-on-One Denver Fire Topic Meeting on January 25, 2017. The outcome of those discussions are reflected in the body of this ATC. KMP also acknowledges the requirement to coordinate with the AHJ during the final design phase of the Project.

## 2. Relevent RFP Requirements

This ATC proposes revisions to the requirements in Schedule 10, Section 12.20.3b (Standpipe, Hydrants and Portable Fire Extinguishers) of the PA.

## 3. Rationale

The purpose of this ATC is to provide an optimized, code compliant standpipe system design that is appropriate for the fire protection coverage needs of the Cover structure.

The proposed alternative design is a single semi-automatic (normally dry) standpipe system connected to the municipal water supply system with activation capability available remotely from the CCMS and locally at both Cover portals. The proposed system consists of a single standpipe main mounted along the center wall of the westbound roadway above and outside the clearance envelope. The single standpipe main would feed five fire hose valve cabinets equally spaced and accessible within the Cover from both the eastbound and westbound roadways (a total of ten fire hose connections).

The proposed alternative concept provides a lower cost, lower maintenance standpipe system that complies with the intent of the PA and meets all performance and design requirements per the governing codes NFPA 502 and NFPA 14.

The requirements in the PA infer that the standpipe system is to consist of two, independent standpipe systems, one in each bore, that are cross-connected via a series of isolation control valves at each of the three cross-bore door locations. KMP interprets this requirement as a provisional means of redundancy that would allow for the isolation of sections of either standpipe system for repair purposes while maintaining system availability to other areas of the roadway within the Cover.

Based on past experience with dry standpipes systems in similar road tunnel facilities, repair activities that take the system out of service are extremely rare occurrences. In fact, in the few known cases of dry standpipe system failures in road tunnels, the cause of failure is consistently attributable to freeze damage resulting from improperly drained pipes. As such, these rare occurrences caused by improper maintenance do not warrant the need for the full system redundancy as implied in the PA.

In the event of periodic service or repairs, other options are available that do not require a separate redundant system. Isolation of sections of a single pipe system can be achieved by the installation of manually operated isolation valves at discreet points along the main header. This allows short segments of the system to be taken out of service while leaving the rest of the system operational. The same isolation can also be achieved by capping pipe ends at points where repairs will take place. This section isolation can be performed in a matter of minutes on an easily accessible, grooved-coupling pipe system such as that proposed here.

These alternatively proposed isolation methods for standpipe system repairs and service are common practice in road tunnels. It should also be noted that NFPA standards for road tunnels

do not require the availability of all sections of standpipe systems during maintenance operations.

This single standpipe system alternative with hose connection stations positioned along the center wall to service both bores was presented as part of our overall fire protection system approach and concept discussion with the AHJ during our One-on-One Meeting on January 25, 2017. At the meeting, the AHJ did not indicate any concerns with this concept approach of a single standpipe system serving both bores.

For the reasons stated above, this ATC proposes a single standpipe header that will service both bores and be easily accessed, repaired and maintained. This ATC directly aligns with the following Project Goals:

- **Protect the Safety of the Workforce and Public:** KMP is committed to protecting the safety of the workforce, public, and first responders. The proposed ATC would not be pursued if it were not fully in compliance with current codes and best practices and did not provide a reliable fire life safety system.
- **Optimization of Scope:** This ATC will optimize scope through meeting the Project Goals and requirements while reducing construction costs.
- **Optimization of the Life Cycle Maintenance Costs:** The proposed standpipe system offers a less complex standpipe system that will result in reduced annual testing time and long term maintenance costs
- **Minimize Impacts:** This ATC results in a reduction of the spatial area required for the standpipe system and replaces complex piping and valve arrangements with a simplified design.

## 4. Impacts

This ATC does not present any potential adverse safety, environmental, social, economic, community, traffic, operations and maintenance, or third party impacts.

## 5. Cost and Benefits Analysis

Preliminary estimates indicate that this ATC will result in a construction cost savings of approximately \$300,000. Additionally, this ATC will decrease cost in the O&M Term by another \$300,000.

**Total cost savings for this ATC is anticipated to be approximately \$600,000.**

## 6. Schedule Analysis

While localized construction durations will be reduced, there will be little if any significant schedule savings to the overall Project. Significant savings in the routine maintenance schedule will be realized from the implementation of this ATC.

## 7. Conceptual Drawings

**Attachment A:** Proposed Standpipe schematic diagram.

**Attachment B:** Tracked changes to Schedule 10 Section 12 of the Project Agreement

## 8. Past Use

This proposed alternative standpipe system design has been implemented successfully in road tunnels internationally. KMP acknowledges that compliance with NFPA 502 requires that each road tunnel facility must be evaluated for appropriate fire protection and life safety features that meet its unique needs as well as the requirements and approval of the local AHJ. This ATC will provide a standpipe system design that is appropriate for the proposed Cover structure and is anticipated to be accepted by the AHJ.

## C. Detailed ATC Requirements

### 1. Risks

There are no changes or additional risks to the Procuring Authorities, CDOT, the State, or third parties associated with implementation of the ATC.

### 2. Handback

There are no negative changes in Handback procedures and/or the Handback Requirements associated with this ATC.

### 3. Right-of-Way

No additional right-of-way is required to implement this ATC.

### 4. List of Required Approvals

This ATC will require approval of the AHJ. There are no other additional third party or governmental approvals, including any design exceptions, associated with this ATC.

### 5. Proposed Drafting Revisions

KMP has included the **Attachment B** with tracked changes for the proposed revisions to the PA Section listed above.

a) RFP Requirements that are Inconsistent with Proposed ATC

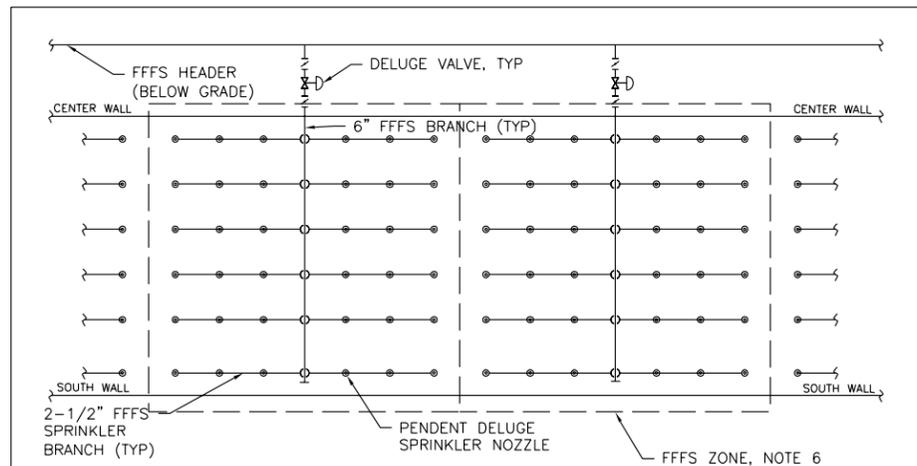
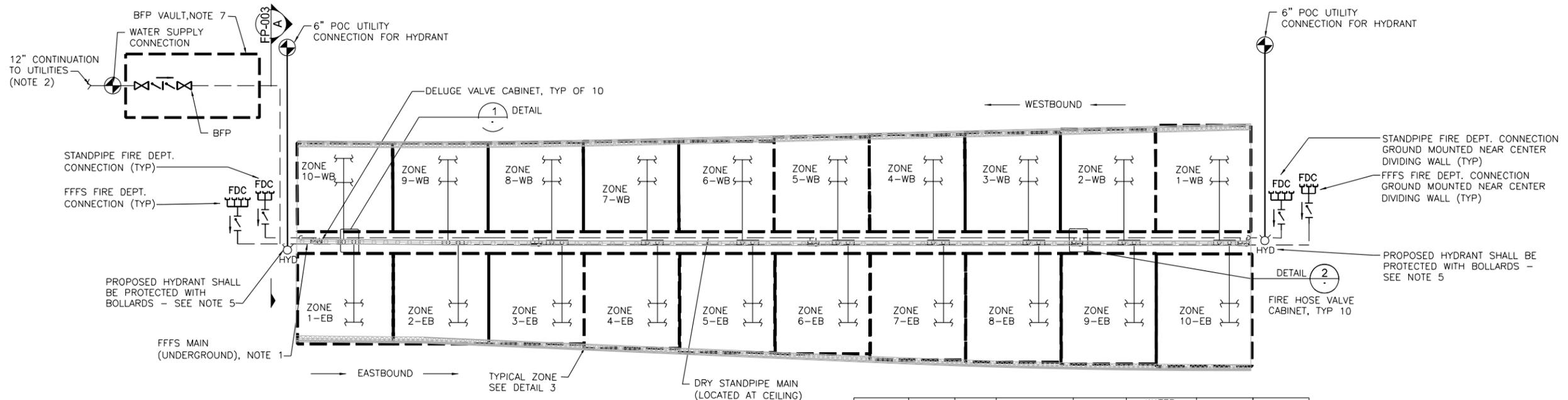
KMP requests that the following sections be revised for the exclusive use by KMP upon acceptance of this ATC.

1. Section 12.20.3b of Schedule 10 of the PA

b) Proposed Revisions to address Inconsistencies

KMP has included **Attachment B** with tracked changes for the changes in the section listed above.





**DETAIL 3**  
TYPICAL FFFS ZONE

ZONE OPTION	ZONE LENGTH	TOTAL ZONE QTY	ACTIVATED ZONES DURING EVENT	COVERAGE AREA, SQFT	WATER APPLICATION RATE (GPM/SQFT)	STANDPIPE DEMAND (NOTE 8)		FFFS DEMAND (NOTE 3,4)	
						GPM	PSI	GPM	PSI
PA REQ.	100 FT	20	2	20000	0.15	750	100	3750	7.8

**MATERIAL TAKE-OFF\***

COMPONENT	QUANTITY	LENGTH (ft)	MATERIAL
8" FFFS DELUGE VALVE ASSEMBLY	20		
6" STANDPIPE DELUGE VALVE ASSEMBLY	1		
10" BACK FLOW PREVENTERS	1		
FFFS DELUGE VALVE CABINETS	10		STAINLESS STEEL
FFFS FIRE DEPARTMENT CONNECTION (4 WAY)	2		
12" FFFS MAIN PIPING		1400	DUCTILE IRON
8" FFFS ZONE SUPPLY PIPING		200	DUCTILE IRON
6" BRANCH PIPING		2000	SCHEDULE 40, HOT DIPPED GALV.
2-1/2" BRANCH PIPING		12000	SCHEDULE 40, HOT DIPPED GALV.
HEAT TRACING (W/INSULATION)- 6" PIPE		200	
PENDENT DELUGE SPRINKLER NOZZLES	720		
FIRE HOSE VALVE CABINETS WITH EXTINGUISHERS	10		STAINLESS STEEL
STANDPIPE VALVE CABINET	1		
FIRE HOSE VALVES	20		
6" STANDPIPE MAIN PIPING		1400	SCHEDULE 40, HOT DIPPED GALV.
FIRE HYDRANTS	2		CITY OF DENVER STD.
4" STANDPIPE BRANCH PIPING		200	SCHEDULE 40, HOT DIPPED GALV.
FIRE DEPARTMENT STANDPIPE CONNECTION (3 WAY)	2		
1" AIR RELEASE/VACUUM VALVE	2		

NOTES:  
\* QUANTITY, SIZE AND LENGTH ARE BASED ON CONCEPTUAL DESIGN SHOWN. PROPER CONTINGENCIES SHALL BE INCLUDED IF USED FOR PRICING.

1. FIXED FIRE FIGHTING SYSTEM (FFFS) SUPPLY PIPING IS PROPOSED TO BE BURIED BELOW ROADWAY GRADE TO REDUCE HEAT TRACING REQUIRED.
2. THE REQUIRED WATER SUPPLY FOR THE FFFS IS BASED ON A 12" SINGLE WATER SUPPLY CONNECTION TO THE PROPOSED CIVIL CONNECTION TO THE 36" TRANSMISSION LINE AT THE WEST PORTAL.
3. DELUGE SYSTEM WATER DEMAND APPLIES A 1.25 EFFICIENCY FACTOR.
4. MINIMUM PRESSURE FOR THE MOST REMOTE ZONE AND NOZZLE
5. STANDPIPE AND DELUGE FDC'S ARE TO BE LOCATED WITHIN 100 FEET FROM MUNICIPAL HYDRANTS.
6. LAYOUT IS SHOWN AS A SCHEMATIC. FINAL DESIGN LAYOUT WILL CONSIDER OBSTRUCTIONS, CEILING AND BEAMS.
7. LOCATION OF 10" BACKFLOW PREVENTER (BFP) TBD. UNDERGROUND VAULT SIZED TO 7'W X 11'L X 8'D. VAULT SHALL INCLUDE MAINTENANCE ACCESS.
8. STANDPIPE DEMAND BASED ON NFPA 502 SECTION 10.1.1 IN REFERENCE TO NFPA 14 SECTION 7.10.1.1.2
9. ADDITIONAL STANDPIPE COVERAGE BEYOND TUNNEL PORTALS WILL BE REQUIRED BY THE AHJ WHERE ROADWAYS ARE DEPRESSED (BELOW GRADE) HIGHWAY IS CONSIDERED LIMITED ACCESS PER NFPA 502 SECTION 4.3.5.
10. SEE SHEET NO. E-009 FOR ORIENTATION OF FIXED FIRE FIGHTING AND STANDPIPE SYSTEM COMPONENTS WITH OTHER MEP ELEMENTS WITHIN COVER CROSS SECTION.



REFERENCE	SECTION	PAGE
B.7	CONCEPTUAL DWGS	3

ALTERNATIVE TECHNICAL CONCEPT  
**Cover Standpipe Requirements**

ATTACHMENT A

ATC NUMBER  
**71.0**

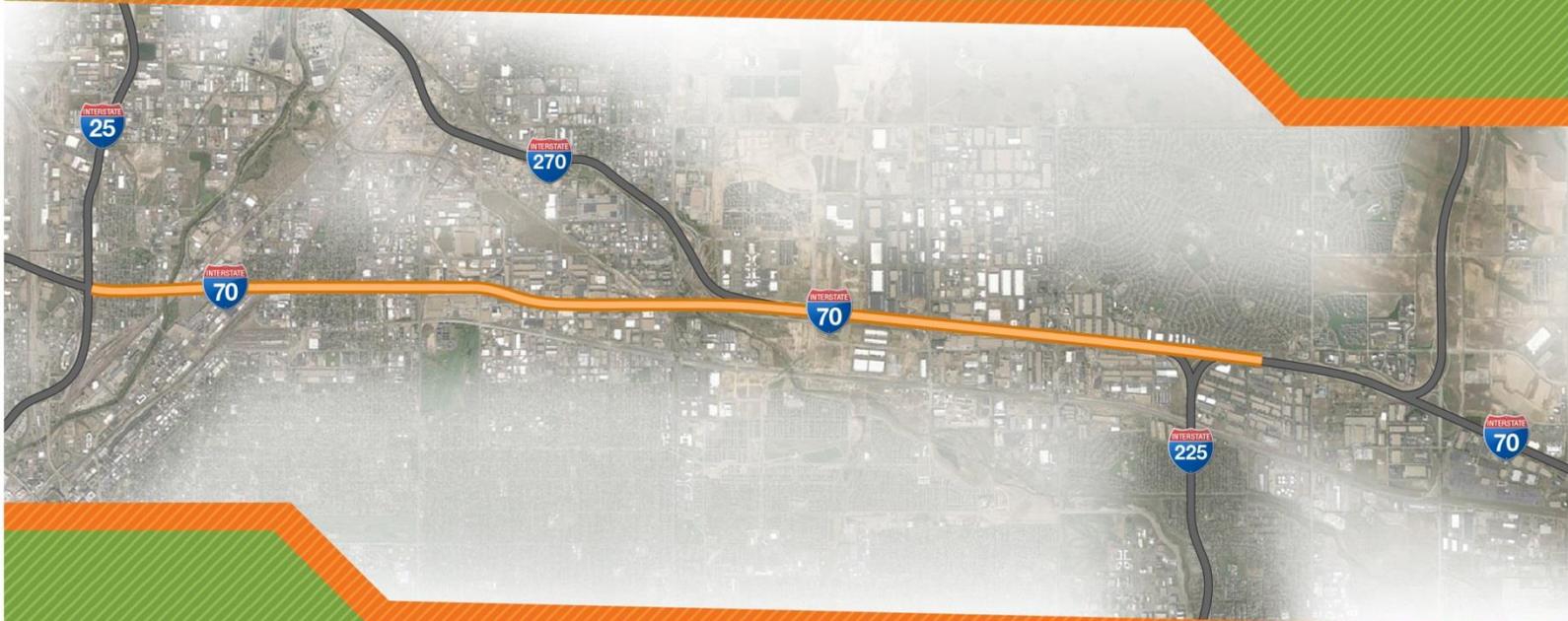
SHEET NUMBER 1 OF 1



# Central 70 Project

Attachment A – Tracked Changes to Section 12 of Schedule 10

ATC 71.0



Submitted to:  
Colorado Bridge Enterprise  
High Performance Transportation Enterprise  
c/o Colorado Department of Transportation



Detailed ATC Submission

March 24, 2017

**Table 12-3 Lighting Control System Interfacing**

System	Interface	Managing system
Ventilation	None	
Drainage	None	
Lighting	N/A	N/A
Fire main	None	
Fixed firefighting system	None	
Portal Photometer system	Dimming input via analogue system to CCMS and then digital signals to the lighting control system	CCMS linking photometers to Lighting control system
Emergency way-finding system	Testing and monitoring of system status	Lighting control system with status signal via CCMS
Radio rebroadcast systems	None	
Voice alarm public address system	None	
AID system	Go to incident lighting scene	Signal via CCMS
FDAS system	Go to incident lighting scene	Signal via CCMS
Plant Room systems	None	
Power distribution system	None	

**12.20. Standpipes, Hydrants and Portable Fire Extinguishers**

12.20.1. Scope

The Developer shall design and install standpipes, hydrants and portable fire extinguishers to provide coverage the full length of the Cover, which shall be available in the event of a fire in the Cover to be used to extinguish or suppress the fire.

12.20.2. Basis of design

The Developer shall design, provide, install, test and commission the FFFS and all fire suppression systems in accordance with the Construction Standards and the requirements of the AHJ. The Developer shall allow for all performance testing and demonstrations to the Department and relevant authorities or appointed representatives. The Developer shall undertake all necessary surveys and investigations to validate the design including, but not limited to Utility surveys, investigations, enquiries with relevant bodies and for obtaining all necessary Permits, approvals and consents.

12.20.3. Design Criteria – Standpipes

- a. The Developer shall design, provide and install all valves, connections, hangers, inserts, piping, sleeves, fittings, and other appurtenances necessary to provide a fully functional and compliant standpipe system.
- b. ~~Standpipes shall be provided in both the eastbound and westbound bores and located in similar locations in each bore at each cross bore door and on the opposite wall. The piping shall be cross connected at cross bore door locations such that either bore can be supplied by either main.~~ Isolation valves shall be provided between hose valve stations to enable sections of the system to be shut down for maintenance without shutting the entire system down. Standpipe hose connection stations shall be located along the center wall of each bore and at A hose connection shall be provided at each cross bore door, in each bore, located adjacent to the door.
- c. The standpipe system shall be a dry pipe system supplied from the municipal water company mains supply. Dry pipe system shall be manually filled from the water supply (with automated control via the CCMS to be provided as a backup). Outside of the Cover

limits, within the limits of the Lowered Section, automated backup control is not required. The Developer shall conduct testing in accordance with NFPA 14 to determine that the supply is capable of supplying the system demand for a minimum period of one hour and of delivering water to all hose connections on the system within 10 minutes or less. In the event that tests indicate that the supply is not capable of meeting the system demands, the Developer shall provide suitable pumping equipment to maintain system pressures.

- d. The required flow rate shall be 750 gpm at the hydraulically most demanding outlet. Allowance shall be made for two hydrants operating simultaneously. The calculation procedure shall be in accordance with section 7.10.1.2.2 of NFPA 14 or in accordance with the requirements of the AHJ. The minimum residual pressure at the hydraulically most remote 2.5 inch outlet shall be 100 psi. Pressure restricting valves shall be provided where the hydraulic head exceeds 100 psi.
- e. Standpipes shall be Class 1 dry type system as defined by NFPA 14 subject to the agreement of the AHJ. A temporary or permanent standpipe system shall be installed and tested during the construction phase in accordance with NFPA 14, NFPA 25, NFPA 502 and NFPA 241 and to the requirements of the AHJ.
- f. Hose connection spacing shall be such that that no location within the protected area is more than 150 feet from the hose connection. Hose connection spacing shall not exceed 275 feet.
- g. The entire standpipe system including valves shall be protected against freezing and shall be complete with all necessary status monitoring and alarms linked to the CCMS system.
- h. The standpipe system shall be suitably protected from mechanical damage and vandalism.
- i. Suitable back flow prevention devices shall be installed to prevent contamination of the Water Company supply and distribution system.
- j. The standpipe system shall be provided with drain points to enable the entire system to be drained down.
- k. The pipework system shall be protected from unequal settlement or structural movement by the use of appropriate flexible jointing couplings.
- l. Suitable fire collars shall be provided where piping passes through fire rated structure.
- m. A two way Siamese coupling shall be provided at both ends of each bore to allow the Fire Department to provide backup water supplies, the location of these connections shall be agreed with the Fire Department. The Developer shall provide all fire hydrants and associated piping.
- n. "Standpipe Connection Stations" with hose connections shall consist of a protective enclosure that also houses portable fire extinguishers. Each standpipe connection station shall have two, 2.5 inch, hose connections with an external thread in accordance with NFPA 1963 or as otherwise required by the Fire Department. The standpipe connection station cabinets shall be located in recesses ~~in the side walls of the Cover~~ to finish flush with the wall surface.
- o. The Developer shall provide an appropriate signage system in accordance with NFPA 14 and to the approval of the Fire Department.

#### 12.20.4. Design Criteria - Portable fire extinguishers

- a. Portable fire extinguishers shall be provided in accordance with NFPA 502 with a rating of 2-A: 20-B: C and shall be located along the Cover of both the Eastbound and Westbound bores. They shall be co-located in approved standpipe connection stations and at intervals of not more than 300 feet. The maximum weight of the extinguishers shall



DATE: April 7, 2017  
TO: Kiewit-Meridiam Partners (KMP)  
FROM: Anthony DeVito, P.E. Central 70 Project Director  
Keith Stefanik, P.E. Central 70 Deputy Director of Project Delivery  
SUBJECT: Central 70 - Initial Detailed Alternative Technical Concept (ATC) Response  
Kiewit-Meridiam Partners - ATC No. 71.0

Dear Mr. Dionisio:

Your Team's ATC Submission Form for Detailed ATC 71.0 has been preliminarily reviewed by the Procuring Authorities. The ATC proposes to revise the requirements for the standpipe system associated with the roadway Cover structure.

In accordance with Section 3.3.2 of Part C of the Instructions to Proposers ("ITP"), the Procuring Authorities are providing the following preliminary written feedback on the above ATC Submission prior to the One-on-One Meeting at which such submission will be discussed:

- 1. unconditional approval;
- 2. conditional approval, subject to modifications and/or conditions;  
 Re-submission required     Re-submission not required
- 3. disapproval, with or without guidance that such ATC can be re-submitted under any circumstance;
- 4. notification that the incorporation of the proposed ATC in the Proposer's Proposal is already permitted under the terms of the RFP, and therefore does not qualify as an ATC (and will not be treated as such for purposes of Section 3.4 of Part C of the ITP).
- 5. subject to compliance with the confidentiality requirements set out in Section 3.4 of Part C of the ITP, the Procuring Authorities are considering amending (for the benefit of all Proposers) the terms of the RFP that are the subject-matter of the proposed ATC.

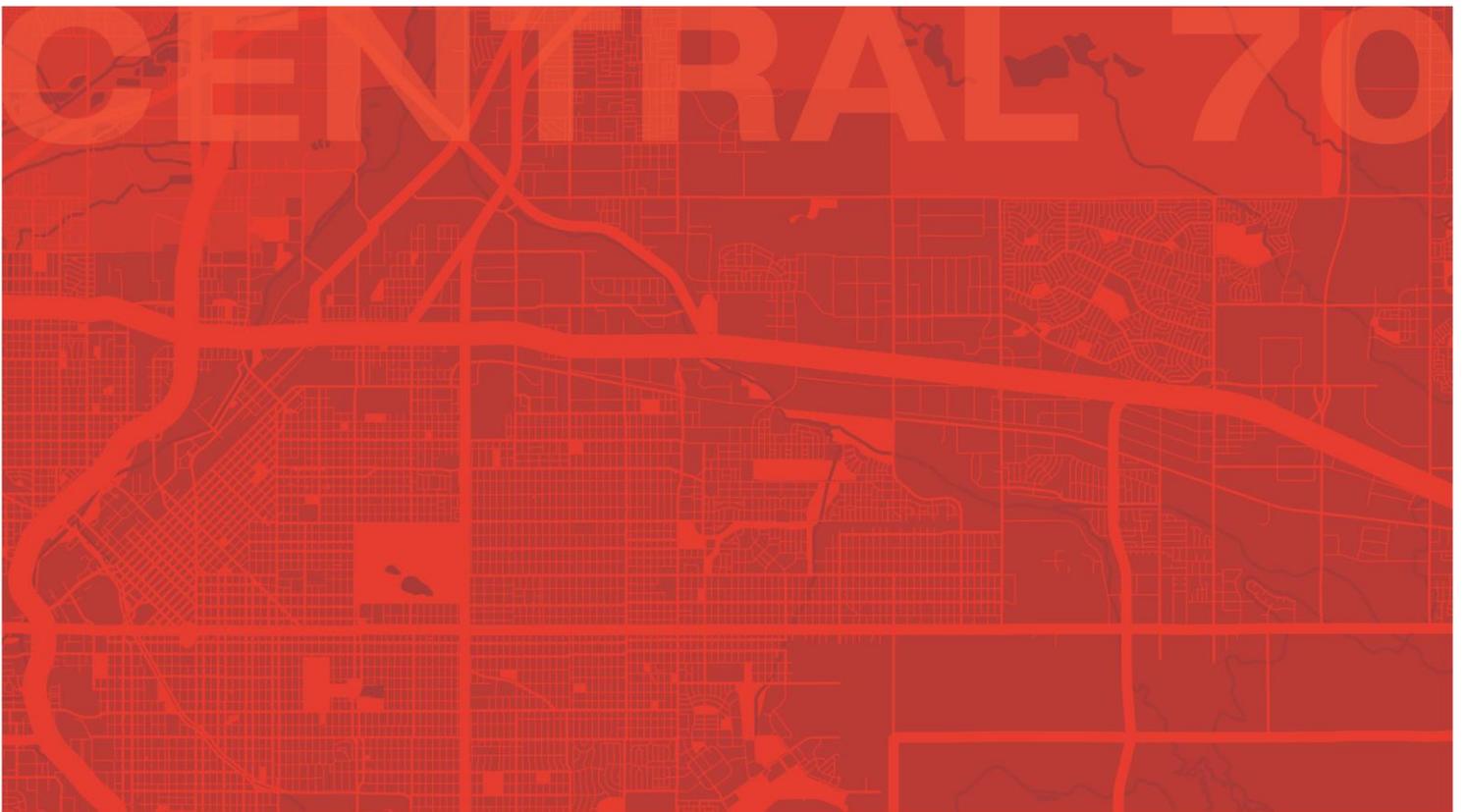
The Procuring Authorities have reviewed the Detailed ATC Submission and have arrived at the above preliminary evaluation as identified with the check mark.

Conditions of approval:

- 1. The Developer shall solely be responsible for any Governmental Approvals required to implement this ATC. In particular, approval from the AHJ will be required.

The Procuring Authorities continue to reserve the right to modify the above preliminary evaluation and/or discuss the Detailed ATC with FHWA and the City of Denver, if necessary. If your Team has elected to discuss the ATC at the upcoming April One-on-One Meeting, further discussion can be accommodated at that meeting.





## APPENDIX H

*Relates to Part 5, Volume 2*



# Draft Operations Management Plan



**SUBMITTED TO:**

Colorado Bridge Enterprise  
High Performance Transportation Enterprise  
c/o Colorado Department of Transportation



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## **SIGNATURE PAGE: APPENDIX H**

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**PROJECT MANAGER**

**DATE**

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**DESIGN-BUILD MANAGER**

**DATE**

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**OPERATING MANAGER**

**DATE**

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**CONSTRUCTION MANAGER**

**DATE**

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**DESIGN MANAGER**

**DATE**



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## RECORD OF REVISIONS

Revision number	Date issued	Pages affected	Comments
0	5/18/2017	All	Proposal Draft Submittal



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## ATTACHMENTS

- **Attachment 1:** Snow and Ice Control Plan
- **Attachment 2:** Incident Response Plan
- **Attachment 3:** Courtesy Patrol Service Plan



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## EVALUATION CRITERIA – APPENDIX H, VOLUME 2

KMP has provided a full Evaluation Criteria Matrix to align the requirements of the Project Agreement with the sections of this Plan.

Sch. 11 Section	Item	QMP Section	Section Name	Check
9.2.1	<b>The OMP submitted (i) prior to the issuance of NTP2, shall include, at a minimum, details of the approach, procedures and means of implementation in respect of the following in respect of both the O&amp;M Work During Construction Period and the Operating Period:</b>	2.0	Operations Management Plan Contents	<input type="checkbox"/>
9.2.1.a	Overview description of all facilities, systems and equipment to be operated by Developer	3.0	KMP Facilities, Systems, and Equipment	<input type="checkbox"/>
9.2.1.b	Organizational structure to ensure 24 hour response to Incidents and Emergencies	4.0	Organizational Structure	<input type="checkbox"/>
9.2.1.c	Monitoring the safety and operational performance of the Project	5.0	Monitoring Safety and Operational Performance	<input type="checkbox"/>
9.2.1.d	Staffing plan procedures, including staff qualifications, training and certification processes	6.0	Staffing Plan Procedures and Training and Certification Process	<input type="checkbox"/>
9.2.1.e	Incident response, management and reporting	7.0	Incident Response, Management, and Reporting	<input type="checkbox"/>
9.2.1.f	Traffic operations restrictions, including permitted Closure hours	8.0	Traffic Operations Restrictions	<input type="checkbox"/>
9.2.1.g	Description of how operations performance monitoring will be accomplished	9.0	Operations Performance Monitoring	<input type="checkbox"/>
9.2.1.h	Establishment of plans and procedures in meeting notification and database requirements in compliance with <u>Part 6 (Reporting Requirements) of Schedule 6 (Performance Mechanism)</u>	10.0	Plans and Procedures for Notification and Database Requirements	<input type="checkbox"/>
9.2.1.i	Operating protocols, agreements, and interactions with the various entities and agencies with interests in the Project, including the Tolloed Express Lanes.	11.0	Operating Protocols and Agreements	<input type="checkbox"/>
9.2.1.j	Standard operating and communication procedures for emergency preparation, response, and recovery, including impacts from extreme weather conditions	12.0	Communication Procedures for Emergency Preparation and Response	<input type="checkbox"/>
9.2.1.k	Planning and coordination with all affected Governmental Authorities, including Emergency Services	13.0	Coordination with Governmental Authorities including Emergency Services	<input type="checkbox"/>
9.2.1.l	Liaison and coordination with the Colorado Traffic Management Center or any other entities that may establish traffic management centers in the area;	14.0	Coordination with the Colorado Traffic Management Center	<input type="checkbox"/>
9.2.1.m	Analysis of vehicular accident patterns to identify safety issues and implement cost effective solutions to maximize safety	15.0	Analysis of Vehicular Accident Patterns	<input type="checkbox"/>

## EVALUATION CRITERIA: APPENDIX H, VOLUME 2

Sch. 11 Section	Item	QMP Section	Section Name	Check
9.2.1.n	Identification, containment and disposal of Hazardous Substances spills with reports to the Department	16.0	Hazardous Material Spill Mitigation Process and Reporting	<input type="checkbox"/>
9.2.1.o	Prompt investigation of reports or complaints received from all sources	17.0	Investigation of Reports of Complaints	<input type="checkbox"/>
9.2.1.p	Establishment of procedures for external communication system messaging resulting in improved dissemination of information and safety notices in reference to, and in compliance with, the requirements of <u>Schedule 14 (Strategic Communications)</u>	18.0	External Communication System	<input type="checkbox"/>
9.2.1.q	Establishment of guidelines and procedures for handling system failures and ensuring that all failures are properly documented	19.0	System Failure Procedures	<input type="checkbox"/>
9.2.1.r	Staff qualifications, equipment availability, response and cleanup because of fuel spills or other contamination-causing events	20.0	Fuel Spill Response and Clean-up (Staff and Equipment)	<input type="checkbox"/>
9.2.1.s	Description of staff training on the National Traffic Incident Management Responder Training Course by FHWA	21.0	National Traffic Incident Management Responder Training	<input type="checkbox"/>
9.2.2	The OMP shall include the following appended Plans			<input type="checkbox"/>
9.2.2.a	Snow and Ice Control Plan	Attch. 1	Snow and Ice Control Plan	<input type="checkbox"/>
9.2.2.b	Incident Response Plan	Attch. 2	Incident Response Plan	<input type="checkbox"/>
9.2.2.c	Courtesy Patrol Service Plan	Attch. 3	Courtesy Patrol Service Plan	<input type="checkbox"/>

# 1. Project Summary

## 1.1 KIEWIT-MERIDIAM PARTNERS CORE VALUES

Kiewit-Meridiam Partners (KMP) is committed to delivering the Central 70 Project (Project) with a focus on client relations, achieving the Project goals, and maintaining transparency with the Department. To achieve these objectives, the KMP Team has adopted the following core values:

### KMP Core Values

Every day we strive to fulfill our role as stewards in our communities—after all, we work in our own backyards.

#### STEWARDSHIP



#### PEOPLE

We are relentless in our ongoing focus that *Nobody Gets Hurt*. We hire bright minds that are hungry for the best training available and committed to Team success.



**KMP's four core values form the cornerstone of our company and the sum of our business ethics conduct. We train on these values so that they are constantly on the minds of our leaders and workforce.**



#### INTEGRITY

We conduct ourselves with the highest levels of integrity. We are responsible, accountable, honest, straightforward, and deal fairly with everyone.



#### EXCELLENCE

We focus on quality production, commit to excellence, and encourage new and innovative ideas. We build our work *Right First Time*.



### 1.2 PLAN MANAGEMENT

This Project summary is presented at the start of each Appendix to serve as a quick reference to our core values, the Project overview, our Team’s composition, and our Key Personnel and Critical Staff. We developed each Appendix to demonstrate our understanding of the Project requirements and facilitate timely Approval by the Department after award.

This document describes KMP’s approach for the Work. KMP resubmits this Plan, including an updated Project summary, to the Department as required per the Project Agreement.

All Project plans, including this document, are stored electronically per KMP’s Document Control System (DCS) Plan. Revisions to these documents may be required as the Project progresses, and annual updates are completed in accordance with Section 4.2 of the Project Management Plan (PMP). The latest revision of all Management Plans are be stored per KMP’s DCS and submitted to the Department through Aconex.

### 1.3 OVERVIEW

The Project is a Public-Private Partnership to design, build, finance, operate, and maintain planned improvements to the I-70 corridor between I-25 and Tower Road.

The Project’s scope is broken down into the following timeframes:

#### Project Time Frames

Time Frame	Period	Description	Estimated Duration
Notice of Award to NTP1	Submittals	Plan development, submittals, and mobilization of Quality Management staff	3 months
NTP1 to NTP2	Construction	Financial Close and Design	6 months
NTP2 to Substantial Completion	Construction	Construction and O&M During Construction (other than snow and ice control services)	45 months
Pre-Substantial Completion to Substantial Completion	Transition	Transition from Construction to Operating Period, and O&M submittals	8 months
Substantial Completion to Final Acceptance	Operating	Final submissions and inspections	4 months
Substantial Completion to Expiry Date	Operating	Operations and Maintenance (including Renewal Work)	30 years
NTP3 to Term	Construction, Operating	KMP snow and ice control services	33-34 years
62-68 months prior to Expiry Date	Operating	Handback Inspections, Handback Work, and Department training to facilitate seamless handover at Expiry Date	62-68 months

Improvements made by KMP during the Construction Period, highlighted in the figure, are described below.

### Project Scope



#### 1.3.1 RESTRIPE: I-25 TO BRIGHTON BOULEVARD

Restriping I-70 from I-25 to Brighton Boulevard to accommodate one managed lane in each direction, including:

- Design and Construction for improvements to associated drainage infrastructure

#### 1.3.2 LOWERED: BRIGHTON BOULEVARD TO DAHLIA STREET

Full reconstruction of I-70 between Brighton Boulevard and Dahlia Street, including:

- Removing the viaduct between Brighton Boulevard and Colorado Boulevard, and reconstructing the Interstate below grade to accommodate the Ultimate Project roadway configuration and associated elements
- Adding one managed lane in each direction with supporting infrastructure to accommodate a second managed lane in the Ultimate Project roadway configuration
- Removing and replacing the Interstate structures over Brighton Boulevard
- Constructing the Cover and associated elements over the Interstate between Columbine Street and Clayton Street
- Constructing cross-street structures at York Street, Josephine Street, Columbine Street, Clayton Street, Fillmore Street, Steele Street/Vasquez Boulevard, Cook Street, Monroe Street, and Colorado Boulevard
- Constructing I-70 Mainline structures at Dahlia Street
- Removing one Railroad structure, and Constructing two Railroad structures at Union Pacific Railroad (UPRR) and BNSF Railway (BNSF)



### 1.3.3 RECONSTRUCTION: DAHLIA STREET TO SAND CREEK

Full reconstruction of I-70 Mainline between Dahlia Street and Sand Creek, including:

- Adding one managed lane in each direction with supporting infrastructure to accommodate a second managed lane in the Ultimate Project roadway configuration
- Removing and replacing Interstate structures over Holly Street, Monaco Street, Denver Rock Island Railroad, and Quebec Street

### 1.3.4 WIDENED: SAND CREEK TO CHAMBERS ROAD

Widening I-70 from Sand Creek to Chambers Road with associated elements, including:

- Adding one managed lane in each direction with supporting infrastructure to accommodate a second managed lane in the Ultimate Project roadway configuration
- Removing and replacing the I-270 flyover structure to I-70 eastbound
- Removing and replacing Interstate structures over Peoria Street

### 1.3.5 INTELLIGENT TRANSPORTATION SYSTEMS (ITS) AND TOLLING RESPONSIBILITIES

Additional ITS and tolling responsibilities, including:

- Closed circuit television (CCTV) camera coverage for I-70 corridor, including interchanges between Pecos Street and Airport Boulevard
- Microwave vehicle radar detection between Pecos Street and Tower Road
- Travel time indicators between Pecos Street and Tower Road
- Lane use signals between Pecos Street and Chambers Road
- Dedicated short range communications radios between Pecos Street and Tower Road

### 1.3.6 OPERATIONS AND MAINTENANCE (O&M) WORK DURING CONSTRUCTION

Operations and maintenance of existing infrastructure within the O&M Limits During Construction as defined by the Project Agreement, including:

- I-70 Mainline and associated infrastructure
- Local Agency infrastructure
- Drainage
- Water quality
- ITS and electronic toll collection facilities
- Utility services
- Traffic signals and lighting
- Railway structures
- Fencing
- Snow and ice control services (following NTP3)

### 1.3.7 OPERATIONS AND MAINTENANCE WORK DURING THE OPERATING PERIOD

Operations and maintenance of I-70 within the limits defined by Schedule 11 of the Project Agreement for the Operating Period (dashed line in figure above), including:

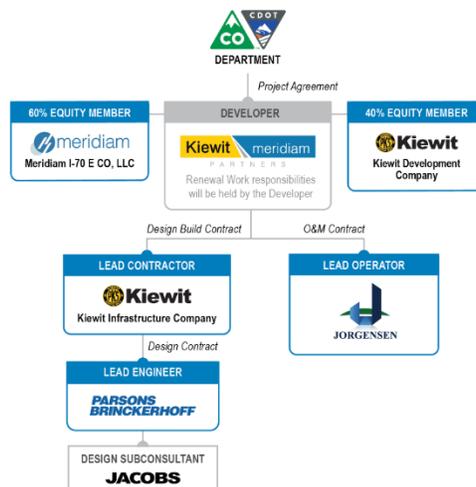
- Providing resources to safely maintain the roadway throughout the Term
- Asset preservation including repair and Renewal
- Snow and ice control services
- Courtesy patrols
- Incident response
- Meet Handback requirements

### 1.4 KIEWIT-MERIDIAM PARTNERS COMPOSITION

KMP organized a streamlined Team to successfully deliver the Central 70 Project. The Core Proposer Team Members of Meridiam, Kiewit, Parsons Brinckerhoff, and Jorgenson are united by a commitment to Project success under a common project management system. KMP’s lean approach has been cultivated from a history of working together, and by our shared cultures of safety, quality, environmental stewardship, and community service. The KMP Team needs no learning curve to start working together, and is positioned to execute on our joint Project delivery commitments from day one.

KMP’s equity members—Meridiam and Kiewit Development Company—formed KMP for the sole purpose of developing this Project. KMP’s Core Proposer Team Members, shown below, include Kiewit Infrastructure Company (KIC) as the Lead Contractor, Roy Jorgensen Associates (Jorgensen) as Lead Operator, and Parsons Brinckerhoff (PB) as Lead Engineer. Our Team is supported by the expertise of subconsultants and subcontractors who possess additional local knowledge and experience, including Jacobs as PB’s main Design subconsultant. KMP is committed to identifying opportunities to maximize the involvement of small and disadvantaged businesses. Throughout the Project, KMP remains the single point of responsibility for meeting all Project Agreement requirements.

KMP co-locates with the Department in both the Project Office and the Colorado Transportation Management Center (CTMC) to foster a collaborative approach that ensures we meet the Department’s Project goals throughout the Project.





### 1.5 KEY PERSONNEL AND CRITICAL STAFF

The table below shows KMP’s Key Personnel overseeing the Project. KMP has also identified positions, and individuals, as Critical Staff who are instrumental in the successful delivery of the Project.

#### Key Personnel and Critical Staff

Staff Type	Title	Name	Employed by	Seconded to
KEY PERSONNEL	Project Manager	Chris Hodgkins	Meridiam	KMP
	Design-Build Manager	Tom Howell	KIC	
	Construction Manager	Barry Thoendel	KIC	
	Design Manager	Doug Andrew, PE	PB	
	O&M Manager	Abraham Henningsgaard, PE	Jorgensen	
	Project Quality Manager	Gordon Peterson, PE	KIC	KMP
	Independent Design Quality Manager	James Rozek, PE	PB*	
	Construction Process Control Manager	Sean McAfee	KIC	
	Independent Quality Control Manager	Tracy Martin, PE	KIC*	
	Environmental Manager	Jenn Bradtmueller, PE	KIC	KMP
	Utilities Manager	Kevin Custy	Jacobs	KIC
	Project Communications Manager	Hunter Sydnor	KIC	KMP

Staff Type	Title	Name	Employed By	Seconded To
CRITICAL STAFF	Technical Manager	Martin Currie	KDC	KMP
	Financial Manager	Christopher Couallier	Meridiam	KMP
	Safety Manager	Ben Snow	KIC	KMP
	Construction Safety Manager	Kenyon Manley	KIC	
	Civil Rights Program Manager	Matt Christensen	KIC	
	DBE/ESB Program Manager and Outreach Training Manager	Colean Bemby	KIC	
	Lead Scheduler	Mauricio Solano	KIC	
	Design Integration Manager	Tim Nelson	KIC	
	Deputy Design Manager	Mark Talvite, PE	Jacobs	
	Cover Design Manager	Heath Therrien, PE	PB	
	Commercial Manager	Jamie Harvey, PE	KIC	

*\*Per Approved ATC 9.1 (see Attachment to the Quality Management Plan), KMP shall use in-house personnel in lieu of employees from an Independent Quality Control Firm*

## 2. Introduction

KMP has a staff of experienced personnel ready to provide 24-hour Operations and Maintenance (O&M) services to the Project seamlessly from Construction through the end of Term. Project Manager Chris Hodgkins, Technical Manager Martin Currie, and O&M Manager Abraham Henningsgaard are engaged throughout all Project periods, providing the Department with established and consistent points of contact. This consistency and the institutional knowledge provided by our long term vision ensures the highest level of service.

During the Construction and Operating Periods, Jorgensen is the Lead Operator for the Project and is supported by the extensive capabilities of the KMP Team members. Jorgensen is uniquely qualified to serve as the Lead Operator for the Project, and currently holds 35 O&M contracts in the US encompassing more than 13,000 lane miles, 900 bridges, 350 major interchanges, and other related facilities in multiple states. Jorgensen provides a complete, proven Maintenance Management Information System (MMIS), the Jorgensen Asset Maintenance Management System (JAMMS), for documenting, monitoring, and compliance reporting for asset management contracts. Kiewit and Jorgensen have collaborated to ensure that JAMMS is fully compatible with InEight Project Suite. This provides Project control consistency through Construction and the Term. Jorgensen has the experience and staffing necessary to successfully serve as the Lead Operator for the Project.

The Operations Management Plan (OMP) is based on KMP's in-depth and local understanding of the Central 70 Corridor, the Department, local governments, agencies, stakeholders, and Project challenges, including:

- Snow and ice control conditions on the viaduct during the Construction Period, and the staffing and equipment needed to meet performance requirements during the length of Denver's snow season
- Operating and maintaining the ITS, ETC, and Cover systems to ensure smooth and safe traffic flow
- Reduced accessibility and available land at the Havana Maintenance Yard due to the Ultimate configuration during the Operating Period
- Courtesy patrol staffing and equipment needs to meet performance requirements during peak traffic hours that will lengthen as the metro Denver area continues to grow
- Proven communication protocols to best meet the challenges of the diverse local governments, agencies, emergency responders, and stakeholders impacted by the Project
- The training necessary to maintain a highly proficient and educated staff

With this understanding and our expertise, KMP delivers an OMP that provides the organizational approach, policies, and procedures to:

- Optimize operating costs
- Minimize impacts to the traveling public
- Ensure the required level of service for all lanes, and reliable travel speeds in managed lanes



- Leverage a collaborative process
- Protect the safety and health of the workforce and motorists

## 2.1 OPERATIONS MANAGEMENT PLAN CONTENTS

The OMP details KMP’s approach to maximizing lane availability and meeting operational obligations detailed in Schedule 11 of the Project Agreement. The OMP details KMP’s technical approach to the Project that ensures we meet the operational obligations described in the Project Agreement and the technical requirements outlined in Schedule 11 and Schedule 12. This OMP encompasses the technical approach the KMP Team implements to meet the Project requirements. Because the requirements and scopes of work of the Construction and Operating Periods are similar, the management, implementation, and execution of the Work, unless expressly stated within each section of this Plan, apply during both the Construction and Operating Periods.

The OMP is an umbrella document describing the managerial approach, strategy, and quality procedures we use to design, build, operate, and maintain the Project according to the Project Agreement requirements.

The OMP addresses operations, practices, and procedures for the Construction and Operating periods of the Project. It also covers the 19 topics found under section 9.2.1 of Schedule 11, including the three required Appendices: Snow and Ice Control Plan, Incident Response Plan, and Courtesy Patrol Services (CPS) Plan. KMP submits and obtains Acceptance from the Department prior to NTP2 and provides an updated version prior to Substantial Completion. In addition, KMP updates the OMP annually, no later than 60 days before the end of the contract year. The OMP is updated more frequently as necessary.

The fundamental objectives of our OMP approach are to:

- Use the strengths of KMP’s resources to assemble a highly qualified Team
- Train the Team members to competently perform their jobs, with continuous improvement
- Proficiently execute the OMP
- Monitor OMP performance
- Report on our accomplishments, compliance, progress, challenges, and important Project data
- Improve the OMP performance based on our experience during implementation
- Provide seamless transition from the Department to KMP as the Construction Period begins
- Provide continuous operations between Construction and Operating Periods
- Efficiently transition to the Department at the end of the Term

## 2.2 APPROACH TO IMPLEMENTING OPERATIONAL RESPONSIBILITIES BOTH DURING CONSTRUCTION AND OPERATING PERIOD

In partnership with Jorgensen, Kiewit performs all O&M responsibilities during the Construction Period. Roles and responsibilities during the Construction Period include:

- Successfully perform all O&M responsibilities during the Construction Period
- Execute and comply with the Interface Agreement
- Manage O&M subcontractor (Jorgensen)

During the Operating Period, KMP's Lead Operator, is contracted directly with KMP for the performance of Routine O&M Work. Abraham Henningsgaard reports to the Technical Manager, Martin Currie. Throughout the Operating Period, KMP subcontracts for the remaining O&M Work after Construction with firms qualified to perform such Work, including Renewal Work and any required Handback Work.

Jorgensen's roles and responsibilities during the Operating Period include:

- Perform all relevant O&M Work responsibilities during the Operating Period
- Execute and comply with the O&M Contract and Interface Agreement
- Manage its subcontractors

Section 4 includes an organizational chart showing how KMP performs operational responsibilities. The figure includes the roles and responsibilities of the KMP Team Members.

## 3. KMP Facilities, Systems, and Equipment

### 3.1 FACILITIES

During the Construction Period, KMP uses the existing Havana Maintenance Yard for our maintenance facility. The proximity of the site to the Project limits facilitates cost effective and efficient response times for incidents and special events. The current yard provides staging area for equipment, materials, resources, and personnel. The existing parcel is approximately 6.5 acres, which includes a 140 ft. by 60 ft. material storage building and a 100 ft. by 45 ft. warehouse and office building.

KMP uses the Havana Maintenance Yard in its current configuration until the Ultimate improvements are constructed. At that time, the facility will be adapted to support the level of service required during the Construction and Operating Periods. If needed throughout the Term, KMP may supplement the existing Havana Maintenance Yard with the Aurora Maintenance Yard until the final Central 70 configuration for the Operating Period is complete. The Aurora Yard includes more than 50 acres located just off the end of the Project limits at Smith Road and Picadilly Road, just northwest of the I-70/E470 interchange.

During the Construction Period, the Project Office used to house Project management and support functions is separate from the Havana Maintenance Yard. Operations personnel are located at the Project Office, at the CTMC, and at the Havana Maintenance Yard. Staff coordinate through regular communications and meetings. During the Operating Period, O&M staff are located at the Havana Maintenance Yard.



KMP recognizes that the Ultimate Central 70 configuration reduces the usable area and limits access to the Havana Maintenance Yard. We will work with the Department during its planning of the Ultimate improvements to the I-70 East corridor to maximize the use of the Havana Maintenance Yard throughout the Operating Period.

We will hand back the Havana Maintenance Yard, built around the envisioned improvements, to the Department at the end of the Term. This eliminates the need for the Department to procure storage space, and assists in facilitating a seamless transition of Department staff back to the service provider role.

## 3.2 SYSTEMS

The KMP Project implementation includes many automated, physical, and mechanical/electrical systems. This Section presents an overview of the more prominent systems that apply to the Project.

### 3.2.1 JAMMS

The primary Maintenance Management Information System for the Central 70 Project is JAMMS (the Jorgensen Asset Maintenance Management System). JAMMS is a comprehensive program developed specifically to manage infrastructure assets including; scheduling and programming work, tracking and reporting accomplishments, asset service history, asset quality control, and equipment and resource management. Smart devices and wireless broadband cards enable our maintenance supervisors and technicians to access their weekly scheduled work orders or annual Work Plans in real-time from the field. The system can import and export Excel files, store documents and photographs, and automatically email reports.

JAMMS assists the O&M Manager with scheduling information, work status identification, asset service history, inspection details, work completion documentation, and photographs.

Appendix I presents a detailed discussion on the attributes and functionality of JAMMS. The formal, overall KMP document control system, described in Section 5.2.4 of the Project Management Plan, is maintained to facilitate a simple, efficient, and achievable Project record. JAMMS communicates with, and directly submits reports to, the Department's document control system, Aconex. KMP and Jorgensen have performed the necessary coordination to confirm that JAMMS interacts seamlessly with InEight Project Suite, including the Asset Manager features. This provides the Department with the consistency of a single Project Control System. The Department can use the model stored in InEight Project Suite to review the full history of inspections, As-Builts, and other data associated with all Project elements. For additional information, the JAMMS manual is included as an attachment to Appendix I, Maintenance Management Plan.

### 3.2.2 ITS AND ETC ELEMENTS

This discussion focuses on operational and maintenance aspects of ITS and ETC elements. KMP understands the importance of this equipment, including the ITS associated with the Cover, and maintains the ITS/ETC assets as a high priority. KMP maintains and operates the ITS and ETC elements of the Project as indicated in Appendix B, Responsibility Matrix from Section 3 of Schedule 10. This matrix is reproduced in the table following the discussion of the ITS and ETC elements. Appendix A-2 of Schedule 11 specifically identifies the performance criteria for those ITS/ETC elements that are KMP's responsibility.

Operations for the ITS/ETC elements under KMP responsibility involves three scenarios—no failures, failures reported, and preventative maintenance. No failures indicate that all ITS systems are functioning as intended and meeting the performance requirements of Schedule 11. System failures include, for example, reports of critical CCTV failure or critical VMS failures. The preventative maintenance activities are planned and scheduled maintenance servicing functions to maximize asset life and avoid catastrophic asset failure.

To develop a reliable and effective preventative maintenance program, KMP uses JAMMS to automate and streamline the maintenance of ITS/ETC devices. JAMMS automates technician dispatch for preventative and responsive maintenance activities, tracks maintenance activities in real time, and provides representative reports for maintenance activities.

Upon receiving notification through a JAMMS ticket, the assigned technicians open the ticket in JAMMS and log in accordingly. The preventative maintenance plan is loaded with the respective device's preventative maintenance schedules so that the system automatically generates preventative maintenance tickets prior to the scheduled date of the assigned Work.

JAMMS generates status reports for the O&M Team review. This report includes detailed descriptions of all services performed and the results of testing conducted during the report period. The report is a collection of events, data, calculations, decisions, instructions, notifications, circumstances, and work performed each day.

Upon detection of an ITS/ETC device failure, JAMMS creates a trouble ticket. The Maintenance Supervisor (or designee) verifies and prioritizes the problem and dispatches a technician to resolve the failure by performing repairs, either remotely or by troubleshooting in the field. The technician's assessment determines the cause of the failure based on a storm event, workmanship, power services, communications, electrical/mechanical components, or software failures. The diagnostic results define the type of repair needed to restore the device(s) to functional status. The ticket includes all issues, which the technician updates to "complete" after service restoration. The technician notifies operations if the device will be down for an extended duration.

KMP coordinates maintenance activities for all ITS/ETC work with the appropriate parties as necessary. After diagnostics, troubleshooting, and repair, we confirm that the ITS/ETC element is operating properly prior to departure from the Site.



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**Responsibility Matrix (from Appendix B of Schedule 10, Section 3)**

Responsibility	Developer				ETC System Integrator			Zayo			CDOT			CCD
	Design	Construct	Maintain Through Two Year Period After Final Acceptance	Maintain During Remainder of Operating Period	Design	Construct	Maintain During Operating Period	Design	Construct	Maintain During Operating Period	Design	Construct	Maintain After Two-Year Period After Final Acceptance	Maintain After Final Acceptance
<b>Conduit Duct Bank and Fiber</b>														
Conduit-next to I-70	X	X	X (includes the Department's new and existing ETC)							X			X	X
Fiber Shared Resource—Zayo Per Schedule 10 Section 3 Zayo and Developer Responsibilities	X	X								X				
Fiber Backbone—Department Per Schedule 10 Section 3 Zayo and Developer Responsibilities	X	X	X										X	
Fiber Backbone—CCD Per Schedule 10 Section 3 Zayo and Developer Responsibilities	X	X												X
Fiber/Conduit Laterals—Department	X	X	X										X	
Fiber/Conduit Laterals—ETC	X	X	X										X	
Fiber/Conduit Laterals—CCD	X	X												X
<b>Utility Service</b>														
Power service including service to all ITS and ETC devices and cabinet	X	X	X										X	
Establish meter service to all ITS and ETC devices	X	X											X	
<b>ITS Devices including Variable Message Signs, Closed Circuit Television Cameras, Travel Time Indicators, DTD ATR's, Doppler Radar, RWIS, Enhanced ATM Elements, DSRC, Ramp Metering, MVRD, UPS</b>														
Existing Devices			X										X	
New Devices	X	X	X										X	
Coordinate with CTMC	X	X	X										X	
Modifications to CTMC's software											X		X	
Integrate devices into CTMS		X	X									X	X	

Responsibility	Developer				ETC System Integrator			Zayo			CDOT			CCD
	Design	Construct	Maintain Through Two Year Period After Final Acceptance	Maintain During Remainder of Operating Period	Design	Construct	Maintain During Operating Period	Design	Construct	Maintain During Operating Period	Design	Construct	Maintain After Two-Year Period After Final Acceptance	Maintain After Final Acceptance
ITS Civil Infrastructure														
ITS sign structures, poles, cabinets and foundations, manholes, pull boxes	X	X	X	X										
ETC Devices														
VTMS system and associated equipment	X	X	X										X	
Integrate VTMS into CTMS operating system		X	X								X	X	X	
AVI antennas and readers	X					X	X						X	
ALPR cameras and loop detector wire	X					X	X						X	
Integrate ETC Devices into ETC System					X	X	X							
Electronic tolling lane controller	X					X	X						X	
Transaction status indicator Beacons	X					X	X						X	
UPS Equipment	X	X	X										X	
ETC Equipment in cabinet	X					X	X						X	
ETC Civil Infrastructure														
ETC lane controller cabinet and foundation, cabling, patch panels, terminations, ALPR camera poles and bases, ETC structures, equipment attachments and hardware and miscellaneous hardware at tolling points	X	X	X	X										
UPS Cabinet	X	X	X	X										

### 3.2.3 COLORADO TRAFFIC MANAGEMENT CENTER (CTMC)

Section 14 below discusses KMP's coordination with the CTMC.

### 3.2.4 OTHER SYSTEMS

The effective and efficient management of the O&M Work requires the use of several element-specific systems. These include:

- Weather stations on bridges
- 4D model incorporation of bridge inspections
- Environmental commitment tracking through InEight Project Suite (see Section 6.2 of Appendix M)
- CCMS
- Cover MEP
- Dewatering pumps

Stormwater in the Onsite system is collected at a pump station adjacent to the low point of the Lowered Section. The pump station consists of six pumps with two designated for normal flows and the remaining four for a 100-year flood event. The two smaller pumps are cycled for consistent wear and are sized to address the routine flows from the typical Colorado storm. Three of the four pumps are required to handle the peak 100-year flow storm event and the fourth pump is included for redundancy. The adjacent detention pond provides water quality treatment for stormwater in the Lowered Section. After treated, water is released into the existing 72 in. storm drain in York Street.

## 3.3 EQUIPMENT

All vehicles used on the Project dedicated for O&M Work have automated vehicle locator (AVL) systems. Vehicles have the necessary valid registrations, permits, licenses, insurance, and certifications. Equipment is maintained to the minimum standard established by commercial vehicle inspection as enforced by the Colorado State Patrol Motor Carrier Safety Section, which is charged with ensuring the safe operation of all commercial vehicles and operators within the State, and the Federal Motor Carrier Safety Regulations that apply in the State of Colorado.

### 3.3.1 NUMBER AND TYPE

The following list shows the proposed number and type of dedicated equipment to perform O&M Work during the Construction Period. Prior to the start of the Operating Period, KMP revises the list. We update it annually, or as we procure additional equipment. In addition, KMP has access to equipment and facilities at Kiewit's Aurora Maintenance Yard.



**Project Equipment List**

<b>Vehicle Description</b>	<b>Role</b>
<b>Trucks (Leased)</b>	
F150 Single Cab	Management/Supervisor
F150 Single Cab	Management/Supervisor
F250 Crew extended cab	Operations- Patrol
F250 Crew extended cab	Operations- Patrol
F250 Crew extended cab	Operations- Patrol
F250 Crew extended cab	Operations- Patrol
F250 Crew extended cab	Operations- Patrol
F250 Crew extended cab	Operations- Patrol
F250 Crew Cab	Maintenance
F250 Crew Cab	Maintenance
F450 Crew Cab	Maintenance
F550 Crew Cab	Operations- Tow
F550 Crew Cab	Operations- Tow
F650 Crew Cab	Operations- Tow
<b>SUBTOTAL</b>	<b>14</b>
<b>Heavy Equipment (Purchased)</b>	
64,000 GVW Tandem Axial Dump Truck	Snow and Ice
64,000 GVW Tandem Axial Dump Truck	Snow and Ice
64,000 GVW Tandem Axial Dump Truck	Snow and Ice
64,000 GVW Tandem Axial Dump Truck	Snow and Ice
64,000 GVW Tandem Axial Dump Truck	Snow and Ice
64,000 GVW Tandem Axial Dump Truck	Snow and Ice
64,000 GVW Tandem Axial Dump Truck	Snow and Ice
64,000 GVW Tandem Axial Dump Truck	Snow and Ice
64,000 GVW Tandem Axial Dump Truck	Snow and Ice
Bucket Truck	Covered Lowered Section
Kubota Tractor	Vegetation Control
Attenuator Truck Flatbed/Scorpion	MOT
Attenuator Truck Flatbed/Scorpion	MOT
<b>SUBTOTAL</b>	<b>12</b>

Utility Equipment (Purchased)	
Trailer—Goose Neck	General
Trailer—Utility	General
Kubota Utility Vehicle	Vegetation Control
Kubota Utility Vehicle	Vegetation Control
8 Cyd V-BOX Spreader/Wet System	Snow and Ice
8 Cyd V-BOX Spreader/Wet System	Snow and Ice
8 Cyd V-BOX Spreader/Wet System	Snow and Ice
8 Cyd V-BOX Spreader/Wet System	Snow and Ice
2 Cyd V-BOX Spreader/Wet System	Snow and Ice
2 Cyd V-BOX Spreader/Wet System	Snow and Ice
Skid Steer	Drainage
Snow Plow	Snow and Ice
<b>SUBTOTAL</b>	<b>19</b>
Rental Equipment	
Ditch Bucket Excavator	Erosion control
Dump Truck (Snow Mitigation)	Snow and Ice
John Deere Front End Loader	Snow and Ice
Lighting Tower Portable	Misc.
Scissor Lift	Misc.
12" Chipper	Misc.
Motor Grader	Misc.
500 Gal Water Tank Trailer	Vegetation Control
Variable Message Board	MOT.
Snooper Truck	Inspections



### 3.3.2 MAINTENANCE AND SAFETY

The O&M Safety Plan (Attachment 3 of Appendix I) discusses KMP’s procedures for ensuring that all Project equipment is safe and performing at optimum efficiency. We use the Circle Start Program and vehicle checklists to ensure the safety of O&M equipment.

Equipment maintenance programs are of critical importance—effective preventative maintenance schedules for equipment enable the Equipment Manager to ensure the safety of KMP staff and the traveling public and to maximize daily production efficiency throughout the Project. We have designed these programs to optimize the Useful Life of equipment and provide responsive in-service capabilities for maintenance personnel.

Employees operating O&M vehicles must use the Circle Start Policy. Each employee is responsible for signing an acknowledgement form and for following the steps outlined below. Failure to do so may result in disciplinary action taken by the Management Team.

1. All employees place a Circle-Start cone on all vehicles as soon as vehicle is parked, the ignition turned off, and the employee is exiting the vehicle at any location. (This does not apply to emergency stops such as initial accident response, debris pickup or other similar situations.)
2. Before leaving their parked location, all employees CIRCLE completely around their assigned vehicle checking for other vehicles, persons, obstacles, hazards and equipment damage or issues before the START of any operations involving an O&M vehicle. After checking for hazards and insuring the vehicle can be safely moved, the employee picks the cone up off their hood and places it in the vehicle in a safe location such as under the seat. At the end of operations the cone is placed back onto the hood or other visible location on the vehicle. This effort helps prevent the majority of preventable incidents.

**NOTE:** *Each vehicle is required to have a cone placed inside at all times. This is part of the Equipment Pre and Post Check. If the cone has been stolen or is missing, the vehicle operator reports this to his Direct Supervisor and obtains a new cone.*

3. Employees insure any attached or additional equipment is properly stored away and secured before moving equipment, this includes raising the attenuator cushion and securing equipment in or on truck beds, or the vehicle.

Complimentary to the Circle Start program is proactive equipment maintenance. In support of this, KMP uses the daily vehicle checklist (DVC) program. The DVC goal enables operators of standard vehicles, trucks, and passenger cars to provide the Equipment Manager with a condition record of high use and high quantity vehicles.

The DVC provides four significant checkpoint components to the Fleet Manager:

- Vehicle exterior
- Vehicle interior
- Mechanical and drive train system
- Documents and licensing

The vehicle exterior and interior inspections verify the overall exterior condition of the vehicle is of professional appearance, and confirms the exterior lighting and interior safety features are operational. The mechanical/drive-train inspection allows the operator to identify mechanical critical symptoms that may produce premature equipment failure. The last component of the DVC ensures each operator verifies the physical presence of appropriate licensing and registration documents.

The following are the procedural and regulatory requirements for the DVC:

- All operators, upon first accessing the vehicle, must complete the DVC
- In general, the operator should complete the inspection in less than 10 minutes
- The DVC should be completed prior to any operation of the vehicle
- When multiple operators use the same vehicle within the same day, the DVC must be performed by each operator
- It is the operator's responsibility to report negligence, deficiencies, damages, immediate service requests, and missing documentation to their direct supervisor. Failure to report these items can result in disciplinary action to the operator.
- The DVC log should be safely stowed and internally accessible in the operator's cab of each vehicle
- The monthly logbook of DVCs should be given to the Equipment Manager at the completion of each Calendar Month and replenished with a new DVC log
- The DVC identifies deficiencies that, if found, result in the immediate suspension of operation on the indicated vehicle. Should the operator fail to report these deficiencies, disciplinary action could result.

This combination of detailed equipment history tracking and the preventative maintenance program allows KMP to have a clear knowledge of the current condition of each piece of equipment. This enables proactive vehicle procurement to ensure equipment is available to service the maintenance needs of the Project.

### 3.3.3 DOCUMENT MANAGEMENT

All O&M vehicles and equipment used on the Project during the Operating Period are assigned a number and logged into JAMMS. Based on the equipment identification number, the equipment record identifies the year, make, and model of the equipment and the original cost or value, primary driver, and hourly rate. JAMMS tracks asset use in the daily work report, identifying the exact equipment used to complete the job.

Additionally, each piece of O&M equipment is included in our fleet management program. This program requires a GPS device on each unit and individual driver ID key fob to allow tracking and monitoring through our fleet network software program. The fleet network software collects data on usage, location tracking, and vehicle/equipment diagnostics. A monthly detailed equipment report is produced to provide information on individual pieces of equipment. We use this to analyze usage, maintenance, and servicing needs.



### 3.3.4 MODERNIZATION

KMP continually monitors changing technologies related to Project equipment, including improvements in fuel consumption, safety, information technology, and performance, and incorporate advancements as appropriate for the benefit of the Project. JAMMS tracks equipment performance to standard metrics, giving the equipment manager necessary information to make decisions regarding repair and/or replacement.

### 3.3.5 RESPONDING TO MAJOR INCIDENTS

KMP's equipment inventory has the capacity to respond to major incidents within Project limits. Major incidents include major weather events, geotechnical failures, and vehicular accidents. For safety, KMP has the depth of inventory to respond to extreme events to supplement the Project-specific equipment. After the Big Thompson River flood in Colorado, Kiewit mobilized 150 staff and 70 pieces of heavy construction equipment to restore 18 miles of Highway 34. Mobilization occurred on short notice (award 48 hours after submission) and Kiewit completed the work in 59 days. Equipment and workers were dispatched from Kiewit offices and equipment yard within the Denver metro area.

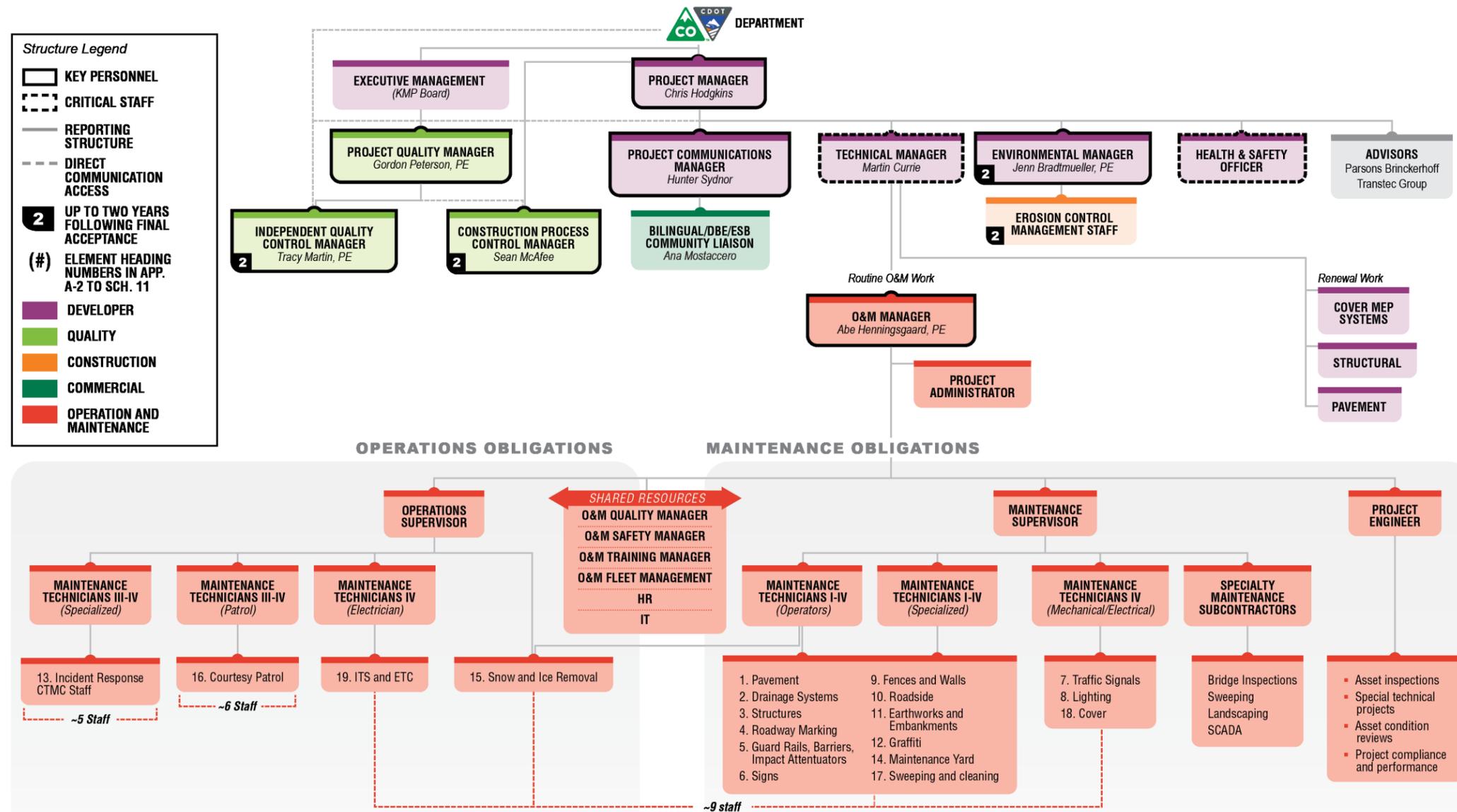
## 4. Organizational Structure

KMP's organizational structure was developed to ensure 24/7 response:

- For the Project, as with our Team's previous O&M projects, all employees know their Work schedules vary by workload, Department requests, location, and emergency conditions. Employees adjust their schedules, assist with emergencies, and perform on-call activities as assigned.
- KMP has established call-out procedures for our O&M staff for various emergency events. See Attachment 1, Snow and Ice Control Plan, to Appendix H for an example discussion.
- The organizational structure presents a well-defined chain of command necessary for a quick response to an emergency.
- KMP has broad experience and understands the importance of evaluating and planning for emergency events in advance. As discussed in Section 13 of our Snow and Ice Control Plan, KMP conducts training exercises and dry runs of the plow routes in September of each year. KMP anticipates staffing sizes, equipment needs and availability (especially heavy for equipment), shift strategies, monitoring, and reporting requirements in advance of emergency events.

The next page presents an example of our real-world experience in responding to an emergency event in Jacksonville, Florida. Also, see Attachment 2, Incident Response Plan, of Appendix H for a comprehensive discussion on this topic.

### KMP's Organizational Structure



#### TEAM MEMBER ROLES AND RESPONSIBILITIES

**Kiewit meridium** KMP, Developer

- Oversees work of all KMP Team Members
- Provides contractual compliance
- Develops and refines O&M strategies and plans
- Communicates and coordinates with Department, Design, Construction, and O&M Teams
- Interface with third party stakeholders and general public
- Performs Renewal Work through sub-contracts

**Kiewit** KIC, Lead Contractor

- Construction
- Responsible for O&M during construction as a subcontractor to KMP
- Engineer in Responsible Charge

**RJA**, Lead Operator

- Operations and Routine Maintenance
- Subcontractor to the Lead Contractor during the Construction Period
- Subcontractor to KMP during the Operating Period

**PARSONS BRINCKERHOFF** PB, Lead Engineer, Advisor

- Engineering and design as subcontractor to the Lead Contractor
- Advisor to KMP during the Operating Period
- Undertake bridge, structural, and Specialty Inspections as a subcontractor to the Lead Operator

**THE TRANSTEC GROUP** The Transtec Group, Advisor

- Advisor to KMP during the Construction and Operating Periods
- Life cycle management and forecast overview services for Renewal Work



## 5. Monitoring Safety and Operational Performance

During the Construction and Operating Periods, KMP’s Project Quality Manager and Safety Manager monitor all O&M activities for compliance with all Plans.

- During Construction Period, O&M Work complies with the Construction Safety Plan and Construction Quality Management Plan. KMP’s Leader Contractor monitors and inspects all Work.
- During the Operating Period, O&M Work complies with the OMQMP and O&M Safety Management Plan. KMP inspects and monitors all Work.

KMP Work activities fully comply with all Occupational Safety and Health regulatory requirements. KMP follows a multi-dimensional, proven approach to developing and maintaining a safe workplace for all employees and the public. In many cases, our policies and procedures exceed existing regulations.

O&M Work exposes staff to high-speed and high-volume traffic risks. To monitor safety performance and ensure the safety of our Team, KMP Executive Management is committed to implementing safety programs, practices, and methodologies to improve safety and monitor the implementation of the safety program, including Kiewit’s *Nobody Gets Hurt* Program.

During the Operating Period, the O&M Safety Manager thoroughly inspects O&M Work including:

- Traffic control (MOT) set-ups
- PPE and safety protections and practices at job sites
- Vehicles and equipment warning lights and markings
- Project Office safety requirement compliance

Following the inspection, the O&M Safety Manager delivers an inspection report detailing all safety items and compliance results to the Technical Manager and O&M Manager. The O&M Manager develops a mitigation plan for any reported violations, and implements the plan prior to the next safety inspection. All inspection reports are available for Department review on InEight Project Suite.

## 6. Staffing Plan Procedures and Training and Certification Processes

### 6.1 STAFFING PLAN PROCEDURES

KMP’s staffing plan meets the requirements of Schedule 11, including the need for a 24-hour response to incidents and emergencies. We based our procedures for developing the staffing plan on our knowledge and experience from other highway infrastructure projects. To develop the staffing plan shown in the organization chart, we:

- Evaluated the requirements of the Project Agreement, including Schedule 11
- Drove the limits of Construction and Operations to understand the route
- Reviewed the facilities at the Havana Maintenance Yard
- Participated in task force meetings to understand the asset after Construction

Based on our understanding of the Project, we have outlined staffing requirements and estimated the necessary number and type personnel. We analyzed the estimate carefully to optimize cost while meeting performance requirements. Seasonal staff level adjustments, and those from the Construction to the Operating Periods were included.

## 6.2 KMP TRAINING/CERTIFICATION PROGRAM

Specific qualifications, certifications, and training are required for all KMP positions. We verify all employees have fulfilled the necessary requirements, and maintain records for recertification or retraining scheduling.

Training of the O&M staff begins during the Construction Period, and continues throughout the Operating Period. This is coordinated with the KMP Construction staff so we can conduct activities such as joint training and certification. Initially, the KMP's Lead Operator's Corporate Training Manager, with the support of the O&M Training Manager, leads this effort. The training program includes the training described in the PMP plus these additional training categories:

- **Initial Training:** New employee training to company policies and procedures and introductory safety training as discussed in the PMP.
- **Environmental, Health, and Safety (EH&S) Training:** Safety-focused and environmental mitigation training modules designed to educate and train employees in correct safety/environmental practices for their job responsibilities
- **O&M Training:** Job-specific training modules to educate employees on correct processes and procedures for their job responsibilities
- **Information Technology Training:** Training modules for specific technologies (universal and proprietary) used for O&M Work
- **Administration Training:** Training for administrators and office positions, including mentorship and support to develop the tools necessary for success in all aspects of their jobs
- **Management and Supervisor Training:** Training modules for managers and supervisors on leadership techniques and management methodologies
- **Communication Training:** Training modules for key managers to develop skills for effective communication with stakeholders and employees

Over 100 specific courses in these seven key training categories are available in the KMP O&M training curriculum. Our most effective training delivery is a combination of classroom training supplemented with On-the-Job Training—the classroom training teaches fundamentals of specific topics, and On-the-Job Training develops skills for practical use.

Courtesy patrol training is one of the highest priorities for O&M implementation. The patrols assist motorists and monitor the system for safety deficiencies. During mobilization, courtesy patrol training includes all of the relevant courses listed in the training matrix below and includes a shadowing program that pairs trainees with active patrols on similar projects, including I-595 in Florida and I-495 in Virginia. As part of the initial training program, KMP requests that the Department provide ride-alongs with Department patrols for first-hand orientation for KMP courtesy patrol staff. This ensures our staff fully understands the Department's expectations.



# CENTRAL

The figure below details the KMP O&M training program, which presents training for various categories (i.e., types of training) and the specific courses by position. As necessary, KMP provides an updated matrix for each position with the OMP provided at NTP2.

## Required Training Matrix by Position

Category	Series	Course	Required	Credit Hrs
<b>Initial Training*</b>	<b>NEO</b>	New employee orientation express (NEO Express)	All	<b>0.5</b>
		New employee orientation live (NEO Live)	All	<b>1.5</b>
<b>Environmental Health &amp; Safety**</b>	<b>HAZMAT</b>	Osha global harmonizing standard (GHS)	All	<b>1.0</b>
		Hazardous materials communications Program HAZCOMM	Supervisors	<b>1.0</b>
		HAZMAT awareness and spill response	All field personnel	<b>2.0</b>
	<b>OSHA</b>	OSHA 10-hour	Crew leaders/ supervisors	<b>10.0</b>
		Personal Protective Equipment	Field personnel	<b>1.0</b>
	<b>CPR/First Aid</b>	CPR/first aid	Crew leaders/ supervisors	<b>4.0</b>
		<b>Environmental</b>	Hot weather/cold weather safety	Field personnel
	Working safely outdoors		Field personnel	<b>1.0</b>
	<b>Emergency Management</b>	Emergency action plan	All	<b>1</b>
		NIMS: ICS100, IS200	Field personnel	<b>Varies</b>
		NIMS: IS700, IS800 incident management	Supervisors	<b>Varies</b>
	<b>Project Safety</b>	Project safety overview	All	<b>3.0</b>
	<b>Operations &amp; Maintenance</b>	<b>MOT</b>	Traffic incident management (TIM)	Field personnel
Traffic control technician (TCT)/Work Zone traffic control			Field personnel	<b>8.0</b>
Traffic control supervisor (TCS)			Supervisors	<b>16.0</b>
Flaggers in the Work Zone		Field personnel	<b>4.0</b>	
<b>Maintenance Activities</b>		Crash barrier systems (Trinity, Gibraltar, gulf industries)	Crew leaders/ supervisors	<b>3.0</b>
		Winter weather operations	Field personnel	<b>8</b>
		Defensive driving small vehicles	All	<b>1.0</b>
TMA Operations and safety		Sponsored operators	<b>2.0</b>	

Category	Series	Course	Required	Credit Hrs
	<b>Tools &amp; Equipment Operations</b>	Hand and power tools	Field personnel	<b>1.0</b>
	<b>TMC Operations</b>	TMC operations	Dispatch operators	<b>4</b>
		TMC communications	Dispatch operators	<b>4</b>
		Incident report writing	Dispatch operators	<b>8</b>
<b>Information Technology</b>	<b>JAMMS</b>	DWR process	Admin, crew leaders, supervisors	<b>2.0</b>
		JAMMS mobile	Admin, crew leaders, supervisors	<b>4.0</b>
		JAMMS desktop	Admin, supervisors	<b>4.0</b>
<b>Management &amp; Supervision</b>	<b>HR</b>	Corrective counseling/write ups	Admin, supervisors	<b>2.0</b>
		Employment Law for Supervisors	Admin, supervisors	<b>1.0</b>
		HR basics	Admin, supervisors,	<b>2.0</b>
	<b>TPC</b>	Third party claims	Supervisors	<b>2.0</b>
	<b>QMS</b>	Quality management system overview	Supervisors	<b>2.0</b>
<b>Leadership</b>	<b>Leadership Basics</b>	KMP...a purpose driven Team	Supervisors	<b>2.0</b>

*\*KMP coordinates the initial training phase for O&M personnel with this training during the Construction Period.*

*\*\*See Section 6 of Appendix M, Environmental Compliance Work Plan, for further discussion on the KMP environmental compliance and mitigation training program (ECMTP) for O&M personnel. See Section 5 of Appendix B, Safety Management Plan (Construction) for further discussion on safety training for O&M personnel.*

In addition to the training courses listed above, the following table identifies an annual training hourly expectations per position type.



### Required Annual Training Hours

Position	Annual Training Hours
O&M Manager	30 hours
Maintenance Project Engineer	30 hours
Maintenance Supervisor	20 hours
Operations Supervisor	20 hours
Technician Level I	20 hours
Technician Level II	30 hours
Technician Level III	30 hours
Technician Level IV	30 hours

### 6.3 MAINTENANCE TRAINING ACADEMY

The Department’s Maintenance Training Academy (MTA) was formed in 1999 to provide consistent training for the Department’s transportation maintenance workers. The MTA curriculum includes courses in:

- Safety
- Defensive driving
- CPR and first aid
- Equipment inspection and maintenance
- Traffic control
- Storm management
- Environmental/water quality
- National Incident Management System
- Survival skills
- Leadership
- Computer skills
- Drug and alcohol
- Diversity
- Workplace harassment

We recognize this valuable resource and intend to use the MTA to train KMP staff to ensure consistency between KMP and the Department. If Approved by the Department, KMP registers at the MTA our O&M employees who will benefit from courses to supplement their KMP training.

Effectively training our employees is a KMP priority. Our key training managers are certified instructors for national programs including OSHA, and ATSSA. We extend these services to our clients including various DOTs and toll agencies as a value added. Specific examples include providing advanced traffic control training, basic CPR, and safety and hazardous material training encompassing more than 1,200 credit hours annually. The Department's transportation workers are also invited to attend KMP's training courses.

## 6.4 STAFF QUALIFICATIONS

Sections 3 and 4 of Appendix I, Maintenance Management Plan present the staffing qualifications and training for the O&M maintenance staff. This includes the management level positions (e.g., O&M Manager, Operations Supervisor) and the Roadway/Bridge Inspectors and Maintenance Technicians. The following identifies the qualifications and training for the major functions in the Operations Management Plan.

### 6.4.1 COURTESY PATROL STAFF/INCIDENT RESPONDERS

The fundamental job responsibility for these staff is to perform all KMP responsibilities as identified in Attachments 2 and 3 of Appendix H.

#### Physical Requirements:

- Able to lift at least 50 pounds easily
- Able to ascend/descend structures to perform job duties
- Able to work safe and independently in vehicle traffic zones
- Able to work safely in a wide range of environmental and weather conditions (i.e., able to work in hot, cold, or wet conditions for extended periods of time)
- Able to stand for extended periods of time while operating equipment

#### Qualifications:

- High school diploma or GED preferred, but not required
- Maintain company standards for background checks (e.g., criminal record, driving record, and controlled substance/drug testing)
- Driver's license with no moving violations within the last five years
- Knowledge of local driving rules and regulations
- Ability to use smart phone and applications

#### Training:

Completed the KMP Required Training Matrix Program for courtesy patrol staff including:

- Completed all Environmental Health and Safety modules for field personnel in the Jorgensen Training Matrix
- Completed CPS Basics (for example, use of J-hooks and push bumpers) and CPS Communication Radio Terms and Codes
- Completed Advanced MOT Training module (the Traffic Control Supervisor module)
- Completed all CTMC Operations Training modules



#### 6.4.2 EQUIPMENT OPERATORS DURING SNOW AND ICE EVENTS

The fundamental job responsibility for these staff is to perform all KMP equipment operator responsibilities as identified in Attachment 1, Snow and Ice Control Plan, of Appendix H.

##### **Physical Requirements:**

- Able to lift at least 35 pounds easily
- Able to ascend/descend structures to perform job duties
- Able to work safely during extreme winter weather conditions
- Able to operate heavy equipment for an extended period of time

##### **Qualifications:**

- High school diploma or GED preferred, but not required
- Maintain Commercial Driver's License
- Maintain company standards for background checks (e.g., criminal record, driving record and controlled substance/drug testing)
- Knowledge of local driving rules and regulations
- Ability to use smart phone and other IT applications

##### **Training:**

Completed the KMP Required Training Matrix Program for Equipment Operators including:

- Completed all Environmental Health and Safety modules for field personnel in the Jorgensen Training Matrix
- Completed Winter Operations Training module
- Completed Extreme Weather Driving Training module

## 7. Incident Response, Management, and Reporting

Incident response and management is a critical operational element for a major facility such as the Central 70 Project. Major incidents can have a debilitating effect on the essential mobility and safety functions of the highway, and a failure to react quickly and effectively fosters a poor public image for both the O&M contractor and the Department. KMP's success and performance on managing these incidents is a high priority during the Construction and Operating Periods. KMP's Lead Operator responds to incidents during the Construction Period in a manner consistent with the Construction Period Incident Response Plan and traffic operations restrictions.

Attachment 2 of Appendix H presents KMP's O&M Incident Response Plan for the Project. The Plan describes the major elements of our Plan:

- Preparedness
- Detection of incidents
- Coordination/communication
- Response/Site management
- Recovery/Site clearance

## 8. Traffic Operations Restrictions

### 8.1 OBJECTIVES

KMP routinely employs Work Zone traffic control applications identical to those defined by the Department's standard O&M activities, capital construction projects, and regular operational needs. The KMP Transportation Management Plan (TMP) in Appendix F includes detailed procedures for traffic control and management during periods of traffic operations restrictions and lane closures. The TMP procedures comply with Schedule 10, Section 2, and include a policy guide and detailed planning to accomplish the MOT Program for all Construction and Operating periods. All of our Work activities are coordinated with the Denver Traffic Management Center and the CTMC.

KMP's Design, Construction, and O&M Teams have reviewed the Project corridor and Work activities, and collaboratively developed the preliminary MOT. The MOT Team created Traffic Control Plans (TCPs) that targeted minimizing impacts to local and Department roadways as follows:

- Combining multiple work activities and events into single closures
- Identifying potentially impacted businesses and major civic events
- Issuing early and definitive notices to the affected parties and general public
- Coordinating with the Denver Traffic Management Center
- Facilitating public media outreach and coordination with CTMC and the Department's Traffic Web Portal ([www.cotrip.org](http://www.cotrip.org))
- Minimizing long term ramp closures
- Limiting major traffic switches



- Reducing neighborhood impacts
- Expediting business access and local traffic signing and access

### 8.2 MOT/LANE CLOSURE PROCEDURES

The MOT Manager reviews the impacts of all proposed temporary MOT applications in the corridor, and ensures the MOT complies with the Project Agreement. For planned and programmed maintenance work requiring shoulder and lane closures, KMP submits closure requests to the Department at least 14 days in advance (except in cases of unforeseen emergencies, which may require shorter notice).

KMP avoids scheduling closures during Holidays and special events because of the amplified impact on the traveling public. Local and federal Holidays are blackout dates when Department Approvals for lane closures are required. Specific dates include:

#### Local and Federal Holidays

Holiday	Day
Labor Day	First Monday in September
Veterans Day	November 11
Thanksgiving Day	Fourth Thursday in November
Day after Thanksgiving	Fourth Friday in November
Christmas Eve Day	December 24
Christmas Day	December 25
New Year's Eve	December 31
New Year's Day	January 1
Martin Luther King, Jr. Day	Third Monday in January
President's Day	Third Monday in February
Memorial Day	Last Monday in May
Independence Day	July 4

KMP avoids traffic operations restrictions during special events such as the National Western Stock Show and Cinco de Mayo.

The KMP Communications Team works closely with the MOT Team to include easy-to-understand, accurate information for distribution in the weekly Lane Closure Reports. We coordinate with the Department to identify the best frequency and submission dates for reports through Aconex. We submit reports each Thursday to the list of contacts provided by the Department, and outline activities for the following week (Saturday-Friday), as Schedule 10, Section 2, of the Project Agreement requires. KMP can repackage technical information for social media, presentations, and other external communications, and for updates and traffic alerts. KMP coordinates with the MOT Team to plan road closures in advance by reviewing upcoming road closures at the MOT meetings and confirming entries in the MOT checklist. KMP notifies affected motorists of lane closures as early as possible to allow ample time for alternative route and schedule planning. We post the time, location, and duration of closures on the InEight Project Suite and the appropriate website, and post information on extended closures on VMS message boards at least one week in advance of the closure.

The MOT Manager monitors and controls the Approval process for closure Work Zone requests. KMP uses the following guidelines when considering requests for closures at Work Zones:

- **Holiday Hours:** Unless otherwise stipulated, Holiday hours begin at 7 pm the day before the Holiday date, and end at 5 am the day following the Holiday date.
- **Permissions:** Unless the Department or Federal agency directs otherwise, closures for incident management are allowable without exception.
- **Exclusions:** In consultation with the Department, the MOT Manager can permit closures for Work Zones if anticipated traffic volumes are significantly less than those during similar non-Holiday periods.

### **8.3 LANE CLOSURE TRACKING**

KMP reports and tracks all lane closures in JAMMS. Each scheduled and Approved lane closure is entered as a work order and scheduled in JAMMS. The specific Lane Closure Traffic Control Plans are attached in JAMMS to the work order. Lane closure beginning and end times can be entered real time through the mobile application, and JAMMS provides lane closure summary reports. The basic process is:

- Service request for the work is entered into JAMMS and a designated work order is issued for the lane closure
- The work order schedule start date is determined, and is added to the weekly schedule report produced in JAMMS
- The Approved Lane Closure Traffic Control Plans are attached to the work order
- Once the lane closure begins, a daily work report is issued out of JAMMS where beginning times, ending times, and all materials, equipment, staff and resources are accounted for
- All information is tracked real-time and accessible and a summary of all closures for the previous month is included in the monthly report, with dates and durations. An example summary from JAMMS is below:



### Asset Service History

Project is in (AGC - SH288 - 36020100) AND DWR Date >= 3/01/2017 AND DWR Date <= 3/31/2017 AND Asset = (33275)

#### Reporting

Asset ID	Description	Project #	Type	Location		
LANE CLOSURE	Lane closure tracking	36020100	ROADWAY	SB 288 @ BW 8		
Road Seg./Route #/Local Name: SH288 - SH288 - SH288				Facility Name:		
SH288						
<b>SERVICE HISTORY</b>						
Work Date	DWR #	Activity Code	Description		Units	Qty
03/01/2017	989561	799	Traffic Control		HRS	2.5
03/14/2017	993445	799	Traffic Control		HRS	8.5
03/15/2017	993463	799	Traffic Control		HRS	6.5
03/16/2017	993488	799	Traffic Control		HRS	1.25
03/24/2017	1003394	799	Traffic Control		HRS	1
03/30/2017	1011205	799	Traffic Control		HRS	1

## 9. Operations Performance Monitoring

KMP has established a comprehensive structure to manage and monitor our performance for O&M activities, including performance criteria in Schedule 11, incident response, snow and ice control responsibilities, and courtesy patrol. To monitor performance KMP uses:

- Highly qualified and experienced staff with responsibility for performing Work according to set procedures and processes that ensure performance requirements are met.
- A maintenance management information system (JAMMS) that provides an automated process to schedule, track, and evaluate all O&M activities. JAMMS measures the performance versus quality objectives, providing a quality check. For example, data from a snowplow is incorporated into JAMMS to determine if the vehicle meets the required cycle time. By comparing actual data to the performance requirements, we make adjustments to the Snow and Ice Control Plan so that performance meets the requirements.
- A comprehensive set of plans for the various O&M activities, as documented throughout Appendix H and Appendix I and their Attachments. Attachment 4 of Appendix I, O&M Quality Management Plan, in particular, describes KMP’s managerial approach to meeting the O&M performance measures and monitoring compliance and noncompliance results.

Work methods vary for each maintenance or operational activity performed; however, some methods benefit all activities. KMP uses the following operational performance monitoring processes:

- **Routine Customer and Internal Progress Meetings:** Used to cooperatively identify completed, current, and future work actions, and discuss achievements and improvement areas of Routine Maintenance Work.
- **Generation of Routine Maintenance Service Requests (RMSRs):** Periodic inspections to identify maintenance needs and identify required Work. JAMMS provides a seamless interface with InEight Project Suite’s inspection feature.
- **Detailed Activity Checklist:** A series of conformance indicators for successfully completing maintenance activities.

- **Maintenance Management Information System (JAMMS):** A software application for planning, monitoring, and tracking maintenance activities and operations. JAMMS accounts for all resources used for O&M Work and measures planned vs. actual metrics for each activity.

For major Operational activities, see Attachment 1, Snow and Ice Control Plan; Attachment 2, Incident Response Plan; and Attachment 3, Courtesy Patrol Service Plan, which describe KMP's strategy for monitoring performance.

## 10. Plans and Procedures for Notification and Database Requirements

KMP provides written notifications of any Noncompliance Event or the commencement of Non-Permitted Closure or excused closure within 24 hours of becoming aware of the event. We provide all written notifications through the Department's document control system Aconex. The plans and procedures for notification follow the policies of Part 6 of Schedule 6.

KMP uses JAMMS for data management. Following each QC review, the inspector enters the information into JAMMS. JAMMS quantifies the results from the QC reviews and provides a summary report of the results. We use the JAMMS database for reporting, tracking, monitoring, analysis, and variance identification.

## 11. Operating Protocols and Agreements

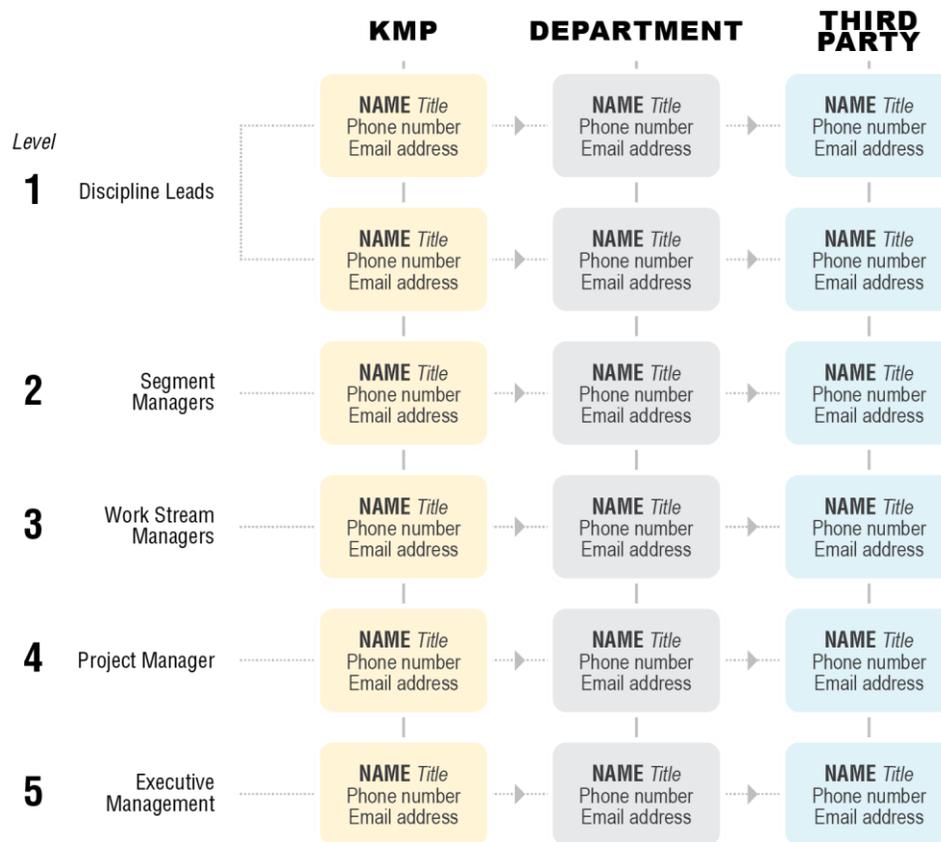
### 11.1 STRATEGIC COMMUNICATIONS PLAN

Appendix J, Strategic Communications Plan, presents KMP's overall, comprehensive strategy for meeting the requirements of Schedule 14. The Plan documents KMP communications strategies and primary stakeholder communication lists, and identifies all Public Information (PI) issues and proposed outreach. The Construction Period Communications Plan (CPCP) also applies to O&M activities during the Construction Period. The Maintenance and Operations Communications Plan (MOCP) is specifically for the Operating Period. The MOCP continues the two-way communication of Project information and dialogue with the Department, third parties, stakeholders, and the public started during the Construction Period. The MOCP adapts the CPCP tools for use during the Operating Period to manage the communications process. The KMP Project Communications Manager provides the overall leadership for achieving the Project communication goals and objectives throughout all Project periods.

During the transition between Construction and Operating Periods, we update the zipper plan in the Project Management Plan (example shown in the next figure) to reflect the Operating Period's organizational structure. The zipper plan includes the various touch points with the Department, stakeholders, and agencies with interests in the Project. The zipper plan identifies Project Team members and their respective counterparts across the Project organization. This plan aids in understanding lines of communication by depicting both vertical and horizontal lines of communication, which allows everyone to remain current with accurate information, fosters effective communication, and aids the Team in solving problems at the best level. The KMP Team has used this plan on other projects with excellent success.



### Example Zipper Plan



## 11.2 COORDINATION WITH THE DEPARTMENT

KMP maintains open communication and transparency in our O&M program to promote mutual trust, confidence, and information exchange with the Department and other stakeholders, including the managed lane operations. We provide the Department with activity schedules and updates, weekly planning meetings with supervisors, in-house progress meetings, bi-annual partnering meetings, and details on significant operational changes. We notify the Department and other stakeholders and agencies at least two weeks in advance, providing locations, Traffic Control Plans, Schedules, and work descriptions for lane closure requests. We post this information on the InEight Project Suite for Department access, and to communicate with the appropriate stakeholders and agencies.

KMP meets with the Department on a regular basis, and as frequently as necessary, to explain planned maintenance activities and lane closure requirements for the upcoming month.

KMP's Project Manager is the direct contact and interface between KMP and the Department for all maintenance-related Project responsibilities. At the discretion of the Project Manager, key O&M staff and maintenance subcontractors are requested to provide additional information and/or attend meetings with the Department.

Maintenance service providers, or other third parties under the authority of KMP, schedule regular coordination meetings with the applicable maintenance stakeholders, the Department, and other Local Agencies. These coordination meetings optimize the needs of the Project and add value to our deliverables.

Information sharing facilitates understanding of compliance requirements and responsibilities, so we provide the Department real-time access to JAMMS for current Project status details on all O&M Work activities. This approach fosters open communication and timely responses from all parties.

### **11.3 COORDINATION WITH OTHER STAKEHOLDERS**

KMP builds strong positive relationships with the myriad stakeholders, customers, and other third parties that involved in the Project as discussed above. KMP is committed to providing high levels of customer service and developing effective interfaces through the following principles:

- Defined communication channels
- Strong framework for a seamless customer service interface
- Consistency of communications

A preliminary list of stakeholders with which KMP coordinates during the Construction and Operating Period includes:

- CDOT High-Performance Transportation Enterprise
- CDOT Office of Emergency Management
- CDOT Public Relations
- CDOT Region 1
- CDOT Transportation System Management and Operations (TSM&O)
- City of Aurora
- City and County of Denver
- Colorado Motor Carriers Association
- Colorado State Patrol (CSP)
- Denver Council of Regional Governments (DRCOG)
- Denver Emergency Management
- Denver Fire Department
- Denver Police Department (DPD)
- Aurora Fire Department
- Denver Police Department
- Federal Highway Administration (FHWA)
- National Western
- Mobility Transportation & Service
- RTD
- Denver International Airport
- Adams County

This list is updated and expanded in the final OMP.



In addition to the agencies and stakeholders named above, KMP works closely with the Cover Top Maintainer to ensure a seamless interface between Cover Top O&M Work and our Cover O&M Work. This close coordination includes being an active partner throughout the Term by providing information, recommendations, and as-needed support during the analysis of any proposed changes. Prior to Substantial Completion, KMP provides a *Cover Top O&M Manual* that outlines the pertinent Cover Design and Construction information, recommended O&M, requirements, and recommended procedures and protocols for coordination between the Cover Top Maintainer and KMP.

## 12. Communication Procedures for Emergency Preparation and Response

See Appendix H, Attachment 1, Snow and Ice Plan, and Appendix H, Attachment 2, Incident Response Plan, for KMP's communication procedures during emergencies. See KMP's Strategic Communications Plan for additional details on KMP's communication procedures.

The O&M Project Administrator distributes and maintains contact lists, which are available on the InEight Project Suite for review and download. The contact list provides contact information and phone numbers so that the Department has access to KMP personnel 24/7.

Coordination with local and regional emergency service providers, law enforcement, and other related agencies occurs through quarterly meetings and weekly emailed updates as detailed in the KMP Public Information Plan (PIP). See the list of stakeholders in Section 11 of Appendix H. KMP cooperates with law enforcement and other emergency response agencies in their response to accidents, fires, hazardous material spills, or other emergency events. KMP also cooperates in all investigations of accidents and incidents within the Project limits in accordance with the Approved MHT.

KMP coordinates with emergency service providers to address emergency access to the corridor, and we communicate changes in access as Work progresses at coordination meetings and in predetermined Construction or Maintenance Work updates through Aconex from InEight Project Suite.

## 13. Coordination with Governmental Authorities Including Emergency Services

KMP develops coordination documentation, procedures, protocols, and other guidelines at the initiation of O&M operations to explain to the O&M staff the specific actions for their assigned responsibilities. A strong, collaborative relationship between KMP, the Department and its Regional staff, and other governmental authorities is essential to Project success. KMP consistently employs effective coordination and communication processes to foster that relationship. For the Project, a preliminary list of emergency service organizations include:

- AirLife Denver
- American Medical Response of Denver
- CDOT Office of Emergency Management
- Colorado Motor Carriers Association
- Colorado State Patrol (CSP)

- Denver City Coroner
- Denver Emergency Management  
Denver Fire Department
- Denver Police Department (DPD)
- Local Ambulance Service
- Federal Emergency Management Agency (FEMA)
- Flight For Life Colorado
- Mobility Transportation & Service
- Aurora Fire Department
- Aurora Police Department

This list is updated and expanded in the Final OMP. See Attachment 2, Incident Response Plan, of Appendix H for more discussion on coordination activities with governmental authorities and emergency services.

The following Sections discuss the primary O&M activities requiring KMP coordination among governmental authorities.

### **13.1 REPORTS AND OTHER DOCUMENTS**

KMP coordinates with Government Authorities, including Emergency Services, through reports and documents including:

- The O&M Plan which includes operating protocols, agreements, communication procedures, and protocols for managed lane operations, incident response, and emergency and courtesy patrol services
- Monthly reports with detailed information as specified by the Department
- Standard Operating Guidelines (SOG) for ITS operations, courtesy patrol, incident response, and snow and ice services
- Disaster reporting and emergency services coordination

### **13.2 MEETINGS**

KMP holds monthly O&M report meetings with Department representatives and other governmental authorities. Discussion topics include the previous month's maintenance activities, planned maintenance activities, future lane closures, incidents and emergencies, O&M violations, and other pertinent information. Example topics for discussion at these meetings include:

- Collaboration on specific O&M issues
- TIM (Traffic Incident Management) meetings
- Local Agency meetings
- Debriefing meetings for major/significant events
- Department coordination meetings on utility impacts
- New, innovative, and emerging methods and products or items not currently on the Approved products list
- Field inspections of specified assets and providing the results to the Department (e.g., attenuators, guardrail, pavements, lighting)
- Periodic bridge inspection findings and a review of National Bridge Inspection Standards (NBIS) data



- Major upcoming activities
- Outreach and charity efforts, community interaction and related activities
- Lessons learned

### 13.3 COORDINATION WITH PUBLIC/MEDIA

KMP's actions relative to our collaboration with the Department's Media Center includes:

- **Kick-Off Meeting:** Held prior to the initiation of the Operating Period for all State and local stakeholders. KMP introduces our Team, explains the general O&M program, provides contact information, and answers any questions or concerns.
- **O&M Overview:** White paper on the activities during the Operating Period, program services, and O&M goals. The paper is distributed at the Kick-Off Meeting, posted on our website, and emailed on request.
- **Website Notification:** Links to the Project website with an overview and contact information.
- **Customer Comment.** Courtesy patrol service operators will offer the Department's CPS program brochure to motorists of disabled vehicles and direct them to the Project website to provide their feedback.

The KMP Project Communications Manager is responsible for the dissemination of travel information regarding incidents and communicating this information and travel information to the public and other governmental authorities. During incident response, KMP classifies the incident response level and communicates this information to the KMP Project Communications Manager, who then communicates immediately with the Department Project Manager and Public Information liaison when an emergency incident occurs. KMP assigns a PI Team member to serve as the point-of-contact for media communications and coordinates information on the incident, updates on the event, and responses to media inquiries on the incident. See Appendix J, Strategic Communications Plan for more information.

## 14. Coordination with the Colorado Traffic Management Center

The CTMC is the source of real-time information for Denver and the surrounding area. CTMC monitors the I-70 corridor systems and events. During both the Construction and Operating Periods, KMP is responsible for the following activities:

- Monitor and control the Cover Mechanical, Electrical, Plumbing (MEP) system
- Assist with the courtesy patrol dispatch
- General traffic and roadway monitoring
- Monitoring weather conditions
- Special event management
- Active traffic management for Cover
- Managed lane system monitoring and operations

KMP's co-location with the Department facilitates the collaboration and cohesiveness necessary for the effective functioning of Project activities for CTMC. KMP provides a trained and dedicated Team, with 24/7 presence, co-located at the CTMC to operate the Cover's Command Control and Monitoring System (CCMS). During both the Construction and Operating Periods, KMP reports any issues or required repairs to the CTMC. The courtesy patrol works with CTMC as discussed in Appendix B of Schedule 11.

KMP coordinates with the CTMC to determine the best protocol for communicating major traffic shifts, I-70 East Corridor closures and detours, ramp closures and detours, and intermediate or major level incidents as defined in the Incident Management Plan.

KMP Team members have experience on previous Department projects working with the CTMC staff in Golden, CO. We are knowledgeable with the Department's VMS usage policy, CCTV video system, Road and Weather Information Systems, and INRIX, and with coordination procedures for the lane closures and detours that include local police and traffic control supervisors.

KMP uses Department ITS/VMS boards to advise motorists of major changes to traffic patterns well in advance of the Work Zone. The goal is to divert trips away from the Work Zone by up to 5% to help reduce travel delay and congestion during major traffic events. We anticipate frequent use of the Department's overhead VMS along I-70, I-25, and I-225 to communicate closure and detour information and to advise the traveling public to use an alternative route.

To maximize the efficient operations of the Central 70 corridor, KMP will seek, and pay for, additional streaming camera feeds to the Project Office. The streaming video should include all cameras within the Project area, plus two miles west and east of the Project on I-70 and two miles north and south of I-70 on I-25. For the major traffic switches and main line closures, KMP requests assistance from CTMC and DTMC staff to support these events.

KMP regularly monitors the traffic speed maps (COTRIP and SIGALERT-Denver) and the Department's live streaming cameras throughout the duration of the Operating Period. We request the use of INRIX performance measure data from the Department at the onset of the Project to develop a baseline for actual traffic flow conditions. In addition, we request INRIX data taken during Mainline closures and detours and traffic switches so the MOT Team can understand the traffic impacts and develop countermeasures for potential traffic problems. KMP also requests a review of the DTMC facility to understand the CCTV camera options, available traffic flow data, and current signal timing plans to help reduce traffic impacts to cross streets during Construction.

KMP has the necessary equipment and staff to operate the Cover from the CTMC. If a failure occurs at the CTMC, KMP has made the necessary provisions for a backup control center with the necessary facilities and equipment to locally control the Cover Onsite.



## 15. Analysis of Vehicular Accident Patterns

KMP has developed an accident analysis and reduction plan with our operational approach. Key activities for this process include:

### Accident Reduction Plan Process

Activity	Action
<b>Accident Debrief</b>	Post-accident meeting with responder to revisit successes and failures in response
<b>Bi-Monthly Accident Meeting</b>	Meeting with O&M Operations Team, police, and other emergency responders. We hold mock scenarios to improve future accident response.
<b>Accident Data Analysis</b>	Analysis of the past month accidents including quantity, type, and response duration table-top exercises

### 15.1 HISTORICAL ACCIDENT DATA MANAGEMENT

KMP evaluates historical accident data to:

- Ensure the most effective accident response protocols are in place
- Determine the changes or improvements to the Project assets that can reduce future accidents

To capture important accident details, responders complete an Accident Summary Report (ASR) as part of every accident response. This report details all actions taken during the accident response, including dispatch time, arrival time, accident location, lane closure times and durations, asset damage, general description of accident, possible causes, and report numbers from law enforcement involvement. KMP uses the ASR data and accident debriefs to implement safety improvements effectively (such as strategies for employing enhanced guidance devices). We also use data collected on ASR forms for KMP’s third party claims process. We enter all data collected for the ASR into JAMMS.

KMP’s collection of accident data is independent from the authority of the Colorado State Patrol to investigate and report accidents on the State highway system.

An example of an ASR follows.

## Sample Accident Summary Report

ITEM	DATA										
<b>Date Requested (Begin)</b>		M	T	W	TH	F	S	SU			
<b>Time Requested (Begin)</b>		AM	PM								
<b>Date Requested (End)</b>		M	T	W	TH	F	S	SU			
<b>Time Requested (End)</b>		AM	PM								
<b>Project Number</b>											
<b>Route #</b>											
<b>MOT Description</b>											
<b>VA Index and MOT Standard</b>											
<b>Travel Lane Direction and Length</b>	NORTHBOUND			Left HOT Lane	Left GP Lane	Other GP Lane	Right HOT Lane	Left HOT E-Lane	Right HOT E-Lane	Left GP Shoulder	Other GP Shoulder
<b>Travel Lane Direction and Length</b>	SOUTHBOUND			Left HOT Lane	Left GP Lane	Other GP Lane	Right HOT Lane	Left HOT E-Lane	Right HOT E-Lane	Left GP Shoulder	Other GP Shoulder
<b>Ramp and/or Detour</b>	NORTHBOUND			Exit Ramp	Entrance Ramp	Total Road Closure	Detour	Moving Operations			
<b>Ramp and/or Detour</b>	SOUTHBOUND			Exit Ramp	Entrance Ramp	Total Road Closure	Detour	Moving Operations			
<b>Mile Post Begin</b>											
<b>Mile Post End</b>											
<b>GPS Longitude</b>											
<b>GPS Latitude</b>											
<b>Zone # (Road Segment ID)</b>					Limited Access	Arterial	County Road	City Road			
<b>Asset Code (if applicable)</b>											
<b>Cross Section Position</b>		MED	ROAD SIDE	OFF RAMP	ON RAMP	INT ROAD	TRAV. LANES	SHLD	N/A		
<b>Specific Location Description</b>											
<b>Problem AND OPERATION Plan Description</b>											
<b>Oversize Load Restrictions</b>	Horizontal clearance less than 14 feet				Vertical Clearance less than 14'6"						
<b>Priority</b>		Emergency		Urgent		Important		Routine Maintenance		Fails MRP	
<b>Requestor Name</b>											
<b>Street</b>											
<b>City, State, Zip</b>											
<b>Source Phone</b>											
<b>Alternate Contact #1</b>											
<b>Alternate Phone #1</b>											
<b>Alternate Contact #2</b>											
<b>Alternate Phone #2</b>											
<b>Source Due Date</b>											
<b>Requestor Source</b>		Transurban	O&M	RJA	Law Enforcement	VA Official	HOT OC	ITS Contractor	VDOT	OTHER	
<b>Source Ref #</b>											
<b>NOTES</b>											
<b>Entered By</b>	_____				<b>Date</b> _____						
<b>SR/VO #</b>	_____										

### 15.2 ACCIDENT DATA ANALYSIS

KMP routinely reviews the historical accident data to identify locations where a disproportionate number of accidents occur and to identify potential countermeasures for safety issues. Our analysis process includes:

- Maintaining maps of Project limits and logging in accident history by location
- Periodically reviewing the accident history to identify sites with a high number of accidents (e.g., at ramp gore locations)
- Retrieving the ASRs and identifying recurring patterns to the accident occurrences (e.g., most occur during inclement weather, at night, during rush hour)



- Identifying potential countermeasures to identified accident patterns (e.g., improved delineation, upgrading the signing and/or pavement markings for better communication to the driver, relocating a hazard further away from the traveled way)
- Estimating the countermeasure costs
- Selecting the countermeasures offering the most benefit for cost

## 16. Hazardous Material Spill Mitigation Process and Reporting

KMP complies with the hazardous material spill mitigation and reporting provisions documented in Schedule 17; the Department's *Procedures for Hazardous Materials Spills That Occur on State and Federal Highways Within Colorado as a Result of a Highway Transportation Incident*, and the Spill Prevention Control and Countermeasure Plan (SPCC) for traffic incidents.

Incidents can involve hazardous materials such as fuel, chemical, or pesticide spills. KMP is responsible for the identification, investigation, removal, treatment, storage, transportation, management, and disposal of all known Recognized Hazardous Materials (RHM) encountered during the Construction and Operating Periods. We train all courtesy patrols, Maintenance Technicians, and supervisory personnel in hazardous material identification and response procedures. Basic procedures include:

- Submitting, as necessary, a Recognized Hazardous Materials Management Completion Report for Acceptance.
- A response time based on the performance measures in Appendices A-1 and A-2 of Schedule 11, Element No. 13.2.
- As applicable, seeking government Approvals for removal, management, and disposal of RHMs using procedures described in the KMP ECWP.
- If the spill is a non-toxic substance and less than 25 gallons, trained maintenance personnel clean up the spill as appropriate (e.g., oil dry or neutralizing agents).
- If the spill involves an unknown substance, or is referenced by a placard on the damaged vehicle or container, responders call 911 for a Hazardous Materials (HazMat) Response Team dispatch. Responders immediately cordon off the Site and limit access until the HazMat Team has released the Site. Incident responders immediately contact the Hazardous Material contractor to relay relevant information and instructions.
- Submitting and reviewing monthly statements of KMP management efforts with the Department.

As discussed further in Appendix M, KMP coordinates with a number of State and Federal agencies regarding any spills of hazardous materials, including:

- The Department
- CDHPE
- USEPA
- City and County of Denver

KMP's staff includes a Recognized Hazardous Materials (RHM) Manager with a minimum of 10 years of experience managing RHMs. In addition, the O&M staff includes a Monitoring Technician (MT) who has completed the 40-hour HAZWOPER and eight-hour OSHA Supervisory training. The MT is responsible for the identification and monitoring of Hazardous Substances during the Term. The MT is also State and EPA-CABI and meets the requirements of a Qualified Project Monitor as defined in the Colorado Solid Waste Regulation Section 5.5.3. The MT is Onsite during activities with RHMs. In locations where RHMs are not anticipated to be encountered, the MT is on-call and available to respond to unexpected conditions.

See Section 20 below; Appendix M, Environmental Compliance Work Plan; and Attachment 2, Incident Response Plan, of Appendix H for more information.

## 17. Investigation of Reports or Complaints

### 17.1 COMMITMENT

KMP maintains a 24/7 customer call line. During regular office hours, the Project Administrator routes calls directly to the Project Office for disposition by the appropriate staff. On a monthly basis, we track all requests, phone calls, and emails in the JAMMS system and summarize in detail requests and resolutions for the Department through Aconex. The real-time call tracking data can be accessed at any time by the Department through InEight Project Suite. In addition, JAMMS can sort reports based on location, date, and activity. Each log entry includes the customer name, contact information, time and date of request, and all resolution activities. The procedure for collecting and tracking includes:

- Immediate JAMMS entry for all phone, email, or in-person customer contacts
- Prioritization based on severity and immediacy
- Scheduled response based on priority level
- Progress and resolution follow ups to the customer
- Activity time stamped and maintained for future review

The Department can access InEight Project Suite at any time to review the logs and the accomplishment reports by Maintenance Area. The following is an example of the Customer Service Request Log.



### Example Customer Service Request Log Entries

Project in (I-595 Express) AND SR.Received Date >= 01/01/2015 AND SR.Received Date <= 12/31/2015

Call Time and Date Information	Source Name / Phone	Nature of Complaint	Zone / Seg / Route / Facility / Location	Date Closed
SR # 161628 ROADWAY	SR Status: CLOSED	Assess the area reported to us with debris left behind from the homeless camp	MM	1/8/2015 11:00:00 AM
Call Received: 1/8/2015 9:28:00 AM	Req. By: Mr. Elliot		86080550 SR 84 WB = WB SR84	
Depart to Scene:	Phone: (954)553-1151		WB SR84	
Arrived:	Source: CLIENT		Lat Begin / End Long Begin / End	
24Hr Call Req'd Y 1/8/2015 9:36:00 A 09:36				
Compl Call Req'd Y 1/8/2015 12:33	Other Src Ref #			
Field Notes			WB, SR-84 and Pine Island Rd on the east side of the bridge	
Verify Notes				
WO # 400241	WO Stage COMPLETED	Job Supervisor SV	Date WO Completed: 1/8/2015 11:00:00 AM	
DWR Nbr 693869	Work Date 01/06/2015	Crew Ldr SV	Work Performed assessed area and pickup debris around area	
SR # 161814 ROADWAY	SR Status: CLOSED	Inspect bridge access hatches to ensure they are properly closed and lock	7 - Zone 7 MM	1/8/2015 12:30:00 PM
Call Received: 1/8/2015 7:48:00 AM	Req. By: Kelley Hall		595 SR-862 / 86095000 = I-595	
Depart to Scene:	Phone: (954)777-4205		I-595	
Arrived:	Source: CLIENT		Lat Begin / End Long Begin / End	
24Hr Call Req'd Y 1/8/2015 8:28:00 A 08:28				
Compl Call Req'd Y 1/8/2015 12:42	Other Src Ref #			
Field Notes			US-441 flyover Bridges 860477 and 860476 over I-595 and the NNRC.	
Verify Notes	01/08/15 - Received an e-mail from Kelley about the access hatches not being locked. 01/08/15- Sent an e-mail response informing her that the latches were properly closed & Locked.			
WO # 400520	WO Stage COMPLETED	Job Supervisor SRC	Date WO Completed: 1/8/2015 12:30:00 PM	
DWR Nbr 694373	Work Date 01/08/2015	Crew Ldr SV	Work Performed confirmed that the access hatches on Bridges 860476 and 860477 were properly closed and locked.	
SR # 162143 ROADWAY	SR Status: CLOSED	Check All underpasses on I-595	All MM	1/14/2015 5:13:00 PM
Call Received: 1/14/2015 9:58:00 AM	Req. By: Natalie Vallina		595 SR-862 / 86095000 = I-595	
Depart to Scene:	Phone: (954)513-3200		I-595	
Arrived:	Source: CLIENT		Lat Begin / End Long Begin / End	
24Hr Call Req'd N				
Compl Call Req'd Y 1/15/2015 05:36	Other Src Ref #			
Field Notes			FROM I-95 TO NEW RIVER BRIDGE EAST / WEST BOUND CENTER MEDIAN	
Verify Notes	01/14/15- Rov'd an email regarding debris at the underpasses on I-595. Sent out the crews to check this. 01/15/15- Sent an e-mail back to Natalie informing her that this had been taken care of.			

KMP is committed to strong customer service and satisfaction, and promotes this as part of our corporate culture. KMP staff is well trained and empowered to resolve service requests quickly and fairly. To ensure effective customer service, KMP has established open communication with stakeholders, travelers, and the Maintenance Team. We promote positive relationships with the leaders and residents of surrounding communities, and hold meetings with special interest groups and citizen representatives. We clearly define customer service roles and responsibilities. Key elements for our customer service process include:

- Management commitment
- Clear explanations of the Work
- Project staff accessibility
- Prompt and courteous responses
- Personalized response whenever possible
- Simple, clear customer communications
- Objectivity and flexibility in determining proper resolutions
- Uniform, consistent, and accessible documentation

## 17.2 CUSTOMER SERVICE RESOLUTION

KMP records and tracks all customer service requests in JAMMS daily. We meet weekly to review the customer service log with supervisors and identify any problems regarding scheduled responses, mitigation requirements, or customer satisfaction. KMP's customer service resolution principles include these concepts:

- Customer service requests are any Project issue not meeting the customer's needs, requirements, or expectations
- Customers include the residents living along the Project ROW, the corridor's travelers, and stakeholders affected by the highway's maintenance
- KMP staff is well trained and empowered to respond quickly to inquiries and service requests
- We handle all service requests professionally and courteously
- We handle requests as expeditiously as possible
- We track each service request in JAMMS and summarize them for Department review
- We promptly follow up with customers regarding service resolutions
- KMP is committed to customer service and successful request resolutions — our management reviews, and improves, related processes on an ongoing basis
- Effective customer service communication and coordination are priorities
- The staff who are assigned customer service and response roles are accessible and capable of effectively resolving service requests
- We consider all Team members to be a part of our overall customer service program

## 17.3 RESPONSE PROCEDURES

We staff the Project Office from 7:00 AM to 4:00 PM, Monday through Friday, and establish a dedicated phone number for customer service requests. A designated staff member receives after-hours calls and begins the appropriate response based on the request's priority level. Staff will:

- Note the call's time, caller name, address, and phone number, and the location and nature of the request in the Customer Service Log database.
- Call the customer within 24 hours with status and pending action updates if the request cannot be resolved immediately.
- Assign a number and a priority level (emergency, urgent, or routine) to the request based on the nature of the complaint.
- Forward telephone requests both verbally, and in writing, to the appropriate supervisor for investigation and resolution. The supervisor reviews the request, visits the Site if necessary, and begins appropriate actions.
- Establish a follow-up schedule for requests unresolvable within one Working Day. Relay follow-up schedule to the customer and note in the Customer Service Log.
- Add the final resolution date to the Customer Service Log.

We summarize the Customer Service Log for management review monthly, and the full log is available for Department review.



## 18. External Communication System

The KMP Project Communications Manager provides the overall leadership for achieving the Project communication goals and objectives throughout all Project periods for both internal and external communication. We post all pertinent Project information on InEight Project Suite for Department use. KMP holds weekly strategic communications meetings at the Project Office to discuss communications issues including lane closures. See Appendix J, Strategic Communications Plan, for a detailed discussion.

## 19. System Failure Procedures

Section 3.2 above provides a partial list of the wide variety of systems that KMP employs during the Construction and Operating Periods. A small number of localized system failures are inherent to the operations of any major highway. KMP has designed all Project systems to mitigate any potential risks. Further, we have established contingency procedures for a back-up plan and procedures to rectify the failures as quickly as possible. The following Sections provide two examples to illustrate KMP's approach.

### 19.1 PUMP STATIONS

The pumping system for the Cover has the capacity to pump more water than required, and the system has redundant pumps, permanent power, and generator backup. Stormwater in the Onsite system is collected at a pump station adjacent to the low point of the Lowered Section. The pump station consists of six pumps with two designated for normal flows and the remaining four for the 100-year flood event. The two smaller pumps are cycled for consistent wear and are sized to address the routine flows from the typical Denver storm. Three of the four pumps are required to handle the peak 100-year flow storm event and the fourth pump is included for redundancy.

The adjacent detention pond provides water quality treatment for stormwater in the Lowered Section. Once treated, water is released into the existing 72-in. storm drain in York Street. This 72-in. trunk line can accommodate the Onsite volume because our Alternative Technical Concept (ATC) 12 eliminated the Offsite flows going to this pipe from the RD. ATC 12 removed 230 cubic feet per second (cfs) in volume from the 72-in. drain, while the combined volume from the Lowered Section and the north side is only 173 cfs. KMP also eliminated 5,300 linear ft. of large diameter storm sewer and the associated maintenance.

### 19.2 MONITORING

Regularly scheduled maintenance by trained, experienced personnel is the best overall strategy to ensure the proper functioning of a pump station. KMP considers many factors when planning maintenance operations, for example, we evaluate the potential impacts on the pump system based on current and forecasted weather events to avoid an engulfment hazard. Also, we remove wet well debris at the conclusion of the winter weather season due to the possibility of sedimentation build-up resulting from the application of de-icing materials. KMP inspects the liquid seal every three years, and replaces it if necessary.

KMP has accounted for the wide range of operational concerns typically associated with pump stations. Pump stations are monitored and maintained to ensure good performance. Monitoring systems (e.g., Onsite warning lights, remote alarms) can help minimize failures and their consequences.

### 19.3 POWER

The need for backup power is dependent upon the consequences of failure, so we base the decision to provide it on economics and safety. For electric motors, two independent electrical feeds from the electric utility with an automatic transfer switch is often the most cost-effective choice when backup power is required. A standby generator is generally less cost effective because of its initial costs and the considerable maintenance and testing necessary to ensure operation in times of need.

### 19.4 JAMMS

Disaster Recovery (DR) strategies are essential for major IT applications. Costs associated with downtime can be high. JAMMS is a critical component to KMP's management of our O&M projects and data is backed-up a remote to a server with redundant power supply.

KMP's host for JAMMS is Cogeco Peer 1. The service has eight data centers nationwide capable of hosting applications, thus negating the consequences of any natural disaster/force majeure. Some of Peer 1's DR services include:

- File and application-level backup
- Backup to disk
- Tape archival
- Disaster recovery
- Ground up recovery
- Live backups for Microsoft SQL server
- Live motion migration of virtual machines

## 20. Fuel Spill Response and Clean-Up (Staff and Equipment)

KMP complies with the hazardous material spill mitigation and reporting provisions documented in Schedule 17 and the Department's *Procedures for Hazardous Materials Spills That Occur on State and Federal Highways Within Colorado as a Result of a Highway Transportation Incident* for traffic incidents and the Spill Response Plan.

KMP designed its Spill Reduction Program with procedures and processes to eliminate fluid releases into the environment. Our goal is zero spills. However, if a spill does occur, the program outlines the steps and procedures KMP employs to prevent future spills.

The drainage system captures hazardous substances that could result from a fuel tanker accident occurring within the limits of the Cover. Potential hazardous substances would be captured and collected in a 500-gallon tank and subsequently pumped out and brought to a hazardous waste facility for disposal.



The Environmental Team includes maintenance personnel and meets on a regular basis to review spill data and develop actions to prevent future spills. Focusing on proactive maintenance has resulted in reduced equipment downtime and reduced man-hours mitigating spills while generating less waste.

We have identified two key initiatives as integral to the success of the program:

- Including Maintenance personnel on the Environmental Team and meeting regularly for their insights on preventative maintenance that can minimize the probability of a spill occurrence.
- Enhancing visual inspections and preventative maintenance programs. In addition to daily inspections by O&M staff, conducting regular proactive inspections of equipment and more detailed inspections during Routine Maintenance.

See Section 16 (staff qualifications) above for a discussion of the Monitoring Technician position responsible for the identification and monitoring of hazardous substances, including fuel. See Section 6 for information on the training and qualifications related to hazardous materials/fuel spills. Appendix M, Environmental Compliance Work Plan, and Attachment 2, Incident Response Plan, also discuss fuel spills.

## **21. National Traffic Incident Management Responder Training**

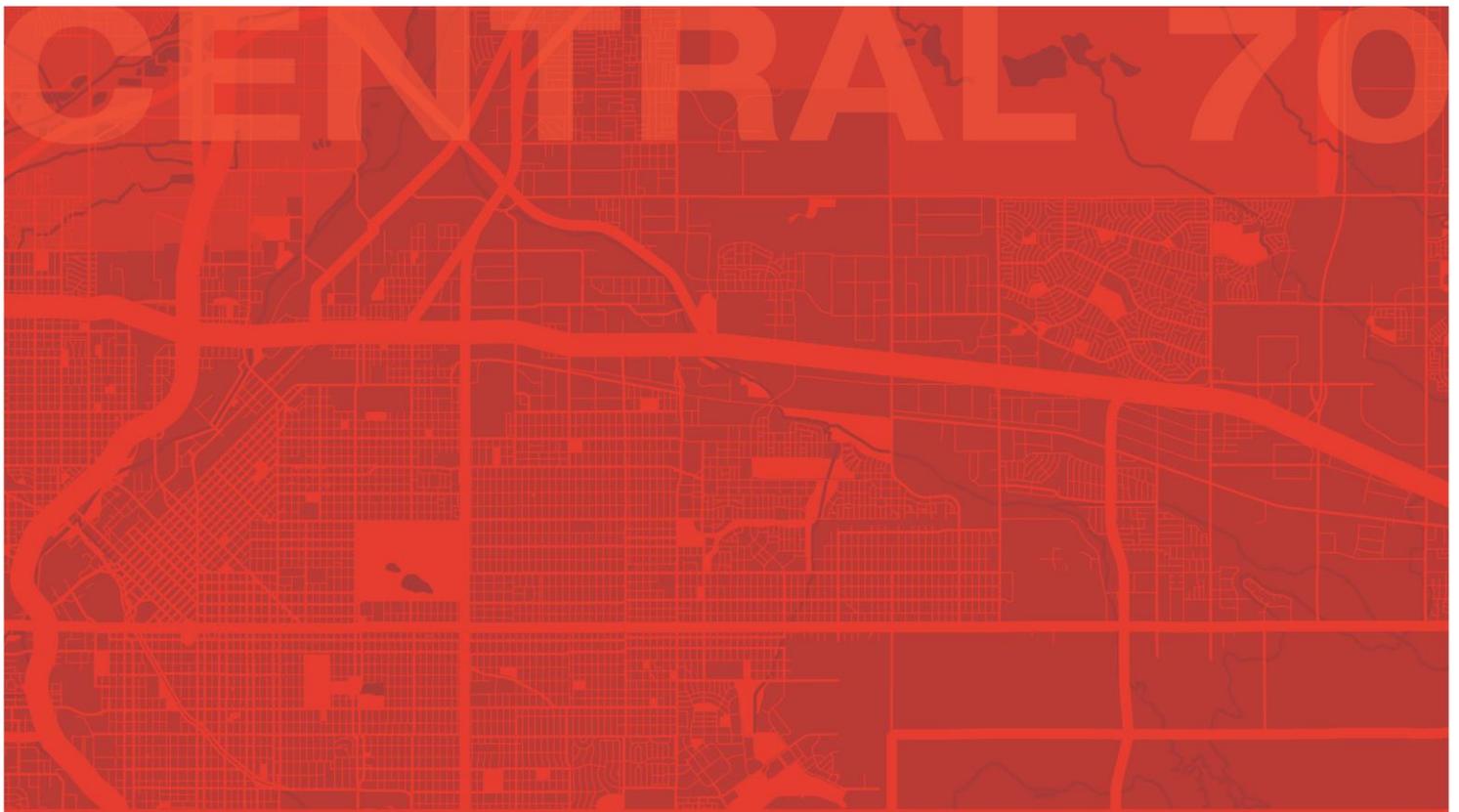
The National Highway Institutes' (NHI) National Traffic Incident Management Responder Training provides first responders with a shared understanding of the requirements for 1) Safe, quick clearance of traffic incident scenes, 2) Prompt, reliable, and open communications, and 3) Motorist and responder safeguards. The training prepares first responders to operate more efficiently and collectively. The training addresses traffic incident management procedures and techniques, including:

- Traffic incident management fundamentals and terminology
- Notification and scene assessment
- Safe vehicle positioning
- Scene safety
- Command responsibilities
- Traffic management
- Special circumstances
- Clearance and termination
- Telecommunicating

KMP's O&M Training Matrix in Section 6 includes two training modules based on the NHI course. See Attachment 2, Incident Response Plan, of Appendix H for more discussion.

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ATTACHMENT 1

*Relates to Appendix H*



# Snow and Ice Control Plan



**SUBMITTED TO:**

Colorado Bridge Enterprise  
High Performance Transportation Enterprise  
c/o Colorado Department of Transportation



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**SIGNATURE PAGE: APPENDIX H  
SNOW AND ICE CONTROL PLAN**

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PROJECT MANAGER

DATE

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DESIGN-BUILD MANAGER

DATE

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OPERATING MANAGER

DATE

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CONSTRUCTION MANAGER

DATE

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DESIGN MANAGER

DATE



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## RECORD OF REVISIONS

Revision number	Date issued	Pages affected	Comments
0	5/18/2017	All	Proposal Draft Submittal



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## EVALUATION CRITERIA – SNOW AND ICE CONTROL PLAN, APPENDIX H, ATTACHMENT 1

The Evaluation Criteria Matrix below associates the Project Agreement requirements with the sections of this plan:

Sch. 11 Section	Item	QMP Section	Section Name	Check
	<p>The Snow and Ice Control Plan shall outline: procedures that will:</p> <ul style="list-style-type: none"> <li>• Be implemented to maintain the I-70 Mainline, and other infrastructure Elements and portions of the CDOT Roadways (in each case) as identified in the O&amp;M Limits Reference Drawings, free from snow and ice to comply with the applicable General Requirements</li> <li>• Meet or exceed the applicable Targets including:                             <ul style="list-style-type: none"> <li>○ Location of maintenance yards</li> </ul> </li> </ul>			
9.3.2	<ul style="list-style-type: none"> <li>○ Procedures for snow and ice clearance plans to maintain traffic flows during and after a Precipitation Event</li> <li>○ Procedure for sourcing and analysis of weather information</li> <li>○ Procedures for meeting response times</li> <li>○ Procedures for meeting treatment and sweeping requirements to counteract ice and snow accumulation</li> </ul> <p>Procedures for techniques to be adopted on all lane types including Tolloed Express Lanes and General Purpose Lanes</p>	1.0	Introduction	<input type="checkbox"/>
9.3.3	<b>The Snow and Ice Control Plan and all updates shall at a minimum include details of the following:</b>			<input type="checkbox"/>
9.3.3.a	Management and administration	2.0	Management and Administration	<input type="checkbox"/>
9.3.3.b	Safety approach and compliance with O&M Safety Plan	3.0	Safety Approach and Compliance	<input type="checkbox"/>
9.3.3.c	Quality approach and compliance with O&M Quality Management Plan	4.0	Quality Approach and Compliance	<input type="checkbox"/>
9.3.3.d	Description of facilities that will be used for staging, including locations	5.0	Facilities Used for Staging	<input type="checkbox"/>
9.3.3.e	Approach to monitoring and oversight	6.0	Approach to Monitoring and Oversight	<input type="checkbox"/>

## EVALUATION CRITERIA: SNOW AND ICE CONTROL PLAN, APPENDIX H, ATTACHMENT 1

Sch. 11 Section	Item	QMP Section	Section Name	Check
9.3.3.f	Frequency of monitoring patrols during and between Precipitation Events	7.0	Frequency of Monitoring Patrols During and Between Precipitation Events	<input type="checkbox"/>
9.3.3.g	Weather forecasting systems, processes and procedures	8.0	Weather Forecasting Systems	<input type="checkbox"/>
9.3.3.h	Equipment, number, size and type	9.0	Equipment, Number, Size and Type	<input type="checkbox"/>
9.3.3.i	Materials and chemicals to be used	10.0	Materials and Chemicals	<input type="checkbox"/>
9.3.3.j	Description of Snow Routes and route analysis to support the equipment and resources required, including the following information:	11.0	Snow Routes and Analysis	<input type="checkbox"/>
9.3.3.j.i	Cycle time (time it takes to complete route)	11.2	Cycle Time	<input type="checkbox"/>
9.3.3.j.ii	Individual maps in a size and format that is legible, including photographs if necessary, clearly showing each winter vehicle route with clear route identification numbers. The colored maps shall be in native file and PDF format, and of sufficient scale that the starting and ending points are clear. Locations of features affecting the route description, including multiple lanes, ramp configurations, channelizations, Tolloed Express Lanes, dead heading, turnarounds and other special features that may affect plowing and/ or material spreading times shall be shown	11.3	Individual Maps	<input type="checkbox"/>
9.3.3.j.iii	Summary map in a size and format that is legible, including photographs if necessary, with all routes clearly labeled on one map	11.4	Summary Map	<input type="checkbox"/>
9.3.3.k	Description of patrol size and philosophy of plowing including shift and shift change times	12.0	Patrol Size and Philosophy of Plowing	<input type="checkbox"/>
9.3.3.l	Call out procedures including personnel, contact lists	13.0	Call Out Procedures	<input type="checkbox"/>
9.3.3.m	Details on how response times will be addressed	14.0	Procedures for Addressing Response Times	<input type="checkbox"/>
9.3.3.n	Application procedures for liquid and/or solid de-icers and anti-icers	15.0	Application Procedures for Liquid and/or Sold De-Icers and Anti-Icers	<input type="checkbox"/>
9.3.3.o	Calibration of Spreaders and liquid de-icer and anti-icer equipment	16.0	Calibration of Spreaders and Liquid De-Icer and Anti-Icer Equipment	<input type="checkbox"/>
9.3.3.p	Staff training plan	17.0	Staff Training Plan	<input type="checkbox"/>

## EVALUATION CRITERIA – SNOW AND ICE CONTROL PLAN, APPENDIX H, ATTACHMENT 1

Sch. 11 Section	Item	QMP Section	Section Name	Check
9.3.3.q	Precipitation Event reporting and documentation	18.0	Precipitation Event Reporting and Documentation	<input type="checkbox"/>
9.3.3.r	Procedure for post-Precipitation Event clean-up work, including stockpiling of excess snow, which shall not be stored in the clear zone;	19.0	Procedure for Post-Precipitation Event Clean-Up Work	<input type="checkbox"/>
9.3.3.s	Procedure for sweeping	20.0	Sweeping Procedure	<input type="checkbox"/>
9.3.3.t	Procedure for meeting Denver Regional Council of Government's air quality requirements after Precipitation Events	21.0	Procedure for meeting Denver Regional Council of Government's Air Quality Requirements Ater Precipitation Events	<input type="checkbox"/>
9.3.3.u	Procedure for reporting including results with respect to Performance Requirements, and pre- and post- event meetings	22.0	Procedure for Reporting including results with respect to Performance Requirements, and Pre and Post Event Meetings	<input type="checkbox"/>

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## 1. Introduction

At all times, Snow and Ice Team members and snow plow operators strictly follow KMP's safety directives, stay alert for hazards, and ensure public safety. We size and staff patrols according to the projected severity of the weather event, and adjust for actual conditions.

During the Construction Period, KMP is responsible for snow and ice control on the existing I-70 viaduct. We recognize the numerous snow and ice control challenges on the viaduct due to congestion, nearby commercial and residential properties, lack of adequate shoulder widths, construction phasing, susceptibility of precipitation to freezing onto the surface, and other factors. KMP meets with the Department to discuss the best practices for snow and ice control on the viaduct, and incorporates the Department's "lessons learned" into the Snow and Ice Control Plan and our fall training sessions for our operators.

## 2. Management and Administration

Contract administration and oversight is provided by KIC during the Construction Period, and by KMP during the Operating Period. Together, KMP has redundant capabilities to meet Department and Project needs.

Based on weather severity, the snow and ice activities range from preventive (including pretreatment) to heavy equipment operations (snow plowing). The figure below illustrates the chain of command for snow and ice management. From experience, KMP knows that some events can last many hours—sometimes days—and span multiple shifts. Though smaller events can be managed with dual responsibility assignments, KMP uses backups to maintain control of larger events.

### 2.1 ROLES AND RESPONSIBILITIES

The Operations Supervisor provides overall management of snow and ice control events supported by the maintenance staff who perform the responsibilities described below.

#### 2.1.1 WEATHER INCIDENT MANAGER

The Weather Incident Manager:

- Reports to the Operations Supervisor
- Communicates with the Department on current conditions, equipment status and location, fueling details, reloads, breaks, and roadway accident reports
- Plans response according to performance requirements
- Determines when adverse weather meet the weather condition standard requiring a response
- Calls the start and end of the event
- Directs application of pretreatment liquid and solid deicing material
- Maintains close communication with the KMP snow and ice team members
- Determines staff assignments and coordinates shift changes
- Routes trucks as needed



### 2.1.2 LOGISTICS MANAGER

The Logistics Manager:

- Reports to the Weather Incident Manager
- Keeps a time-stamped log of all communications, activities, and accident reports
- Maintains close communication with the Field Event Manager
- Maintains GPS logs of equipment locations and start, and stop and idle times
- Coordinates and assists in transporting employees to the deicing material storage facilities and equipment operator staging areas
- Maintains records and updates the material inventory

### 2.1.3 FIELD EVENT MANAGER

The Field Event Manager:

- Reports to the Weather Incident Manager
- Maintains close communication with all team members
- Logs all trucks/spreaders that return for service, equipment breakdown diagnoses, and time of repair
- Generally the shift manager for liquid application trucks, snow plows, and spreaders
- Manages loader operators and truck loadouts and ensures that records of quantities and route times are maintained
- Manages the snow removal and chemical application fleet logistics
- Manages the truck fueling, driver breaks, and maintenance/repair callouts
- Keeps Load Master log, loader logs, and driver logs

### 2.1.4 OPERATORS

The spreader and snow plow operators:

- Report to the maintenance facility for shift duty briefings, route and contact information
- Perform vehicle and spreader inspections
- Drive their assigned route

## 3. Safety Approach and Compliance with O&M Safety Plan

The Snow and Ice team, including Subcontractors, are required to perform Work in accordance with the O&M Safety Plan. Our approach to safety includes training focusing on the skills and knowledge necessary for proficient snow and ice response, including:

- **Safety:** Skills and knowledge necessary for safe Snow and Ice Operations.
- **Communication and Responsibilities:** Proper radio communications, understanding segment routes, the operations chain of command, and coordination with other emergency responders and public agencies
- **Equipment:** Fueling, controls, operational details, preventive maintenance, and emergency repairs for all pertinent equipment

- **Operations and Treatment Practices:** Fundamentals of snow and ice concepts, materials, operational strategies, application rates, and special conditions such as bridges, steep grades, curves, ramps and intersections
- **Policy and Procedure Review:** Detailed understanding of the Department's snow and ice maintenance policies and procedures

KMP provides oversight and inspection to assure that the snow and ice control services are conducted in accordance with the provisions of the Snow and Ice Control Plan, and in accordance with the Construction Safety Plan during Construction Period and the O&M Safety Plan during Operating Period.

#### 4. Quality Approach and Compliance with O&M Quality Management Plan

KMP is dedicated to quality throughout the Project. During the Operating Period, snow and ice control activities comply with the O&M Quality Management Plan (OMQMP). During the Construction Period, snow and ice control activities follow the Construction Quality Management Plan. Both plans are subplans to the overarching Quality Management Plan (QMP). The OMQMP addresses the quality process for O&M, supports the QMP quality improvement objectives, describes management responsibilities and communication interfaces, and is based on the applicable quality requirements set forth in the Project Agreement and the QMP. KMP revises the OMQMP as needed to add information, clarify current information, or improve procedures. KMP provides oversight and inspection to assure that the snow and ice control services are conducted according to the Construction QMP during Construction and the OMQMP during the Operating Period.

Our approach to quality is to meet the requirements of the Project Agreement and to adhere to its quality objectives. Our principal quality objectives are to meet the requirements of the Project Agreement, meet or exceed the Department's expectations, and to eliminate rework by performing our work *Right First Time*. We monitor our performance against these objectives and require continual improvement.

Snow and Ice Operations comply with the OMQMP in Appendix I, Attachment 4. Operations are monitored and audited for adherence with the OMQMP. Metrics are documented in our Maintenance Management Information System, JAMMS, JAMMS generates reports that shows actual versus expected performance. This information provides feedback for continuous improvement of Project quality.



## 5. Facilities Used for Staging

Appendix H, OMP, describes the facilities used for staging equipment and materials needed to support snow and ice control activities.

During the Construction Period, KMP uses the existing Havana Maintenance Yard for our maintenance facility. The proximity of the site to the Project limits is conducive to cost effective and efficient O&M services, especially for meeting the required response times for incidents and special events. The current yard provides an excellent staging area for KMP's equipment, materials, resources, and personnel. KMP's preliminary analysis estimates that the existing parcel is approximately 6.5 acres, which includes a 140 ft. by 60 ft. material storage building and a 100 ft. by 45 ft. warehouse and office building.

KMP uses the Maintenance Yard in its current configuration until the Railroad improvement and any off-ramps bisect the property. At that time, the facility will be adapted to support the level of service required during the Construction and Operating Periods. KMP may supplement the existing yard with the Kiewit Aurora maintenance Yard until the final facility configuration for the Operating Period is complete.

During the Construction Period, the Project Office is separate from the maintenance facility. Operations personnel are located at the Project Office, at the CTMC, and at the Maintenance Yard. Staff coordinate through regular communications and meetings. During the Operating Period, O&M staff are located at the Havana Maintenance Yard facilities.

KMP recognizes that the ultimate configuration reduces usable area and limits access to the yard. We will coordinate with the Department during its planning of improvements to the I-70 East corridor to maximize the use of the Havana Yard throughout the Operating Period.

KMP has access to individual team member resources like the Kiewit Aurora yard (fully-permitted and zoned), which is approximately 60 acres near the east end of the Project, just north of I-70 at Piccadilly and Smith Road. Included at this Kiewit-owned site are covered equipment maintenance, rail off loading, concrete batch plant, office facilities and a state of the art training center and over 20 acres available for material storage.

## 6. Approach to Monitoring and Oversight

KMP provides oversight and inspection to ensure compliance with the Snow and Ice Control Plan, the Safety Plan, and the Quality Plan. A Winter Weather Event Response Report (an Accomplishment Report for "Snow and Ice Control" reporting labor hours, material used, and other information as requested) is submitted to the Department. Upon cessation of the winter weather event, the Department and KMP hold an Operational Review Meeting within seven days to ensure that quantities were tracked, all key performance indicators were met, lessons learned are communicated, and personnel are debriefed.

## 7. Frequency of Monitoring Patrols During and Between Precipitation Events

KMP provides the appropriate level of response during and between precipitation events. We generally conduct snow and ice removal operations in three phases, with the frequency of monitoring patrols dependent on the severity of the event. Our goal is to reach a disabled vehicle between five and 10 minutes from the time that the courtesy patrol receives a call during precipitation events. During the Operational Review Meeting, we review performance and determine if the frequency of courtesy patrols met performance requirements. Appendix H, Attachment 3, Courtesy Patrol Plan provides additional information on monitoring patrols.

## 8. Weather Forecasting Systems

Our snow and ice control treatment decisions are informed by multiple weather forecasts and knowledge of weather trends:

- MDSS ClearPath Weather is our primary source of forecasting
- The National Weather Service (NWS) offers good regional and national information of approaching adverse conditions. Forecasts, radar, satellite, and graphical forecasts are available at <http://weather.gov>.
- Other weather forecasting and tracking websites include:
  - **Accuweather:** Forecasts, radar & satellite <http://www.accuweather.com/wx/index.htm>
  - **Intellicast:** Forecasts, radar & satellite <http://www.intellicast.com/>
  - **Underground Weather:** Forecasts, radar, satellite <http://www.wunderground.com/>
  - **Real-time Weather Data:** Forecasts, radar, satellite <http://www.rap.ucar.edu/weather/radar/>

KMP works directly with the Department, which receives daily briefings on activity off the Pacific Coast that could impact the state more than 72 hours in advance, and the National Weather Service which has several forecasting offices in Colorado.

When a storm is imminent, the Department holds briefings every 12 hours for affected agencies, including the state patrol, county-level Office of Emergency Management personnel, and sheriff's departments. KMP participates in these briefings beginning 72 hours prior to the anticipated event. During the pre-event phase, Project supervisors evaluate anticipated staffing resources, equipment, and material requirements and elevate these resources to an appropriate readiness level. If the forecasting probability escalates, KMP's Snow and Ice Operation is activated to full readiness. Anti-icing pretreatment operations when ambient and pavement temperatures are suitable can begin between 12 and 24 hours prior to the event. Preparations and staging for solid deicing chemical application and plowing operations begin 8 to 10 hours prior to the event.



KMP requests to be a full participant in the Department’s current coordination and notification procedures. As an anticipated snow and ice weather event approaches, the supervisors of the State’s eight maintenance sections begin calculating staffing levels, and confirming positive equipment status and material stockpiles (salt, sand, and magnesium chloride). In the 24 hours before a weather event arrives, the Department extracts data from the traffic management company, Iteris. This is entered into its Maintenance Decision Support System (MDSS) that connects plow trucks, supervisors, and Statewide Department managers with localized estimates on, for example, pavement temperature and snowfall rates. The MDSS was created to:

- Assess current road and weather conditions using observations and reasonable inferences based upon observations
- Provide time- and location-specific weather forecasts along transportation routes
- Predict how road conditions will change due to forecasted weather and potential road maintenance treatments
- Notify state agencies of approaching conditions and suggest maintenance treatments based on the resources available
- Evaluate the reliability of predictions and the effectiveness of maintenance treatments for specific road and weather conditions

## 9. Equipment: Number, Size, and Type

The table below provides the equipment list for snow and ice events during the Construction Period. It also shows the pool of equipment designated for other Work but that is available, as needed, for snow and ice control Work. This table is updated in the final Snow and Ice Control Plan and for the Operating Period. For major storms, KMP may subcontract to augment resources.

Typically, snow removal equipment for significant events includes motor graders, end loaders, and backhoes to:

- Keep travel paths as wide as possible
- Keep shoulders and berms clear to aid plow effectiveness
- Clear snow drifts
- Reestablish storage and cross-over areas on shoulders and medians
- Clear interchanges

Equipment is continuously maintained and inspected before each use. We immediately remove from service any equipment not in full operational compliance, including on board safety equipment, brakes, light wipers, heat/defroster, spreader/auger, plow components, and other safety equipment, until compliance is reestablished.

### Project Equipment List

Vehicle Description	Role
<b>Trucks (Leased)</b>	
F150 Single Cab	Management/Supervisor
F150 Single Cab	Management/Supervisor
F250 Crew extended cab	Operations- Patrol
F250 Crew extended cab	Operations- Patrol
F250 Crew extended cab	Operations- Patrol
F250 Crew extended cab	Operations- Patrol
F250 Crew extended cab	Operations- Patrol
F250 Crew extended cab	Operations- Patrol
F250 Crew Cab	Maintenance
F250 Crew Cab	Maintenance
F450 Crew Cab	Maintenance
F550 Crew Cab	Operations- Tow
F550 Crew Cab	Operations- Tow
F650 Crew Cab	Operations- Tow
<b>SUBTOTAL</b>	<b>14</b>
<b>Heavy Equipment (Purchased)</b>	
64,000 GVW Tandem Axial Dump Truck	Snow and Ice
64,000 GVW Tandem Axial Dump Truck	Snow and Ice
64,000 GVW Tandem Axial Dump Truck	Snow and Ice
64,000 GVW Tandem Axial Dump Truck	Snow and Ice
64,000 GVW Tandem Axial Dump Truck	Snow and Ice
64,000 GVW Tandem Axial Dump Truck	Snow and Ice
64,000 GVW Tandem Axial Dump Truck	Snow and Ice
64,000 GVW Tandem Axial Dump Truck	Snow and Ice
64,000 GVW Tandem Axial Dump Truck	Snow and Ice
Bucket Truck	Covered Lowered Section
Kubota Tractor	Vegetation Control
Attenuator Truck Flatbed/Scorpion	MOT
Attenuator Truck Flatbed/Scorpion	MOT
<b>SUBTOTAL</b>	<b>12</b>



Utility Equipment (Purchased)	
Trailer—Goose Neck	General
Trailer—Utility	General
Kubota Utility Vehicle	Vegetation Control
Kubota Utility Vehicle	Vegetation Control
8 Cyd V-BOX Spreader/Wet System	Snow and Ice
8 Cyd V-BOX Spreader/Wet System	Snow and Ice
8 Cyd V-BOX Spreader/Wet System	Snow and Ice
8 Cyd V-BOX Spreader/Wet System	Snow and Ice
2 Cyd V-BOX Spreader/Wet System	Snow and Ice
2 Cyd V-BOX Spreader/Wet System	Snow and Ice
Skid Steer	Drainage
Snow Plow	Snow and Ice
<b>SUBTOTAL</b>	<b>19</b>
Rental Equipment	
Ditch Bucket Excavator	Erosion control
Dump Truck (Snow Mitigation)	Snow and Ice
John Deere Front End Loader	Snow and Ice
Lighting Tower Portable	Misc.
Scissor Lift	Misc.
12" Chipper	Misc.
Motor Grader	Misc.
500 Gal Water Tank Trailer	Vegetation Control
Variable Message Board	MOT.
Snooper Truck	Inspections

## 10. Materials and Chemicals

KMP manages and controls material and chemical inventories to ensure that material stores remain adequate to meet the Department's performance requirements in Schedule 11. Materials and chemicals are safely secured to ensure adequate supplies for extreme weather events. In general, KMP estimates inventory quantities based on projected temperatures, and placement rates and areas, which represent best industry practices and assumptions. As a general practice, KMP stockpiles materials and chemicals necessary for a four-day snow and ice event.

KMP submits a monthly Ice & Snow Removal Material Inventory Report to the Department, which contains the total amounts of stored materials and chemicals from the maintenance yard. KMP also submits material inventory reports to the Department after each event. The reports include snow and ice material, quantities, and recommendations for adjustments. See Section 15 of this Plan for sample material quantity tables for de-icing and anti-icing products.

## 11. Snow Routes and Analysis

We actively monitor Project routes to ensure thorough coverage, and proactively troubleshoot challenges. Spreader and sprayer trucks operators adjust routes as necessary to maximize resources. These measures provide an intelligent network tool to optimize our resources immediately for changing conditions on the ground.

All snow and ice removal equipment is equipped with Global Positioning Systems (GPS) systems and AVL that allow KMP and the Department to track deployed vehicles in the field and locate resources, in map view, at any time. This ability facilitates optimized operations and coverage during a snow and ice event. KMP's newer trucks also have dashboard systems that provide real-time weather and pavement temperature sensors.

### 11.1 ENHANCED PROCEDURE FOR THE CENTRAL 70 VIADUCT

There is limited shoulder width to accommodate plowed snow and plowing snow over the exterior barrier adversely impacts business and residential areas below. KMP understands operational complexities associated with safe and efficient plowing of the viaduct. We implement unique procedures and techniques to address these complexities. Further, viaduct will receive enhanced monitoring to minimize icing and snow accumulation. KMP will use procedures to minimize snow and ice accumulation along the centerline barrier, which could disable drainage assets from performing properly and create conditions for ice to form on the travel lane as melting occurs.

This section of the highway also requires close monitoring of the pavement temperature and a proactive program for the application of liquid anti-icing chemicals. During low temperature conditions (close to, or outside, the minimum range for liquid chemical application) we use solid deicing chemicals, calibrating quantities to maximize the melting of ice and snow. Chemicals are pre-wetted to enhance surface adhesion and to eliminate bounce/scatter. We adjust chemical placement mid-storm to optimize accumulation reduction.



When accumulation occurs, we enhance viaduct operations to reduce cycle times. We use tandem plow teams to clear the road surface during smaller to lower moderate accumulation events. When excessive amounts of snow and ice occur during heavy events, we use dump trucks with front-end loaders during post-storm cleanup operations.

### 11.2 PLOWING CYCLE TIMES

The figure below details production cycle times based on resources as shown in the equipment list above. Equipment includes multi-axle trucks with plows/spreaders or anti-icing sprayers, single-axle trucks (pickup trucks) with plows and spreaders, front-end loaders with plows and/or buckets, motor graders with front plows and moldboards, 4WD supervisor pickups, and a Truck mounted attenuator (TMA). We resource additional equipment as necessary when warranted by snow and ice conditions.

The cycle times are based on average speeds and allow for normal traffic conditions, and for loading and load speed access. The liquid chemical application occurs up to 24-36 hours prior to the event, which is usually sufficient for timely completion. Using the 17 trucks shown in the equipment list, the network can be served with an average cycle time of 0,92 hours.

We maintain an active fleet of tandem trucks outfitted with anti-icing sprayers/plow or with V-box spreaders/plow to handle light to moderate events. To meet cycle times during severe events, we use small heavy equipment including rubber tire loaders/motorgraders with plow wings and single-axle trucks with 8-ft. plows/2 cyd spreaders mainly targeting shoulders and interchange services. We maintain additional subcontracted services as backup to respond to severe events.

During an event, the plows and solid chemical application trucks are strategically located so that reductions in traffic speed typically impact only a single route. To maximize operations and reduce cycle time delays caused by accidents, dispatch directs operators away from accidents.

The following table shows the expected production rates using the equipment as shown on the equipment list.

## Draft Snow and Ice Production Rate Table

I-70 Snow and Ice Production Rate Calculations					
<b>Roadway Centerline Miles (mi)</b>	<b>13.45</b>	<b>Equipment</b>			
Total Lane Miles	<b>116.67</b>	Tandem Trucks w/Anti Icing Sprayers		<b>4</b>	
Total Shoulder Miles	<b>70.23</b>	Tandem Trucks w/Spreaders		<b>10</b>	
Number of Interstate Interchanges	<b>12.00</b>	Single Axle Trucks w/Spreader/Plow		<b>3</b>	
Number of Interstate Interchange Ramps	<b>61.00</b>	Snow Plows		<b>8</b>	
Roadway: Ramp Factor	<b>0.45</b>				
Total Roadway Centerline Miles Including Ramp	<b>29.88</b>				
Total Roadway Lane Miles Including Ramps (MI)	<b>147.46</b>				
	Roadway	Shoulders	Interchanges	Total	Comments
Lane Miles	<b>116.67</b>	<b>70.23</b>	<b>16.43</b>	<b>203.33</b>	Total LMs including mainline, shoulders and interchange ramps
Production Rate, Lane Mile/Hour	<b>15.00</b>	<b>15.00</b>	<b>10.00</b>	<b>13.33</b>	Average production rates including refueling and loading time. Plow/Spreading Speeds of 30-40 mph
Target Cycle Time, Hours	<b>0.75</b>	<b>1.00</b>	<b>1.00</b>	<b>0.92</b>	Mainline held at one cycle per ¾ hour
Lane Miles per Cycle	<b>11.25</b>	<b>15.00</b>	<b>10.00</b>	<b>12.22</b>	Shoulder and interchange serviced alternate cycles
Number of Trucks Required	<b>10.00</b>	<b>5.00</b>	<b>2.00</b>	<b>17.00</b>	8 full time trucks supplemented by 2 additional rental trucks as required for major events
Anti-Icing Pre-Treatment Cycle Time (hours)	<b>1.94</b>		<b>0.41</b>	<b>2.50</b>	Total cycle time to place anti-icing solution on all travel lanes
De-Icing Pre-Treatment Cycle Time (hours)	<b>0.78</b>		<b>0.16</b>	<b>1.00</b>	Total cycle time to place solid chemicals on all travel lanes

### 11.3 INDIVIDUAL MAPS SHOWING EACH VEHICLE ROUTE

The included maps (On the next page) show the projected route during the Construction Period. Maps are updated as Construction progresses, and for the Operating Period.



# OPERATIONAL PLAN

## 11.4 SUMMARY MAP

The included maps show the projected routes during the Construction Period. The map is updated as Construction progresses, and for the Operating Period.

### Snow & Ice Response Routes



**BEAT W**

**BEAT WE**

-- Main line --

-- Frontage road/ramps --

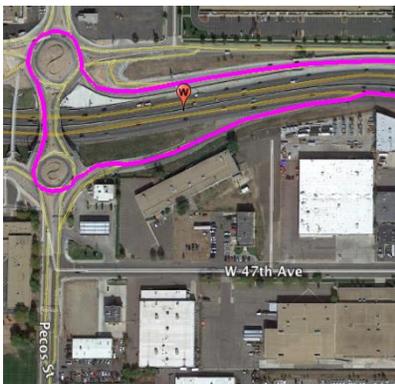
**BEAT E**

**BEAT EE**

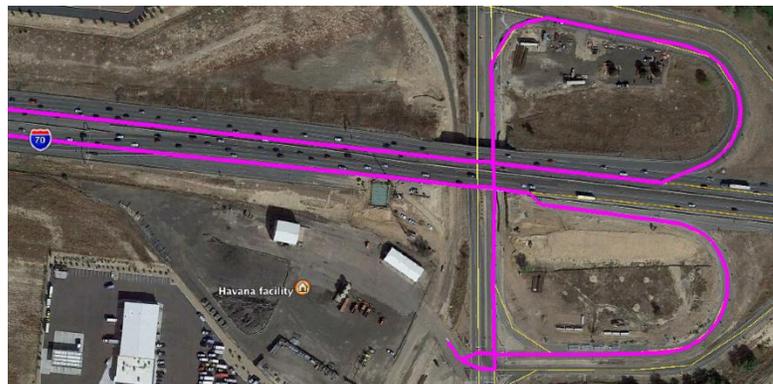
## BEAT W



Havana St. facility WEST to Pecos St.



Pecos St. Turnaround



Havana St. Turnaround

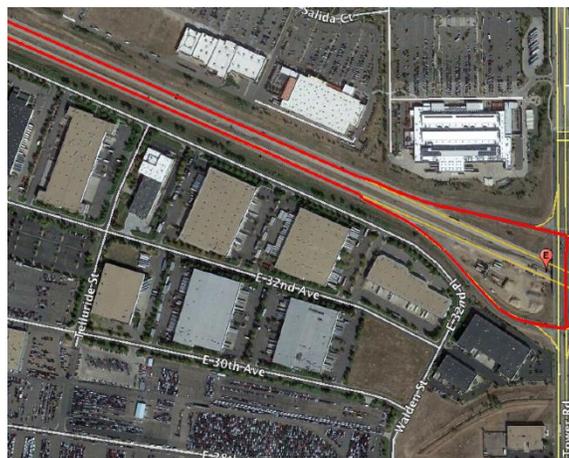
**BEAT E**



**Havana St. facility EAST to Tower Rd.**

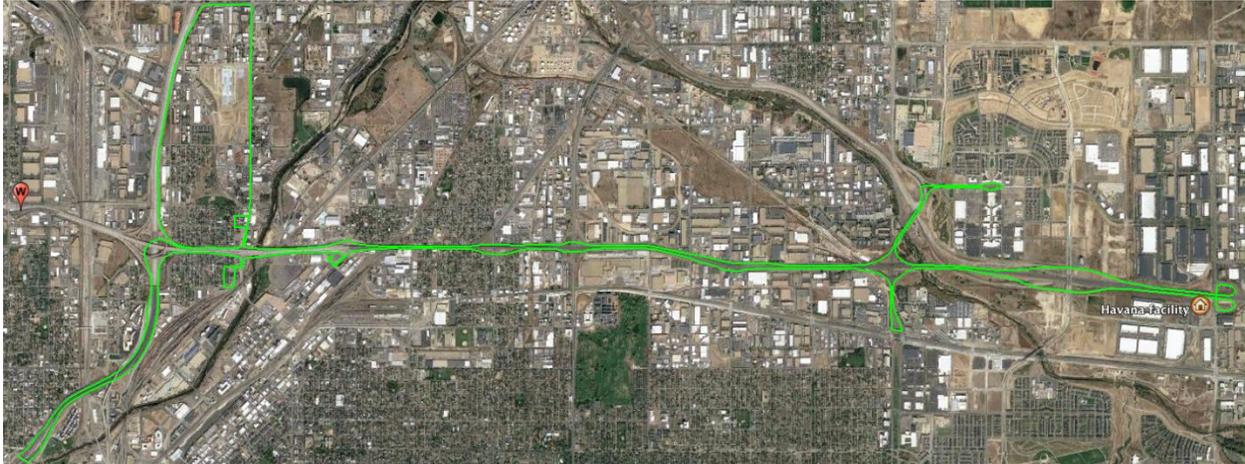


**Havana St. Turnaround**



**Tower Rd. Turnaround**

# BEAT WF



Havana St. facility WEST to I-25



I-25 turnaround

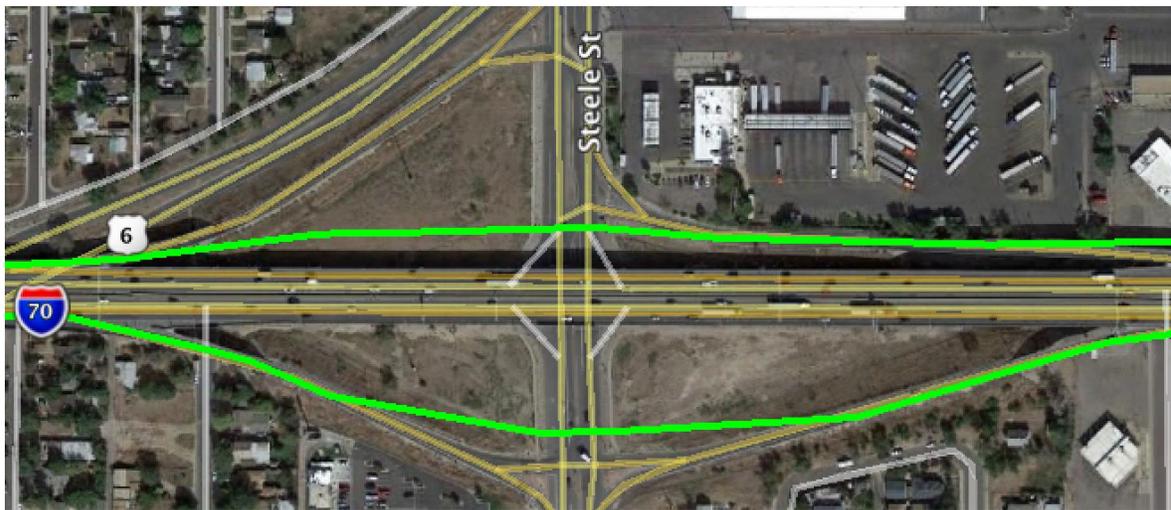


Washington St. Interchange

# BEAT WF (cont.)



**Brighton Blvd. Interchange**



**Steele St. Interchange**

**Colorado Blvd. Interchange**

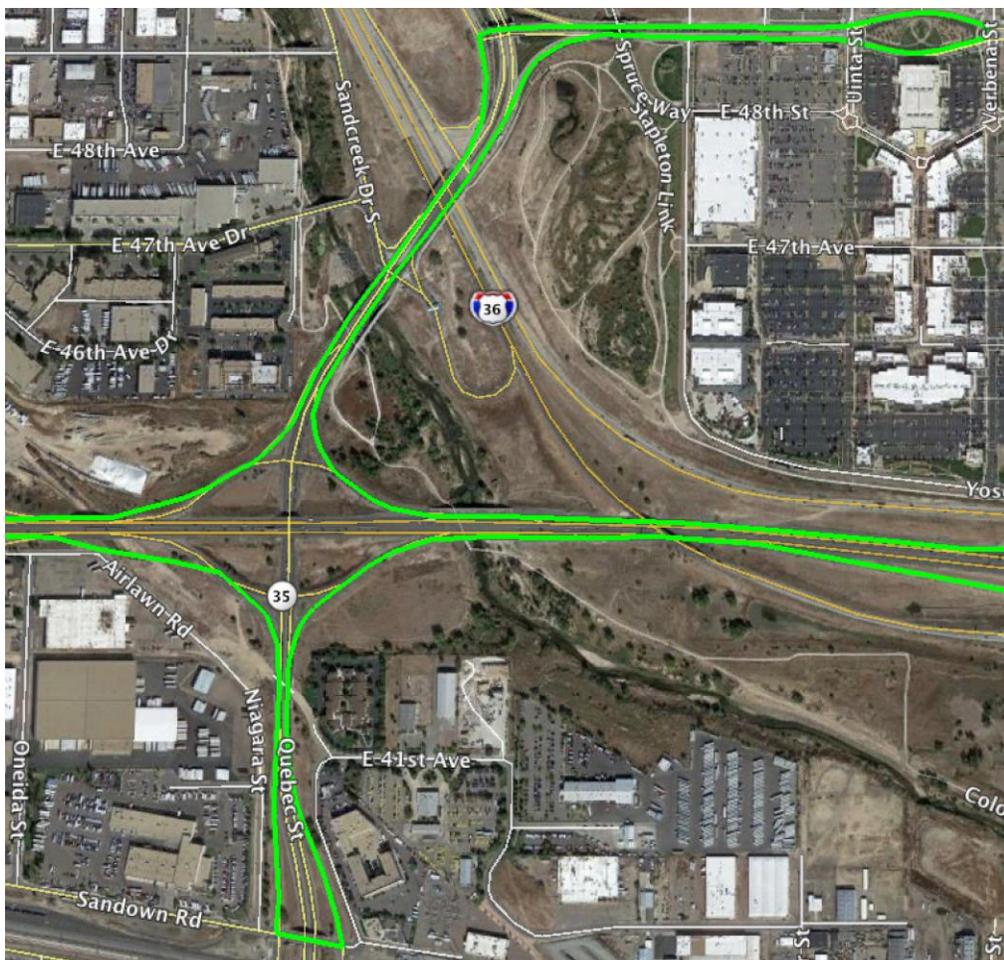




## BEAT WF (cont.)



Holly St. Interchange



Quebec St. Interchange

## BEAT WF (cont.)



Central Park Blvd. Interchange



Havana St. Turnaround



# BEAT EF



Havana St. facility EAST to Tower Rd.



Havana St. Turnaround



Peoria St. Turnaround

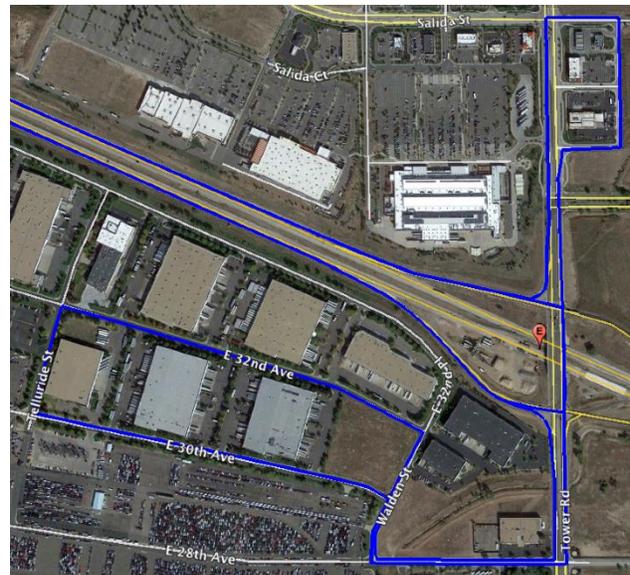
**BEAT EF (cont.)**



**Chambers Rd. Interchange**



**Airport Blvd. Interchange**



**Tower Rd. Turnaround**



## 12. Patrol Size and Philosophy of Plowing

### 12.1 SNOW PATROL SIZE AND SHIFT CHANGES

We base the number of snow patrols needed to meet snow and ice performance obligations on the size and type of event. Larger events are supplemented by subcontractors. Operators generally run 12-hour shifts with staggered start and end times. Patrol size varies based on storm level. There are events which do not require supplemental solid applications or plowing, and only liquid is applied.

### 12.2 SNOW PLOW PHILOSOPHY

At all times, snow and ice team members and snow plow operators strictly follow KMP's snow plow safety directives, stay alert, and ensure public safety. All drivers are experienced snow plow operators and receive detailed classroom and field training, including annual refresher training sessions prior to each snowplow season. Safety is everyone's responsibility, and operators are carefully monitored for hours worked and signs of fatigue. Supervisors direct operators to cease operations at the first signs of fatigue, or when maximum allowable shift hours have been reached

KMP's snowplow philosophy includes these practices:

- Use speeds appropriate to conditions to avoid damage to roadside hardware, highway signs, utility lines, mail boxes, parked cars, and other private property. We avoid areas where pedestrians may be present.
- Maintain moderate speeds when plowing both wet and dry snow—wet snow is easily cast, while dry snow can obscure visibility.
- Avoid plowing on the centerline or against median barriers to avoid casting snow into the oncoming lanes, and when passing or being overtaken by other traffic to avoid casting snow onto windshields and obstructing driver vision.
- Take care while removing snow near cars parked (legally or not) adjacent to the highway.
- Take care when plowing near or around Railroad crossings, raised curbs, raised pavement markings, and other obstructions. When possible, such obstructions are marked and maintenance personnel informed of the obstructions.
- Treat accumulation as an ice control operation when accumulating snow becomes compact and removal is impossible with available equipment. Ice and compact snow are best removed under thawing conditions. If possible, schedule ice and compact snow removal operations during the temperature rise that often occurs between 11:00 a.m. and 3:00 p.m. We use this time to clear surfaces of melting snow and ice and to remove as much slush as possible.

- Use tandem plowing for snow removal on multilane highways. When reversible plows are available, it is often advantageous to operate one plow toward the left plowing to the median strip. Where drifting snow is a frequent problem, exercise caution in placing snow on the median. A narrow median filled with snow can cause drifting in adjacent lanes. Melting snow in the median can cause icy roadways during colder nights.
- Treat interchange ramps as separate roadways independent of the highway. Priorities are determined by traffic volume. We normally treat ramp roadways after one or more lanes are open on the main roadway.
- Never leave a windrow of snow on a Railroad grade crossing. Drivers must raise or otherwise adjust the blade before reaching the crossing to prevent damage to the crossing and/or equipment. Be aware of and avoid any conflicts between snow removal operations and approaching railway traffic.
- Widen for snow storage and established turnouts when available manpower and equipment permit. Shoulders are plowed in conjunction with plowing of the traveled way or immediately after the storm is over. Clearing shoulders provides storage space for additional snow, makes the highway safer for motorists, and helps prevent damage to the road bed from moisture infiltration and excessive runoff onto the pavement. We perform shoulder plowing in the direction of travel and always establish proper traffic control before plowing against traffic on the median shoulder of divided highways.
- Clear all drainage ways from the roadway surface prior to thawing conditions. We use a road grader or wing plow if possible.
- Clear snow-covered highway signs after normal snow and ice control operations. We provide first attention to regulatory and warning signs.

### 13. Call Out Procedures

The following table shows the typical operational procedures used for specific call-out events. For example, given a Storm Level 1, anti-icing crews and associated equipment are mobilized.

The O&M Project Administrator distributes and maintains personnel contact lists, which are available on the Project website for review and download. The contact list provides contact information and phone numbers so that the Department has access to KMP personnel 24/7.

#### Call-Out Procedures for Escalating Storm Events

Snow and Ice Control Plan				
National Weather Service and RWIS Forecasts	Storm Level	Response Plan	Comments	Crews and Resource Needs
<ul style="list-style-type: none"> <li>• <b>Precipitation</b> <i>20-29% or greater</i></li> <li>• <b>Accumulation</b> <i>Ice/Snow Possible</i></li> <li>• <b>Ambient or Pavement Temp</b> <i>30-36 degrees Fahrenheit</i></li> </ul>	1	Spot treatment of bridges, overpasses, and other critical structures and locations	Anti-icing required	<ul style="list-style-type: none"> <li>• Anti-icing applicator truck and</li> <li>• Plow/spreader truck units</li> </ul>



**Snow and Ice Control Plan**

<ul style="list-style-type: none"> <li>• <b>Precipitation</b> <i>50-100% chance</i></li> <li>• <b>Accumulation</b> <i>Up to 1 in. of snow</i></li> <li>• <b>Ambient or Pavement Temp</b> <i>25-29 degrees Fahrenheit</i></li> </ul>	<b>2</b>	Light solid chemicals operations	Anti-icing required	<ul style="list-style-type: none"> <li>• Anti-icing applicator truck and</li> <li>• Plow/spreader truck units</li> </ul>
<ul style="list-style-type: none"> <li>• <b>Precipitation</b> <i>50-100% chance</i></li> <li>• <b>Accumulation</b> <i>Up to 2 in. of snow or up to 0.1 in. of ice</i></li> <li>• <b>Ambient or Pavement Temp</b> <i>20-24 degrees Fahrenheit</i></li> </ul>	<b>3</b>	Solid chemicals operations and potential for plowing	Anti-icing required, may require Ice Slicer to maintain bare pavement	<ul style="list-style-type: none"> <li>• Anti-icing applicator truck and</li> <li>• Plow/spreader truck units</li> </ul>
<ul style="list-style-type: none"> <li>• <b>Precipitation</b> <i>50-100% chance</i></li> <li>• <b>Accumulation</b> <i>Up to 6 in. of snow or up to 0.25 in. of ice</i></li> <li>• <b>Ambient or Pavement Temp</b> <i>15-19 degrees Fahrenheit</i></li> </ul>	<b>4</b>	Solid chemicals operations and plowing	Anti-icing required, Ice Slicer required	<ul style="list-style-type: none"> <li>• Plow w/spreader</li> <li>• Anti-icing applicator truck and</li> <li>• Plow/spreader truck units</li> </ul>
<ul style="list-style-type: none"> <li>• <b>Precipitation</b> <b>50-100% chance</b></li> <li>• <b>Accumulation</b> <i>More than 6 in. of snow or more than 0.25 in. of ice</i></li> <li>• <b>Ambient or Pavement Temp</b> <i>&lt;15 degrees Fahrenheit</i></li> </ul>	<b>5</b>	Solid chemicals and heavy plow operations. All resources are deployed	Anti-icing required, Ice Slicer required, bridge decks and guardrail sections may require loader/snow blower	<ul style="list-style-type: none"> <li>• Anti-icing applicator truck and</li> <li>• Plow/spreader truck units</li> <li>• Additional heavy equipment including motor graders, end loaders and backhoes are deployed</li> </ul>

## 14. Procedure to Addressing Response Times

KMP is committed to meeting the response times specified in Appendices A-1 and A-2 to Schedule 11. We recognize that Snow and Ice Response requires a prompt and structured plan to preserve public safety. The success of the operation is based on the labor, equipment, and materials for a rapid response. Snow and ice conditions can present significant challenges and dangers to the public. To meet these response times, KMP uses the following best practices:

- Proper planning and scheduling
- Skilled, trained, and fit crews
- Focus on safety for employees and motorists
- Targeted material application
- Environmentally friendly materials
- Turn by turn route maps
- Pre-season to preparation

During September, we assign employees their duties for winter weather events. Drivers receive route training using turn-by-turn maps, ensuring coverage is thorough and well executed. All other personnel study the full plan and undergo multiple off-season dry runs.

KMP conducts snow and ice planning events as necessary, starting in September of each year, to achieve the highest level of execution. Applicable training, certifications, and licenses are provided to participants in advance. Events include all snow and ice control participants to ensure their familiarity with roads and equipment. All subcontracted drivers are required to review the snow and ice removal plan and safety procedures, and to complete all planning events after the mandatory training. We hold a Snow and Ice Preparation Meeting each summer that includes the KMP Project Manager and Department personnel, to discuss the Work plan for the upcoming winter weather season.

To ensure that we meet snow and ice response times and other requirements, we also conduct a dry run no later than October 1 of each year. Inspection checks are required to confirm that:

- Equipment is inspected, operational, properly calibrated, and in compliance as required
- GPS, AVL, and two-way radios are installed, secured and operational
- Operators are cell phone equipped
- A clear process has been identified to inform the Department of the available list of equipment, personnel, and assets

Other key dates include:

- **July:** Initial snow and ice removal operations process
- **August:** Update Snow and Ice Plan by September 1<sup>st</sup>
- **September:** Preparing and conducting snow and ice planning events (training, certifications, licensing)
- **October:** The Department provides KMP with a two-week notification to conduct a QA/QC dry run no later than the 1st of November of each year

## 15. Application Procedures for Liquid and/or Solid De-Icers and Anti-Icers

### 15.1 ANTI-ICING PROGRAM

Our anti-icing program includes four major components: initial operations, subsequent operations, special considerations, and post-storm assessment. KMP develops specific recommendations for anti-icing operations to address six weather events:

- Light snow storm
- Light snow storm with period(s) of moderate or heavy snow
- Moderate or heavy snow storm
- Frost or black ice



- Freezing rain storm
- Sleet storm

If anti-icing operations are used:

- Necessary equipment is strategically located near bridges, interchanges, and other cold spots before storm events
- Applications begin at storm onset
- Applications are made on the “high side” of curved or uneven roadways to allow proper distribution
- Supervisors monitor treatment effectiveness and direct reapplication when necessary

Based on the Department’s practice, KMP considers pretreatment to be an anti-icing product applied eight to 10 hours before snowfall and when temperatures are above freezing. The product is a 23.3% brine solution (rock salt and water) with a corrosion inhibitor added to protect vehicles and bridges.

KMP implements the anti-icing program for the mainline and ramp pavement. We have adopted an application plan based on Maintenance Decision Support System (MDSS) that integrates relevant historical meteorological data, current atmospheric and pavement conditions, predicted future weather, and communications to determine an appropriate roadway treatment strategy.

The procedures for anti-icing application include:

- Apply when the ambient and pavement temperature is, or is forecasted to be, 8° F or above
- Apply anti-icing immediately prior to forecasted frost, freezing fog, or black ice events on bridge decks or pavement trouble spots
- Plan applications to prevent deteriorating conditions or development of packed and bonded snow
- Reapply when necessary to prevent refreeze
- Apply when necessary before predicted frost or snow events
- Equip material storage zones with storage tanks outfitted for expedited loading

## **15.2 DE-ICING PROGRAM**

Prior to storm events, KMP mobilizes and strategically positions trucks with plows and/or spreaders to deploy de-icing chemicals and abrasives as needed. Supervisors respond to conditions and adjust strategy as necessary to avoid the bonding of snow and ice with the pavement.

Pre-wet de-icing chemicals are used when packed snow or black ice forms to ease its removal by plowing. Both anti-ice and de-ice operations are conducted with treatment overlap to avoid gaps.

De-icers are applied when snow begins to fall or the temperature drops below freezing. All products are freezing-point depressants, and also make snow easier to remove with plows.

- **Liquid de-icers:**
  - **Magnesium chloride is used** when the pavement temperature is above 16 degrees Fahrenheit.
  - **Cold temperature magnesium chloride is** used when the pavement temperature is below 16 degrees Fahrenheit. It contains corn byproduct to lower the freezing point.
- **APEX** is a magnesium chloride based product effective down to minus 4 degrees Fahrenheit. Apex can substitute for regular and cold-temperature magnesium chloride, but it is more expensive.
- **Solid de-icers:**
  - **Ice Slicer is** made of granular salt and magnesium chloride and is effective down to 5 degrees Fahrenheit.
  - **Sand or sand/salt mixture can be** used for extreme cold temperatures and when more traction is needed.

## 15.3 LIQUID CHEMICALS

### 15.3.1 APPLICATION RATES

KMP uses liquid chemicals (obtained in bulk), including Meltdown APEX-C, for roadway anti-icing and for pre-wetting, and anti-icing solid chemicals during lay down operations. Liquid chemical, dry and pre-wetted chemicals, and the use of plows is coordinated for maximum efficiency. KMP uses strategies that are recalibrated using post-storm assessment reports. Estimated application rates are:

- **Frost:** Liquid de-icer (20-30 gallons/lane mile)
- **Black ice:** Liquid de-icer (30-40 gallons/lane mile)
- **Sleet:** Liquid de-icer (20 gallons/lane mile recommended; 30 gallons/lane mile maximum)
- **Freezing rain:** Liquid application not recommended
- **Light snow (less than 0.5 in./hour):** Liquid de-icer (30 gallons/lane mile recommended; 40 gallons/lane mile maximum)
- **Moderate or heavy snow (greater than or equal to 0.5 in./hour):** Liquid de-icer (40 gallons/lane mile recommended; 50 gallons/lane mile maximum)

The table below provides a sample estimated quantities for APEX-C based on 33 events annually. The number of events is based on the average annual days in Denver that it snows at least 0.1 inches.



### Sample Application Rates for APEX-C

Pretreatment Services						
Quantities at Various Application Rates	Lane Miles	APEX-C @ 32% Solution (gal/lane-mile) MATERIAL				
		Gallons/LM	20	30	40	50
Main travel lane area	116.67	<b>Total Gallons Main line</b>	2333	3500	4667	5833
Lane ramps	30.79	<b>Total Gallons Ramps</b>	616	924	1232	1540
Total estimate lane miles for one treatment cycle	147.46	<b>Event Gallons</b>	2949	4424	5898	7373
Annual events (33) *	19	<b>Annual Gallons</b>	56034	84051	112068	140085
Event percentage					30%	40%
<b>Total Annual Material (Gals)</b>					16810	33621
<b>Total annual APEX-C (gals)</b>	<b>86,853</b>					

\* Annual number of events based on average number of days in Denver it snows at least 0.1 in.

### 15.4 SOLID CHEMICALS

Envirotech Ice Slicer is our primary solid material used for de-icing. We obtain and store the product in bulk to meet anticipated demand. The table below provides a sample quantity presentation.

### Sample Quantity Table for Solid De-Icer

De-Icing Treatment Materials (Including Sand Treatment on Curves/Bridges/Grades)								
Amounts Needed at Various Application Rates		Ice Slicer (LBS/lm) MATERIAL						SAND (LBS/LM)
		LBS/LM	100	150	200	300	400	
Main travel lane area: 10 x 11 lanes (LMs)	116.67	<b>Total LBS Main line</b>	11667	2625	23333	35000	46667	8750
Lane ramps (LMs)	30.79	<b>Total LBS Ramps</b>	3079	693	6158	9238	12317	2309
Total estimate lane miles for one treatment cycle (LMs)	147.46	<b>Total LBS</b>	14746	3318	29492	44238	58983	11059
Annual Events (33)* 2 Applications/Event w/1.2 FS (EA.)	79.2	<b>Total (Tons)</b>	584	131	1168	1752	2336	438
<b>Event Percentage</b>			30%	85%	40%	20%	10%	85%
<b>Total Annual Material (Tons)</b>			175	112	467	350	234	372
<b>Total Annual Material Quantity</b>								
<b>Total Annual Ice Slicer (Tons)</b>	<b>1,338</b>							

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**Total Annual Sand (Tons)** 372

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**Total Deicing Materials (Tons)** 1,710

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*Note: Sand (500lb/LM) and Ice Slicer (150lb/LM) mix used on Bridges/Grades/Curves represent 15% of total LMs applied on 85% of events.*

*\* Annual number of events based on average number of days in Denver it snows at least 0.1 in.*

## 15.5 ABRASIVES

Potential abrasives include crushed stone and cinders, but sand is most common. When mixed with solid de-icing chemicals, abrasives are effective in low-temperatures and increase roadway traction. They also increase roadway wear and impede drainage systems; therefore, we typically reserve their use for curves, steep grades, and bridges that are prone to icing.

De-icing chemical application rates are between 100 and 400 lbs. per mile. We use a Sand/Ice Slicer mixture of 150/500 lbs. per mile on bridges, grades, and curves, which comprise approximately 15% of the network.

## 16. Calibration of Spreaders and Liquid De-Icer and Anti-Icer Equipment

KMP maintains fleet equipment through an established process based on scheduled inspections, maintenance, and verification to ensure that the equipment is operational and calibrated correctly. We maintain equipment in compliance with the U.S. Department of Transportation (DOT) applicable regulations. Additionally, we inspect equipment before, during, and after any snow and ice removal operation.

Each year we confirm that equipment is properly calibrated, operational, and compliant with requirements. Each spreader is calibrated to distribute the correct amount of material per lane mile. KMP maintains records for each truck. The records indicate date of calibration, the inspector performing the calibration, and the results. Spray trucks are also calibrated for correct spray rates, and the calibration information is recorded. Spreader gate adjustments and calibration are part of the training discussed below.

See the O&M Safety Plan, which is Attachment 3 to Appendix I, for additional information on safe, efficient, and compliant equipment maintenance.

## 17. Staff Training Plan

All snow and ice control operators, including relief operators, have a valid Commercial Driver's License (CDL) for each class of snow and ice removal equipment, adequate snow and ice removal experience, and the skills necessary for their assigned tasks. Snow and ice control staff receive environmental compliance training. Environmental topics include water quality regulations, air quality regulations, and compliance procedures. Each operator receives safety, operator, and maintenance training. A minimum of two operators for each piece of equipment receive pre-commencement and annual refresher training.

Operator training includes the following topics.



### **17.1 SAFETY TRAINING**

- Personal Protective Equipment (PPE)
- Manufacturer's safety recommendations for truck chassis, body type, and attachments
- Equipment maintenance and safety inspection
- Use of dump body safety prop pins
- Hydraulic lines connection and disconnection
- Operator safety (grades, speeds, and road conditions)

### **17.2 OPERATIONAL TRAINING**

- Spreader gate adjustments and calibration
- Granular pre-wet systems
- Liquid chemical spray application equipment operation and calibration
- Diesel particulate filter regeneration
- Operation of all truck, spreader, snow plow, pre-wet systems, and liquid chemical spray tank features
- Loader operations and filling liquid chemical tanks
- Operating problems and breakdown reporting protocols
- Operator testing and certification

### **17.3 EQUIPMENT MAINTENANCE TRAINING**

- General standardized vehicle and equipment inspections
- Identifying and troubleshooting faulty components or systems
- Fluid types and levels
- Belt identification and inspections
- Filters, hoses, and hydraulic pumps
- Tire inspections and inflation
- Lamps and emergency lighting
- Climate control
- Spreader gate adjustments and calibration
- Liquid chemical spray application equipment operation and calibration
- Engine, drive train and attachment Preventive Maintenance procedures
- Diesel particulate filter regeneration

## 18. Precipitation Event Reporting and Documentation

Snow and ice control services performed in the previous month are included in the monthly O&M report. The data collected per event shall include: truck number, event start date, event start time, 24-hour clock (HH:MM), material type solid, spinner mode (single or dual), spread rate (lbs/mi), total distance (mi), spread distance (mi), spread quantity (lbs), blast distance (mi), blast quantity (lbs), event type, material type Liquid, pre-wet liquid rate (%) and pre-wet volume (gal).

A Winter Weather Event Response Report (an Accomplishment Report for “Snow and Ice Control” reporting labor hour, material used, and other information) is submitted to the Department once the winter weather event has concluded. We hold the Operational Review Meeting within seven days after the winter weather event to ensure quantities were tracked, all key performance indicators were met, lessons learned are communicated, and all personnel are debriefed.

## 19. Procedure for Post-Precipitation Event Clean-Up Work

Following a snow and ice event, we monitor snow and ice areas that received control materials. During the first eight hours after a winter storm event, KMP notifies the Department on the road conditions and provides recommendations on cleaning operation areas to begin sweeping cycles. KMP begins road-cleaning operations. Work orders are used to track labor hours, equipment hours, and material usage throughout the event under the Activity Group “Snow and Ice Control” and/or “Sweeping and Cleaning.”

The cleanup begins immediately after the termination of snow and ice alerts. The on-duty crew empties and cleans all trucks and equipment as directed. We remove spreaders from attenuator trucks immediately after the event (we remove attenuators from other trucks as necessary after the immediate cleanup is complete.)

At the conclusion of each event, the on-duty Load Master reports the material used at each stockpile and the remaining material at each stockpile to the Weather Incident Manager. We use the information to replenish stockpiles, and re-order necessary materials.

KMP’s goal is to remove all materials used for the snow and ice event within seven days of the event ending. To accomplish this, the Maintenance Supervisor establishes hours of operation, crew configuration, and priority for sweeping operations. The sweeping operations continue until all sand and materials have been removed from the roadway.

Locations for stockpiled snow are identified prior to the snow event. Excess snow is not stored in the cleared area.



## 20. Sweeping Procedure

Roadway sweeping occurs throughout the year on a weekly basis, and especially during the spring, when KMP comprehensively sweeps bridge surfaces to remove winter de-icing material, sand, and other fine debris. Any debris collected is disposed at Department-approved sites. Debris, litter, abandoned vehicles, and graffiti are removed at the minimum of the required cycles, with prioritized removal of these elements if there is potential risk to safety or roadway operations. Our courtesy patrols and maintenance crews visually identify these elements as part of their daily patrols.

See Section 18 for post-event cleanup. The sweeping operations continue until sand and materials are removed from the roadway. We perform sweeping as required by the Denver Regional Council of Governments (DRCOG).

## 21. Procedure for Meeting Denver Regional Council of Government's Air Quality Requirements After Precipitation Events

DRCOG for the Denver Transportation Management Area (TMA) is required to show conformity of the DRCOG Transportation Plan with the Transportation Improvement Program (TIP) and with the State Implementation Plan (SIP) for air quality. Conformity to an air quality implementation plan is defined as "conformity to the implementation plan's purpose of eliminating or reducing the severity and number of violations of the National Ambient Air Quality Standards (NAAQS) and achieving expeditious attainment of such standards." In addition, no activity may cause or contribute to new violations of air quality standards, exacerbate existing violations, or interfere with the timely attainment of required emission reductions towards attainment.

KMP complies with air quality requirements by:

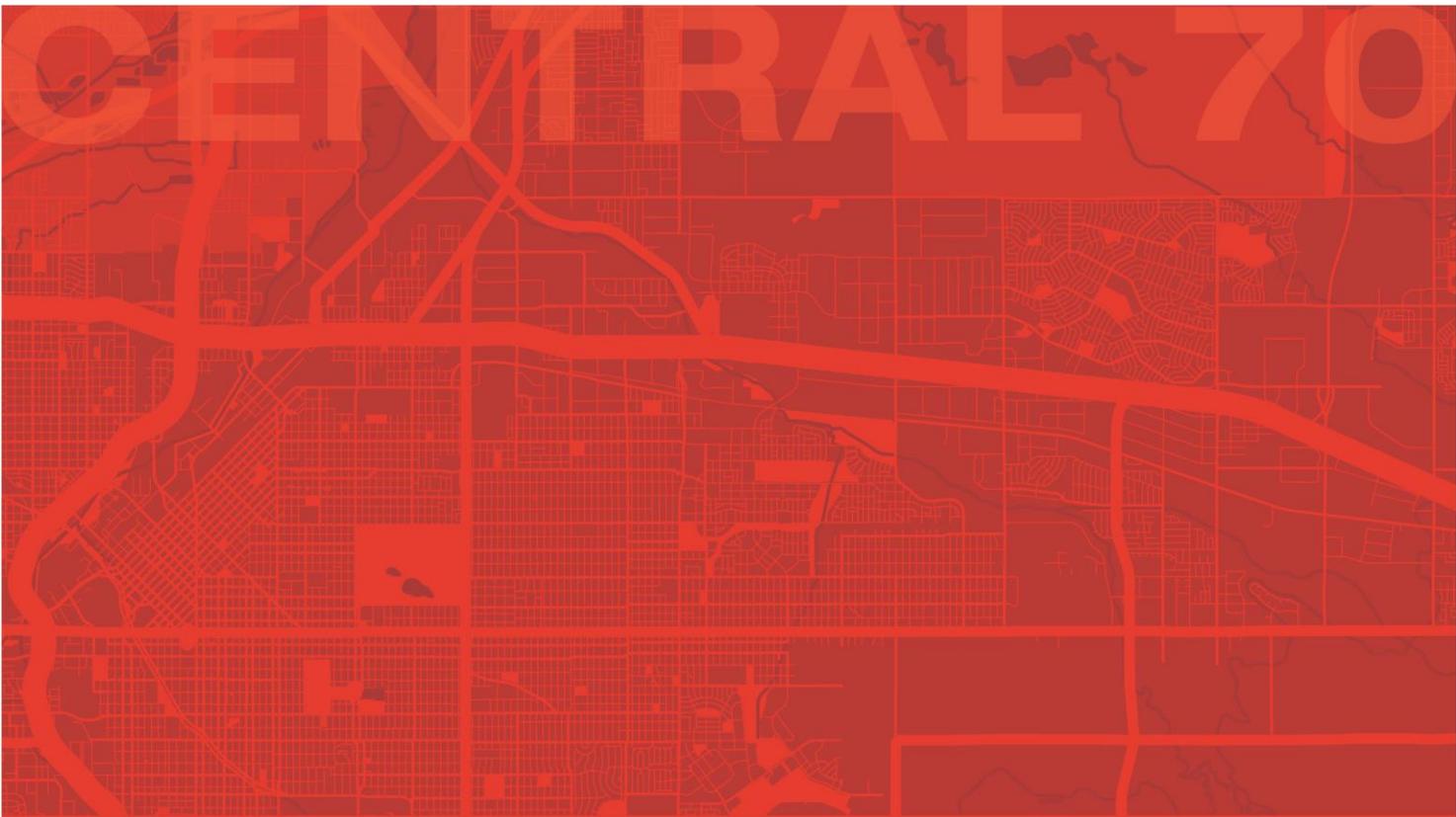
- Minimizing the use of sand and grit by reserving these traction aids for when de-icing chemicals are not effective due to extreme cold
- Using sweepers to remove excess and remaining sand and grit as soon as possible after use
- Reducing airborne dust during operations through equipment selection
- Cleaning and replacing air filters as required
- Enforcing the vehicular idling policy

## 22. Procedure for Reporting, Including Results with Respect to Performance Requirements, and Pre- and Post- Event Meetings

See Section 5 and Section 13 for a description of reporting and meetings held due to snow and ice events. KMP records equipment use during each winter storm event. Operators record roadway treatments, times, and outcomes.

KMP attends all required pre- and post-event meetings.

– END OF SECTION –



ATTACHMENT 2

*Relates to Appendix H*



# Incident Response Plan



**SUBMITTED TO:**

Colorado Bridge Enterprise  
High Performance Transportation Enterprise  
c/o Colorado Department of Transportation



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## RECORD OF REVISIONS

Revision number	Date issued	Pages affected	Comments
0	5/18/2017	All	Proposal Draft Submittal



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## EVALUATION CRITERIA: INCIDENT RESPONSE PLAN, APPENDIX H, ATTACHMENT 2

The Evaluation Criteria Matrix below associates the Incident Response Plan (IRP) requirements with the sections of this plan:

Sch. 11 Section	Item	OMP Section	Section Name	Check
9.4	Developer shall submit an Incident Response Plan (“IRP”) as part of the OMP that is consistent, and demonstrates how Developer will comply, with incident management requirements of relevant Governmental Authorities. In the IRP, Developer shall address as a minimum:	1.0	Introduction	<input type="checkbox"/>
9.4.a	Description of Developer's specific responses to incidents;	2.0	Description of Specific Responses to Incidents	<input type="checkbox"/>
9.4.b	The responsibility to prepare, and turnaround time for the preparation of, monthly Incident Reports in electronic format (and as further specified in this Schedule 11 and submission of them to the Department when incidents occur;	3.0	Preparation, and Turnaround Time for the Monthly Incident Reports in Electronic Forma	<input type="checkbox"/>
9.4.c	All issues associated with Hazardous Substances spills	4.0	Hazardous Substance Spills	<input type="checkbox"/>
9.4.d	Necessary coordination responsibilities with the Department and relevant Governmental Authority and Emergency Services personnel when incidents occur.	5.0	Coordination with the Department, Governmental Authorities and Emergency Services	<input type="checkbox"/>

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## 1. Introduction

KMP has developed an Incident Response Plan (IRP) to facilitate a multi-agency, unified response to incidents within the Central 70 Project (Project) limits. An incident is an event that impedes the normal flow of traffic. The IRP applies to both the Construction and Operating Periods. As described in the *CDOT Incident Management Guidelines*, the National Unified Goal (NUG) supports the National Traffic Incident Management Coalition (NTIMC) goal for the successful development of local, regional, and statewide incident programs through peer networking and knowledge sharing. The NTIMC objectives include the development of multi-jurisdictional, multi-disciplinary incident management policies, procedures, and training. The NUG has three primary objectives:

- Responder safety
- Safe, quick clearance
- Prompt, reliable, interoperable communications

This Incident Response Plan has been prepared based on previous project experience and complies with the *CDOT Guidelines for Developing Traffic Incident Management Plans for Work Zones*.

The priorities for KMP's Incident Response Plan include:

- Protecting the safety and health of everyone who uses the I-70 East Corridor
- Preserving the transportation assets of the I-70 East Corridor
- Recording and documenting asset damage for effective recovery and rehabilitation
- Maintaining efficient traffic flow and operation
- Collaborating with the Department on how best to restore full use of the affected infrastructure

This plan details the management and response procedures KMP follows for incidents affecting the network within the Project area. The Plan defines the management procedures, coordination efforts, response protocols, and contact information for our management of all types of incidents.

## 2. Description of Specific Responses to Incidents

The Project is a critical network for the Denver metropolitan region. Incident response operations are an essential element of our O&M approach. This section includes a detailed Operations Plan for incident response.

Emergencies and other incidents require careful management, interagency coordination, and effective communications to secure the network's infrastructure and its travelers. KMP is committed to following the Department's emergency management procedures and requirements for our response management.

KMP has protocols for maintaining traffic flow with detours, restricting traffic in hazardous areas, managing traffic accidents, and responding to emergency asset repairs. KMP has a systematic procedural approach to achieve the timely management to traffic for incident response and to maintain asset health.



### Incident Management Operations



### 2.1 INCIDENT TYPES

The corridor is vulnerable to a wide variety of potential hazardous events. There are four basic categories of incidents:

- **Natural Hazards:** Wildfires, floods, tornadoes, lightning, snow or ice storms, and earthquakes
- **Transportation Hazards:** Major accidents, oil spills, industrial fires and explosions, and hazardous material spills (radioactive or chemical)
- **Homeland Security Threats:** Terrorists using conventional, chemical, biological, nuclear, radiological weapons, or cyber-attacks
- **Other Threats/Hazards:** Human and animal epidemics/pandemics, civil unrest, disruptions in production and distribution of critical goods and services, and energy shortages

Natural hazards (specifically severe weather) and transportation hazards are the most likely threats to the I-70 East Corridor.

### 2.2 READINESS AND RESPONSE LEVELS

KMP implements a four-tier readiness and response-level scheme:

- **Level IV Normal Conditions:** Planning, training, and drills for emergency responders. Maintenance and testing of emergency equipment, facilities, and communications systems.
- **Level III Increased Readiness:** Local responders resolve routine emergency incidents. A significant emergency has not yet occurred but increased readiness is necessary due to increased potential (for example, severe weather forecasts). Key Personnel are alerted and incident staffing is increased, equipment readiness is confirmed, contingency plans are reviewed, advisory notices are sent, response units are alerted, coordination activities increased, Public Information activities are started, and official and agency representatives are briefed.

- **Level II Escalated Response Conditions:** Emergency threat is elevated by local responders and evacuations may be implemented, emergency staffing and hours are increased, response units are deployed, aid resources are requested, officials and agencies are briefed, Public Information activities are expanded, and contingency efforts are started if State or local government operations are impaired.
- **Level I Emergency Conditions:** The scope of the emergency is beyond the capabilities of local responders and additional resources are requested from local, state, intrastate, or federal government.

## 2.3 PHASES OF INCIDENT RESPONSE

KMP implements five action phases:

### 2.3.1 PREPAREDNESS

Procedures to ensure timely and effective responses to, mitigation of, and recovery from incidents:

- Develop and refine procedures related to traffic movement and evacuation during major emergency and disaster events.
- Develop and document reverse-lane activities and procedures for use within the Project limits and on the local roads network.
- Develop, review, and update this Incident Response Plan to ensure timely and effective emergency response and recovery.
- Train O&M employees in incident response procedures at all levels. Use drills to promote emergency skill readiness.
- Develop and document local mitigation strategies.

### 2.3.2 INCIDENT DETECTION AND IDENTIFICATION

Accurate and responsive incident detection and identification is a high priority for KMP. For the Project, an incident can include crashes, disabled vehicles, problems resulting from weather, debris, or other incidents adversely impacting traffic flow. Many of the notifications will be via 911 calls. In addition, an incident source can come from:

- Courtesy patrol call reports
- Denver Police Department call reports
- Department employee/contractor/subcontractors advising of an incident
- Colorado Traffic Management Center (CTMC) closed-circuit television cameras providing incident detection and location confirmation

### 2.3.3 RESPONSE

The KMP response to an incident varies based on incident severity level. The four levels as defined by the Department are:

- **Minor (Level 1):** Impact to traveled roadway estimated to be less than 30 minutes with no lane blockage.
- **Intermediate (Level 2):** Impact to traveled roadway estimated to be greater than 30 minutes, but less than two hours with lane blockages, but not a full closure of the roadway.
- **Major (Level 3):** Congestive impact to traveled roadway is estimated to be greater than two hours or roadway is fully closed in either direction.



- **Major Long Term Closure (Level 4):** Extended closure greater than 24 hours. The Incident Commander determines the closure duration.

Timely and effective response is a critical component of incident management for all potential events. The primary goal of the response operation is to ensure an effective response to the challenges that can occur in emergency situations. For advanced warning events, actions depend on the type and timeline of the incident. For those without warning, responses depend on the type of incident and the resulting conditions.

We immediately dispatch notifications received during the workday to the closest available responder. Incident response trucks have GPS tracking systems, allowing office administrators and supervisors to know immediately which units are nearest to an incident. Incident responders are also on-call during off-peak hours.

KMP's main priorities at an incident site are to manage lane closures as conditions or law enforcement directives dictate, and expeditiously procure resources to clear debris, remove vehicles, and safely resume traffic. KMP is proud to aid emergency responders in securing the scene and aiding injured parties. To ensure our effectiveness, KMP completes the following tasks during the mobilization period:

- Identify and GPS map responding parties including the Department's offices, law enforcement, and emergency responders
- Develop emergency response standard operating procedures
- Develop Traffic Control Plans for typical incident responses
- Schedule introductory meetings with emergency agencies to facilitate response protocols and to discuss response expectations, lines of communication, and coordination and contact information
- Provide patrol routes, contact information, and office locations to all responders, the Department, third parties, stakeholders, and the public, and issue revisions promptly
- Review and revise protocols with emergency responder agencies
- Develop recurring meeting schedules with all responding agencies to develop collaborative emergency response practices

#### 2.3.4 RECOVERY

After the emergency has concluded, rebuilding and restoration become the priorities. Efforts focus on the corridor's individual assets and the overall infrastructure as it relates to the Project. For Governor-declared emergencies, or where state resources are involved, federal and state recovery teams may be deployed within the first 24 hours to assist local organizations. The Federal Emergency Management Agency (FEMA) may also be involved. If so, KMP defers to its priorities.

For all incidents, KMP may deploy specialized recovery teams to complete damage assessments and assist with coordinating initial recovery.

Initial recovery includes damage assessment and documentation, initial roadway clearance, cost estimating for emergency and permanent repair, and traffic management operations. If hazardous materials are involved, a remediation plan is required before environmental mitigation efforts begin. If the infrastructure incurs major damage, we will likely implement recovery in two phases—temporary repairs and permanent repairs based on coordination with the Department and possibly FEMA.

### 2.3.5 MITIGATION

The goal of the mitigation period of incident response is to ensure that the traveling public is safe by reducing risks and vulnerability. These efforts include:

- Developing and implementing improvements to enhance capabilities to address hazards and environmental damage
- Reducing natural and man-made vulnerabilities to State-owned facilities and infrastructure

## 2.4 INCIDENT PROCEDURES

### 2.4.1 INCIDENT SITE MANAGEMENT

The safety of responders, victims, and the traveling public requires effective incident site management. A well-planned and managed response provides for the safety of responders and the traveling public. The response must minimize the number of responding units, yet provide for efficient and effective resources to manage the incident.

Incident management is complex and covers a wide variety of guidelines and processes. Based on the Department's *Guidelines for Traffic Incident Management in Work Zones*, KMP's Incident Management and PI Teams review the Department's applicable site management strategies, including:

- 24-hour patrols
- Peak period motorcycle patrol
- CCTV
- Public education program
- List of personal resources/equipment/material resource lists
- Pre-planned alternate routes
- Alternative emergency response access routes
- Predetermined protocols for changing traffic control
- Communication protocols to enhance radio communication between agencies
- Interagency training
- Equipment storage sites
- Defined traffic control techniques
- A mobile command post
- Identification vests
- Flashing light guidelines
- Predetermined staging areas
- Predetermined incident response teams
- Incident Management Review Team
- Guidelines for consideration of travel on shoulder
- Closure and alternate route guidelines
- Rapid vehicle removal guidelines
- Identified landing zones for medevac helicopters
- Inflatable air bag system for rapid removal of overturned trucks
- GPS-enabled equipment to document locations of critical accidents
- Accident investigation site guidelines
- Incremental lane opening guidelines



### 2.4.2 INCIDENT CLEARANCE

KMP, in collaboration with the Department, establishes realistic expectations and achievable goals to meet performance measures for safely and quickly clearing incidents. Our proactive approach includes rapid, safe, and thorough removal of temporary obstructions from the roadway. This approach minimizes the responders' exposure to passing traffic, the probability of secondary crashes, and overall congestion and delay.

Incapacitated vehicles are usually part of an accident, or are abandoned. KMP removes incapacitated vehicles quickly because they pose hazards to motorists and impact lane availability. Procedures for removing incapacitated vehicles include:

- Confirming the vehicle is incapacitated and/or abandoned (abandoned vehicles must be marked, and reported as unattended, for more than 24 hours)
- Moving the vehicle to the shoulder if possible and safe
- Coordinating with emergency responders to identify a towing company to move the incapacitated vehicle if necessary
- Notifying the CTMC of the abandoned vehicle, mark the vehicle as abandoned, and report to law enforcement

Many of the strategies for incident clearance correspond to incident site management strategies and include the following:

- Public education program
- Available personnel resource lists
- Equipment/material resource lists
- Pre-planned alternate routes
- Alternative emergency response routes
- Agency radio communication protocols
- Interagency training program
- Strategic placement of equipment storage sites
- Defined traffic control techniques
- Incident Management Review Team
- Travel on shoulder guidelines
- Closure and alternate route guidelines
- Rapid removal guidelines
- Medevac landing zone guidelines
- Push bumpers for righting overturned vehicles
- Accident investigation site guidelines
- Traffic signal control plans
- Ramp metering
- Incremental lane opening guidelines
- Variable message signs

In summary, KMP's philosophy for safe, quick clearance response is to:

- Work with a sense of urgency to clear incidents
- Use unified command to meet incident objectives
- Complete tasks concurrently, when possible
- Use all available resources for clearance
- Seek the opportunity to think outside the box on how things can be done differently

### 2.4.3 COURTESY PATROL

KMP courtesy patrols survey all lanes of the Project to 1) Identify unsafe or potentially unsafe conditions; 2) Identify conditions potentially threatening the infrastructure; and 3) manage current, or changing, conditions. Qualified members of KMP, including supervisors, patrol regularly. Supervising personnel are trained in observation and reporting standards, and have incident management training.

During severe weather events that could cause damage, serious disruption, or the loss of human life such as high winds, severe thunderstorms, snow and ice storms, tornados, heavy rainfall and flooding, and hail, patrols are conducted at least every two hours. Patrol records include details of weather conditions, road surface conditions, unusual observations, and any photographs taken. See Attachment 3, Courtesy Patrol Service Plan, of Appendix H for a detailed discussion.

## 2.5 INCIDENT-SPECIFIC OPERATIONS

### 2.5.1 MASS CASUALTY CRASHES

- **Preparation:** Meet annually with local county emergency managers to review their plans and learn their expectations for KMP assistance in evacuations, traffic control for emergency vehicles, rescue, and cleanup
- **Response:** For crashes directly affecting the Project, the response is identical to any incident blocking a roadway: Stabilize the situation, call for help, notify the Operations Supervisor, and provide maintenance of traffic (MOT) by any safe means available
- **Recovery:** Cleanup roadways and right-of-way (ROW) and repair any significant damage

### 2.5.2 BRIDGE DAMAGE OR FAILURE

- **Preparation:**
  - Ensure FHWA NBIS inspections are performed according to requirements
  - Ensure bridge Work Orders are completed.
  - Maintain easily accessible bridge plans.
  - Identify the Project Engineer responsible for coordinating emergency bridge repairs.
- **Response:**
  - First responders review the damage for threats to public safety. If threats exist, attempt to safely stabilize the situation with available MOT supplies. Call 911 if necessary.
  - If an oversized load hits any structural support member, review damage as soon as possible to determine if immediate attention is necessary. For hits not requiring immediate attention, inspect the site the first workday following the incident. Determine if a routine Work Order is sufficient or if immediate repair is necessary.
  - For damage requiring immediate evaluation and repair, provide immediate notification for site assessment and identify the next action.
  - KMP Bridge Design subcontractor will standby for any requested structural analyses.



- KMP Operations Supervisor will standby to direct necessary detour set-up and maintenance.
- **Recovery:**
  - For emergency contracts, KMP obtains a contractor and oversees the repair Work as soon as possible. Emergency plans are coordinated between KMP and the Department.

## 2.6 PROCEDURES FOR EFFICIENT DISPATCH AND RESPONSE

KMP uses practices and procedures to enable quick dispatch and response to incidents.

- **Historical incident data management:** With an extensive history in responding to thousands of Incidents, KMP has tracked typical response times. This allows us to reduce uncertainty in Routine Maintenance planning and increase Incident response efficiency.
- **Incident management proactive communication:** KMP makes every effort during the response process to gain accurate information and to respond accordingly. KMP, through our Project Communications Manager, contacts the local and State law enforcement units, notifies the Department’s Incident response personnel, and dispatches responders to verify the Incident. KMP also contacts other agencies (such as Fire and Rescue) for assistance or standby requests. Assigned staff carry MOT equipment and materials for minor to moderate traffic accidents and hazardous waste spills.
- **Incident management contact lists:** KMP maintains updated reference lists with the names of coordinating agencies, contact individuals, and contact information. This list includes Department contacts at the CTMC.

Additionally, on-call responders for incidents, emergency repair actions, and major MOT requirements are available and informed.

### Responder List

RESPONDER	EMERGENCY SPECIALTY
Primary on-call supervisor	Incident Management supervision
Primary on-call technician	Telephone operator, first responder
Primary on-call electrician	First responder for electrical incidents
Secondary on-call electrician	Back-up support for all incidents and electrical problems
Primary on-call equipment operator	First responder for sand truck, TMA, heavy equipment operation needs
Primary on-call sign technician	First responder for downed regulatory traffic signs
Secondary on-call mot technicians	Secondary need for MOT support and asset damage
Monitoring technician	Hazardous material spill response

- **Resource Organization.** KMP has developed strategic logistics for the IRP. We establish our Havana Maintenance Yard, and identify equipment and resources for an efficient response to incidents. The first table below is a preliminary list of materials (and quantities) for an incident response. The second table itemizes our available equipment.

## Preliminary Material Resources

Incident Material Needs	Amount
<b>Sand/Oil Dry</b>	25 cu. yds.
<b>Fill</b>	100+cu. yds.
<b>Pea-rock (base)</b>	25 cu. yds.
<b>Cold-Mix Asphalt/Concrete</b>	3-5 tons
<b>Millings Material</b>	100+cu. yds.
<b>Rip Rap</b>	50 cu. yds.
<b>Guardrail Materials</b>	New material parts of over 100 components
<b>Attenuator</b>	1-month stockpile
<b>Lighting Materials</b>	Load centers, bulbs, ballasts, fixtures, light poles, conductors, HMLP components—3-month stockpile
<b>Traffic Signs</b>	Over 10,000 sq. ft. warning signs, regulatory signs and guide signs
<b>Fencing Materials</b>	3-month stockpile of Type A/Type B components

## Preliminary Equipment Resources for Incident Response

Equipment	Type Of Use
<b>Truck mounted arrow boards</b>	Lane closures and MOT support
<b>Truck mounted attenuator trucks</b>	Mobile operations
<b>Sand spreader truck</b>	Slick liquid/solid spills
<b>Dump trucks</b>	Cleanup and materials transport
<b>Bucket truck</b>	Emergency tree removal, lighting damage
<b>Excavator</b>	Massive cleanup needs, slope/shoulder repair
<b>Skid steer</b>	Massive cleanup needs, slope/shoulder repair
<b>Arrowboard trailers</b>	MOT controls and lane closure support
<b>Trailers</b>	MOT controls equipment transport and debris transport
<b>Cones, barrels, barricades, signs</b>	MOT controls
<b>High mast drill motors</b>	Drill motors for high mast lowering
<b>Generators</b>	Misc. power needs, high mast drill motor power

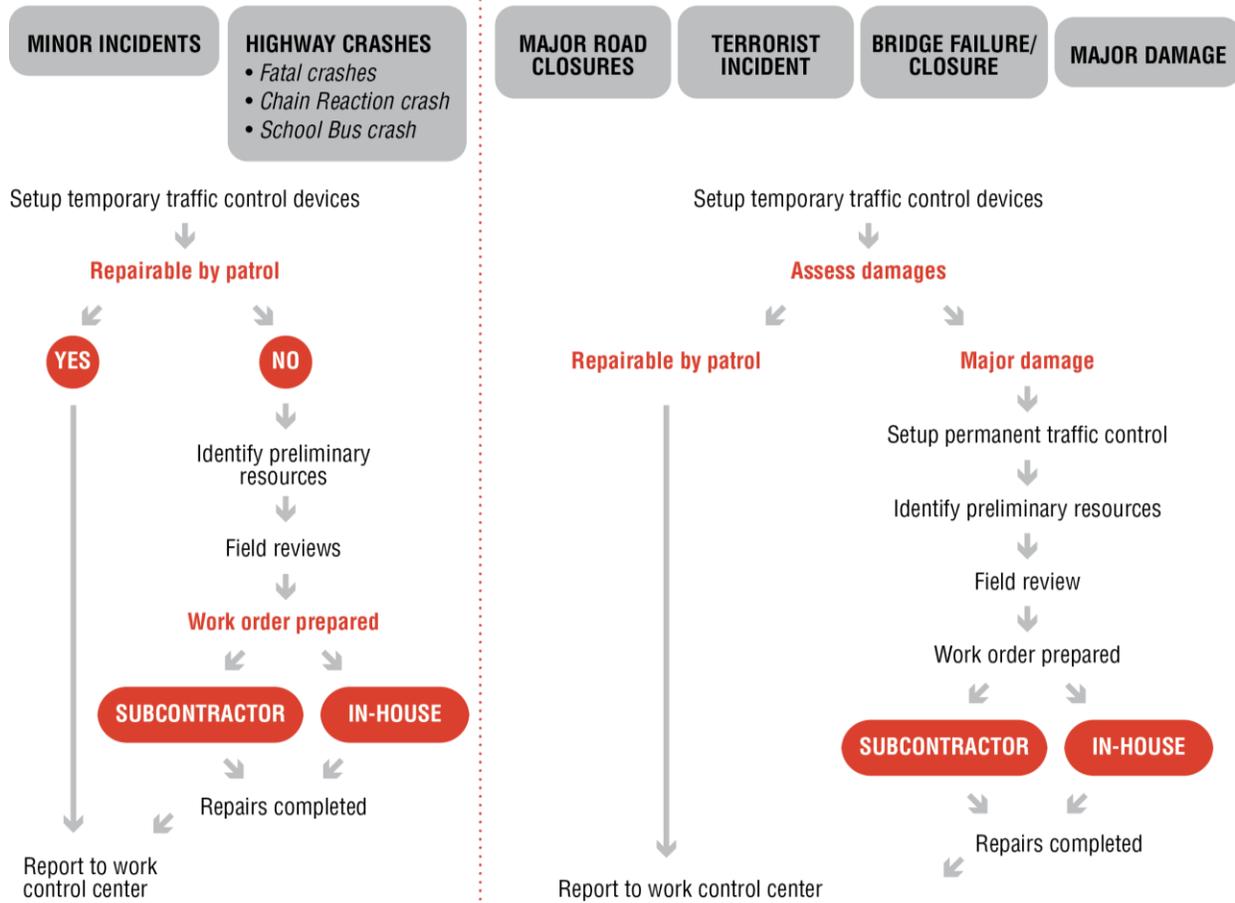


## 2.7 INCIDENT RESPONSE PROCEDURE

### 2.7.1 BY INCIDENT TYPE

KMP has established procedures for incident response. The following flowchart summarizes the procedures by incident type.

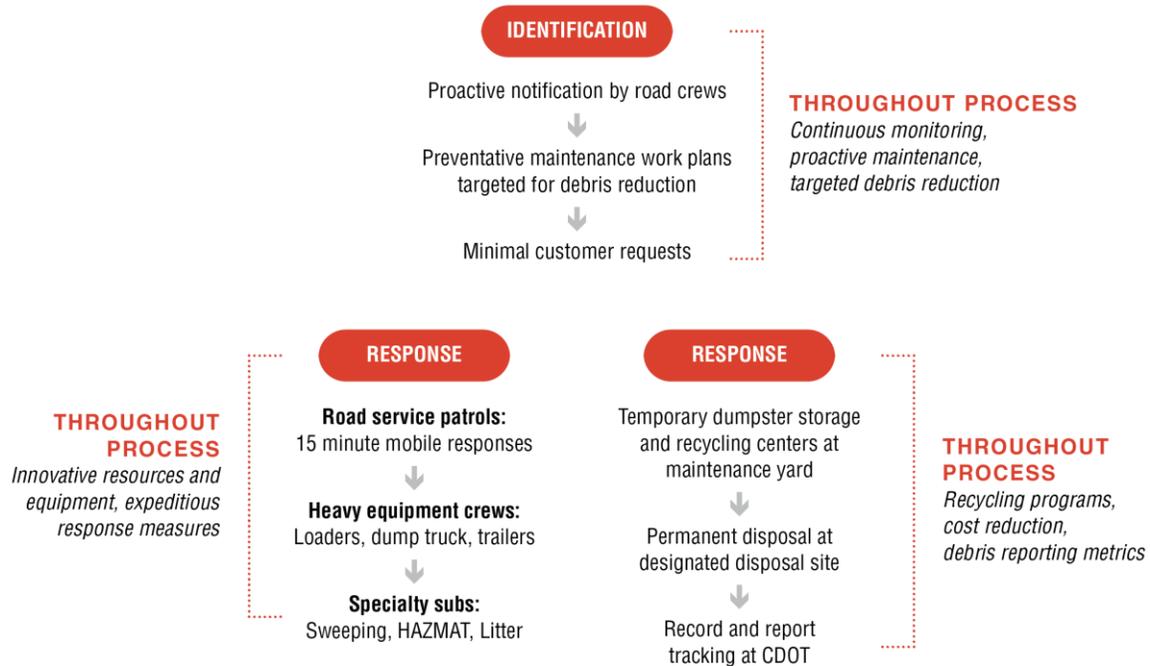
#### Incident Response Procedure by Incident Types



### 2.7.2 FOR DEBRIS CLEANUP

One of the most common incident responses is to remove debris from the ROW. Below is our debris removal protocol:

## Roadway Debris Protocol



KMP dispatches response equipment to the field, removes debris from the ROW, and disposes of the debris at the closest designated location. We have agreements with local subcontractors for supplemental equipment and operators, and we have provisions for emergency debris response and equipment rental vendors. These arrangements help ensure timely debris removal.

KMP has debris management and recycling storage areas at the Havana Maintenance Yard. We handle debris removal to maximize motorist and worker safety and minimize traffic impedance and damage to assets. KMP follows these basic principles:

- **Proactive Management:** Courtesy patrol service
- **Equipment:** Dump trailers, sweeping attachments, blowers
- **Timely removal:** Within emergency response time for debris removal specifications
- **Third party hazardous waste management:** Documented, legal disposal
- **Recycling programs:** Cost reduction

### 3. Preparation, and Turnaround Time for the Monthly Incident Reports in Electronic Format

JAMMS, our Maintenance Management Information System, generates monthly reports on incidents resulting in damage to any asset element or resulting in emergency service response. Reports identify the nature of the incident, time, date, location, parties involved, and actions taken. For incidents involving fatalities, KMP submits the Incident Report to the Department within 24 hours of the incident.



## 4. Hazardous Substances Spills

KMP complies with the hazardous material spill mitigation and reporting provisions documented in Schedule 17, specifically the Department’s *Procedures for Hazardous Materials Spills That Occur on State and Federal Highways Within Colorado as a Result of a Highway Transportation Incident*, and the *Spill Prevention, Control, and Countermeasure Plan*.

- **Preparation:**
  - Train O&M employees for basic first response, based on spill size and type. Training in weekly safety meetings to give all employees basic knowledge on chemicals routinely transported on the State highway system. Employees have basic knowledge of hazardous spill response and notifications, and can secure the area and notify the appropriate authorities.
  - Distribute response guidebooks with placard descriptions and identification.
  - Ensure availability of frontend loader, dump truck, and fill dirt to assist containment.
  - Be knowledgeable of local and State laws, regulations, policies, and procedures concerning hazardous spills.
- **Response:**
  - Immediately contact KMP Environmental Manager.
  - O&M provides backup assistance.
  - Stay clear of any spill material until a professional has identified the material and its level of hazard.
- **Recovery:** Determined by the KMP Environmental Manager—O&M staff assists as needed.

See Sections 16 and 20 of Appendix H and Appendix M, Environmental Compliance Work Plan, for more discussion on hazardous material spills.

## 5. Coordination with the Department, Governmental Authorities, and Emergency Services

KMP strives to develop strong relationships and effective communication and coordination with law enforcement and emergency responders for efficient event mitigation. For this, and to foster efficient response times from all responding parties, KMP carefully analyzes the roles and responsibilities of associated agencies. KMP proposes development of a formal proactive Incident Response Plan, with signoff from appropriate emergency response agencies to ensure consistent and effective incident response.

Following is a list of agencies and their anticipated roles in events:

- **Law Enforcement (Colorado State Patrol, County Sheriff, and local police):** Providing blue lights to warn motorists, incident scene investigation, securing and releasing scenes
- **Emergency Responders (Fire and Rescue and other responders):** Mitigate impacts such as fires and injuries
- **O&M Supervision:** Coordination of resources to the site, continuous communication between all responders, documentation of incident details, facilitate motorist notification, facilitate stakeholder notification (including impacts to local roads and closures)
- **KMP Crew:** MOT and traffic control management, procure resources to remove the debris field, report incident status to dispatcher, communicate internally

- **CTMC:** Review visual updates from responders if cameras are available, and facilitate notification and advanced warning to motorists
- **Local Municipalities:** Help facilitate motorist warnings
- **Department:** On-scene command and support based on the severity of the incident and structural damage to assets

To develop and maintain strong coordination processes, KMP:

- Holds monthly meetings with law enforcement and emergency responders
- Holds debriefing sessions after major incidents to discuss lessons-learned and consider event response modifications
- Develops monthly mock response scenarios available to all stakeholders and incident response parties
- Holds demonstrations of equipment use
- Provides guidance on lane configuration changes to improve incidence response
- Attends emergency responder functions such as career days, luncheons, and charity events, as requested

The KMP Project Communications Manager is responsible for the dissemination of travel information regarding incidents and communicating this information and travel information to the public and other governmental authorities. During incident response, KMP classifies the incident Response level and communicates this to the KMP Project Communications Manager, who then communicates immediately with the Department Project Manager and Public Information liaison. KMP assigns a Public Information Team member as the point-of-contact for media communications, consolidates relevant information, and provides updates. See Appendix J, Strategic Communications Plan, for more information.

KMP maintains adequate staffing to respond to incidents 24/7/365. For response to incidents affecting the Project, KMP establishes a command post with a KMP Incident Response Coordinator (IRC), typically the Operations Supervisor, as the direct point of contact.

If there is need to relocate staging areas, offices, or other Work sites due to damage or inaccessibility, KMP relocates to a secure, advantageous location. We move the maintenance operation administration to KMP facilities not damaged by the event.

Communication among the State emergency response teams, and supporting agencies and organizations, is of primary importance. The disruption of normal communication among KMP, the O&M staff, and the Department hinders efficient and post-event recovery. KMP has developed communication disruption contingencies:

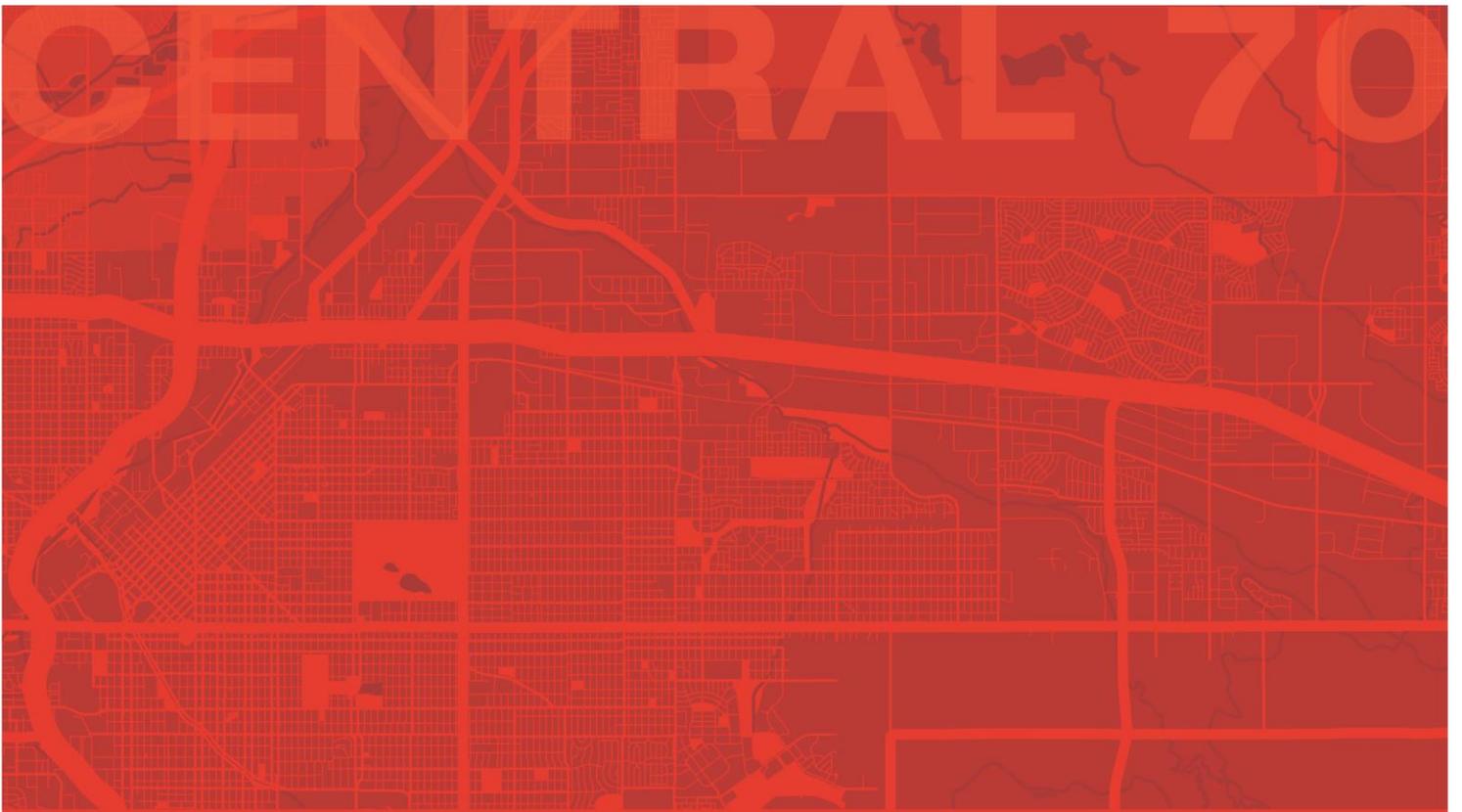
- **Satellite Phones:** O&M field managers are equipped with satellite phones, which are not subject to the same disruptions as cell phones.
- **Rosters and Pre-Assigned Meeting Times and Places:** The KMP IRC establishes a pre-assigned meeting place and time for all staff to gather if communications disruptions occur. All available staff members check in at the meeting place to receive their assignments. Field supervisors establish additional meeting times and locations as communication disruptions persist.

The IRC, in coordination with the O&M Manager, also pre-assigns anticipated Recovery Work in anticipation of communications disruptions. Maintenance crews are pre-assigned road segments for an “initial push” to clear obstructions and debris or otherwise ensure that their segments are clear.



The IRC communicates the pre-established meeting time and place to the appropriate Department authority so emergency staff have access to the O&M Managers during severe disruptions.

**- END OF SECTION -**



ATTACHMENT 3

*Relates to Appendix H*



# Courtesy Patrol Service Plan



**SUBMITTED TO:**

Colorado Bridge Enterprise  
High Performance Transportation Enterprise  
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## EVALUATION CRITERIA: COURTESY PATROL REQUIREMENTS, APPENDIX H, ATTACHMENT 3

The Evaluation Criteria Matrix below associates the Courtesy Patrol requirements with the sections of this plan:

Sch. 11 Section	Item	OMP Section	Section Name	Check
10.1.1	For the duration of the O&M Period During Construction and the Operating Period, Developer shall provide Courtesy Patrol Services service for the Project as described in this Section 10 and Appendix B to this Schedule 11.	1.0	Introduction	<input type="checkbox"/>
10.1.1.a	Continuously patrolling within the Project during peak and non-peak traffic hours and weekends	2.0	Patrolling within the Project during Peak and Non-Peak Traffic Hours and Weekends	<input type="checkbox"/>
10.1.1.b	Providing towing and motorist assistance services	3.0	Towing and Motorist Assistance Services	<input type="checkbox"/>
10.1.1.c	Providing towing services for the Tolloed Express Lane(s) and General Purpose Lane(s)	4.0	Towing Assistance for the Tolloed Express Lane(s) and General Purpose Lane(s)	<input type="checkbox"/>
10.1.1.d	Providing on-call severe weather emergency or planned Special Event towing services	5.0	On-Call Severe Weather Emergency or Special Event Towing Services	<input type="checkbox"/>
10.1.1.e	Quickly locating, assisting, and/or removing any disabled vehicles thereon as soon as possible	6.0	Locating, Assisting, and/or Removing Disabled Vehicles as Soon as Possible	<input type="checkbox"/>
10.1.2	<p>Categories of Service</p> <ul style="list-style-type: none"> <li>i. To locate a disabled vehicle on the shoulder of the highway segment and, at the motorist's election, to move the vehicle to an appropriate Drop Site and there to provide the limited assistance available to Developer (i.e. flat tire, out of gas, etc.) if such assistance will make the vehicle operational;</li> <li>ii. To locate a disabled vehicle in traffic on the highway segment and, at the motorist's election, to move the vehicle either to the shoulder of the highway segment or to an appropriate drop site, and there to provide the limited assistance available to Developer if such assistance will make the vehicle operational;</li> <li>iii. To assist motorists, and Local Agencies or Emergency Services as requested, concerning an accident or other emergency on the highway segment. Such assistance includes, without limitation, towing or pushing vehicles as directed, protecting the scene of an accident, cleaning up debris caused by an accident and calling an assisting local law enforcement in the event of an accident;</li> </ul>	7.0	Categories of Service	<input type="checkbox"/>

**EVALUATION CRITERIA: COURTESY PATROL PLAN, APPENDIX H, ATTACHMENT 3**

Sch. 11 Section	Item	OMP Section	Section Name	Check
	iv.		To pick up light debris on roadway; and	
	v.		Data collection communication to the Department.	

## 1. Introduction

The Courtesy Patrol Service Plan provides an overview and establishes procedures for courtesy patrol services (CPS) as required in Section 10 and Appendix B of Schedule 11 of the Project Agreement. KMP provides courtesy patrol services during the Construction and Operating Periods, which provides continuity for greater reliability and effectiveness

Courtesy patrols are an important component of the Project. The patrols minimize impacts to the traveling public, ensure reliable travel speeds in managed and other travel lanes, and protect the safety of the workforce and public within the O&M limits. Courtesy patrollers provide assistance to motorists, maximize traffic flow, and enhance safety. As discussed in Section 6.1 of Appendix H, Patrollers receive specialized CPS training for properly assisting motorists and coordinating with the Colorado Traffic Management Center (CTMC). Our courtesy patrol program is an extension of KMP's commitment to motorist and worker safety.

Our Lead Operator, Jorgensen, has provided courtesy patrol services on projects for Florida DOT for over seven years, and for Virginia DOT. We use our best practices from these projects to develop the Project's CPS program. Our experience includes:

- I-595 Roadway Corridor Improvements (Florida): 10 CPS vehicles, 21 operators, 20 cycles, 24/7 operations, averaging less than 5-minute response time with an average of 1200 events monthly.
- Capital Beltway I-495 Express HOT Lanes (Virginia): 5 CPS propane vehicles, 8 operators, averaging less than 5 minutes response times for 3 years.
- Broward County (Florida): 25 CPS propane vehicles, 50+ operators operating 15 beats, 24/7 operations.
- Treasure Coast (Florida): 14 CPS propane vehicles, 7 operators, 7 beats, 24/7 operations.

## 2. Patrolling within the Project during Peak and Non-Peak Traffic Hours and Weekends

The services provided by a courtesy patrol include the following:

- Assisting stranded motorists by clearing disabled vehicles from travel lanes, changing flat tires, jump-starting batteries, and providing limited amounts of fluids such as gasoline and engine coolant
- Assisting stranded motorists in contacting services for repair or towing
- Assisting the CTMC with traffic and incident management to reduce traffic congestion and delays caused by vehicle breakdowns, collisions, and material spills
- Providing assistance to law enforcement personnel as requested, including MOT as required
- Clearing, cleanup, and removal of debris found on the travel way or resulting from a collision.



- Sweeping the managed lanes prior to opening for each change of direction to confirm they are free of wrong way traffic

## 2.1 ANALYSIS

Courtesy patrol services vary daily. Many variables impact service requirements, including traffic volumes, weather conditions, accident history, and roadway conditions.

Developing patrol and staging plans based on field conditions is the key to creating CPS resource management efficiencies. KMP bases CPS schedules, routes, and resource needs on the Project needs, our Project knowledge, and our experience providing CPS services on similar projects.

KMP performs a monthly evaluation and analysis of incidents and response data for the Department, and we revise our plans to continuously optimize patrol time and resource levels given the conditions encountered in the field.

## 2.2 TRAINING

KMP trains CPS operators to understand their roles and responsibilities based on best practices and lessons learned from over a decade of providing patrol and motorist assistance services. Our experience has enabled us to develop proper response protocols for almost any situation encountered by a CPS operator. In Florida, Jorgensen has successfully recruited and trained more than 35 courtesy patrol operators in 2016 and 67 in 2015 during the mobilization of new contracts. Our operations serve as the training ground and template for similar programs at other transportation agencies across the United States. Section 6 of Appendix H discusses KMP's training program for CPS employees in detail.

## 2.3 CENTRAL 70 CPS STAFFING

Courtesy patrols patrol within the Project's O&M Limits during peak and non-peak traffic hours and weekends per the requirements of Schedule 11, Appendix B (6:30 AM to 8 PM weekdays, and 10 AM to 7 PM for weekends except for New Year's, Thanksgiving, and Christmas Holidays). The courtesy patrol drives their assigned routes during the day, stopping to clear debris/litter from the roadway, assist with incidents, and inspect the roadway when needed.

Courtesy patrols:

- Are scheduled for maximum effectiveness
- Clear disabled vehicles from travel lanes and assist with flat tires, dead batteries, and fluid deficiencies
- Assist in coordinating towing services including severe weather emergency or planned Special Event towing services
- Assist the CTMC with traffic and incident management to reduce traffic congestion, maximize traffic speeds on the managed lanes, and reduce delays caused by vehicle breakdowns, collisions, and material spills
- Assist law enforcement and begin maintenance of traffic (MOT) controls when necessary

- Clear debris impeding traffic or compromising traveler safety

We schedule routes so Project limits are patrolled in 30-minute cycles during both peak and non-peak hours.

CTMC operators monitor and direct the courtesy patrols to ensure positioning for efficient response to incidents. KMP operators are co-located with the CTMC dispatch staff for collaboration and cohesiveness of the courtesy patrols. KMP operators are equipped and trained on the use of the two-way SLERS compatible radios to communicate with the CTMC. Operators adhere to KMP radio reporting requirements. Additionally, operators are equipped with two-way cell phones for backup to the SLERS radio.

KMP's Patrol Schedule for the Project includes:

- Incident response time of 15 minutes (after dispatch) as stipulated in Section 1.1.D of Appendix B of Schedule 11
- Patrols times as stipulated in Section 1.1.B in Appendix B
- Peak times of week days from 6:30 am to 9 am and 3 pm to 6 pm (adjusted if necessary)

The courtesy patrols start and end their shifts from the Havana Maintenance Yard. We adjust routes during the Construction Period based on location and Work to maximize service coverage and promote driver safety. We also adjust routes throughout the Operations Period based on data for better route efficiency.

## 2.4 ROUTES

The courtesy patrol drives routes in a loop during the designated times, only stopping to clear debris/litter from the roadway, assist with incidents, and inspect the roadway on request.

Although the entire route can be transited between peak and non-peak traffic times in 22 to 28 minutes (depending on traffic conditions), two standard routes are established for redundancy. The main track for each route is from Pecos Road on the western end of the Project, and from Tower Road on the eastern end of the Project. The existing roundabout facilitates quick turnaround for the patrol route, as does the diamond-shaped interchange of Tower Road on the east end of the Project.

- Route 1 Loop (East): From Pecos Road eastbound roundabout on-ramp to eastbound off-ramp to Tower Road.
- Route 2 Loop (West): Westbound on-ramp from Town Road to Pecos Road westbound off-ramp. Following roundabout to I-70 eastbound.
- Stage Vehicle: Staged primarily during peak hours at the Havana Maintenance Yard halfway through the Project. Its primary role is to provide additional support and response during peak traffic periods for patrol routes 1 and 2.



Operators monitor the courtesy patrol to confirm their strategic placement throughout Project Limits for faster response to incidents. The Operations Supervisor assists with courtesy patrolling, as do our backup maintenance units. We mobilize these assets as necessary for effective response to multiple, simultaneous, incidents.

### **2.5 CPS SCHEDULING MANAGEMENT**

Each CPS operator maintains a daily schedule of work activities. The shift schedule is prepared with 30-minute overlap to accommodate shift changes. KMP provides the Department a weekly schedule with CPS operators, truck numbers, and patrol routes. We use on-call staff, supervisory staff, and management staff to cover patrols if an absence occurs. We inform the Department of schedule modifications no later than one hour after implementation.

## **3. Towing and Motorist Assistance Services**

In coordination with the CTMC, KMP provides:

- Equipment and resources for towing and recovery for vehicle breakdown
- Services to locate disabled vehicles in traffic, and, at the motorist's discretion, relocation of the vehicle to the shoulder or an appropriate drop site
- Limited assistance to restore the vehicle to operation when possible

To supplement KMP's resources, we use an on-call list for vehicle towing and wrecker companies able to respond within a specified timeframe.

## **4. Towing Services for the Tolloed Express Lane(s) and General Purpose Lane(s)**

Our CPS staffing allows KMP to respond to calls within 15 minutes of dispatch from the CTMC. This is especially critical for managed lanes because of customer expectations and revenue considerations.

To open lanes, we move incidents or accidents to the nearest shoulder or designated drop sites, and provide additional services for motorist and operator safety.

## **5. On-call Severe Weather Emergency or Planned Special Event Towing Services**

During severe weather emergencies, or planned special events that result in illegally parked vehicles, KMP provides on-call towing services.

## 6. Locating, Assisting, and/or Removing Disabled Vehicles as Soon as Possible

The courtesy patrol locates disabled vehicles and provides assistance within the response times as stipulated in Appendix B of Schedule 11. This includes removing the disabled vehicles from the traveled portion of the highway when the presence of the disabled vehicle presents a significant safety hazard. KMP personnel driving KMP vehicles stop to assist motorists and alert the courtesy patrol and CTMC when they observe a disabled vehicle. KMP personnel not in KMP vehicles call in the location of disabled vehicles to the courtesy patrol.

KMP follows the protocols as set in Schedule 11, Appendix B.

KMP inspects and monitors CPS to ensure that motorists are assisted as soon as possible. CPS Supervisors coordinate the courtesy patrol function. The CPS Supervisor is responsible for ensuring that patrols provide the required services according to the policies and procedures documented in Section 10 and Appendix B of Schedule 11.

## 7. Categories of Services

KMP courtesy patrols contact and assist law enforcement when necessary and, at their direction, assist with vehicle relocation, accident scene protection, and accident debris clean-up. Courtesy patrol categories of service include five general categories of service:

- Find and assist disabled vehicles on highway shoulders, and when necessary, move the vehicle to an appropriate drop site
- Find and assist disabled vehicles in traffic and move the vehicle to the shoulder or to an appropriate drop site
- Assist motorists, local agencies, and or Emergency Services as requested
- Clear light debris from the roadway
- Communicate data and detail to CTMC

The general duties of each CPS operator are:

- **Emergency response and special events:** Respond to dispatcher requests for traffic-related actions or information. Respond to traffic incidents directed by the dispatcher within 15 minutes of receiving notification. During major events and special events, keep routes clear of debris and disabled vehicles.
- **Incident management:** Communicate with the CTMC to identify details of the incident and sequence of events including location, description of vehicles, injuries, incident response, lane closure details, and property damage. Provide continuous updates on changing conditions. Assist with motorist warnings of backed-up traffic conditions and temporary traffic control. Clear and remove debris and other hazards from travel lanes. Complete daily logs. General protocols for incident response include:



- **Motorist assistance:** Communicate with CTMC to identify the location, description of vehicles, and extent of injuries. Assist with relocating disabled vehicles from travel lanes and shoulders, changing flat tires, jump-starting batteries and providing limited amounts of vehicle fluids including fuel. Provide accommodations including cell phone usage and bottled water.
- **Debris removal:** Remove light debris from highway to facilitate the flow of traffic and promote motorist safety.
- **Communication:** Once the courtesy patrol performs a service, they relay or verify the following information to the CTMC:
  - Type of incident
  - Location of incident
  - Road name
  - Direction
  - Proximity to exit
  - Exit
  - Notified by
  - Contact name
  - Dispatched to
  - CPS activity
  - Zone
  - Anticipated clearance time
  - Lane closures
  - Injuries
  - Hazardous materials
  - Fire
  - Additional services required (including Colorado State Patrol, Rotational Tow, Fire, Ambulance)
  - Vehicle information (make, model, color, tag information)

## CPS Protocols

### Weekdays:

- **Routine Incident:** Courtesy patrol responds, KMP Supervisor is first backup for continuing patrol or taking over incident; backup courtesy patrol vehicles are available for multiple incidents.
- **Major Incident:** Courtesy patrol is initial response, towing may be activated by the KMP dispatcher TMC. KMP dispatches the KMP Supervisor to the scene to assume control, Supervisor responds to scene. Backup courtesy patrol vehicles are available for multiple incidents.

### Weekends:

- **Routine Incident:** Courtesy patrol responds-second patrol takes the entire corridor. If another incident occurs, call out the on-call KMP Supervisor.
- **Major Incident:** Courtesy patrol is initial response-KMP dispatches KMP Supervisor.

We provide information collected from the courtesy patrol the CTMC for analysis. The CTMC informs the Colorado State Patrol and other agencies as required. While on site at active incidents, the courtesy patrol provides ongoing updates to the CTMC Operators. These changes may include lane block patterns, incident severity, additional services required, and duration changes based on information from on-scene incident responders.

With the above information, the CTMC Operators can locate incidents, post messages on the DMS signs, and notify appropriate agencies of the active incident and its ramifications. The courtesy patrol informs the CTMC Operator of their departure and the final status of the incident.

– END OF SECTION –



APPENDIX I

*Relates to Part 5, Volume 2*



# Draft Maintenance Management Plan



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## **SIGNATURE PAGE: APPENDIX I**

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**PROJECT MANAGER**

**DATE**

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**DESIGN-BUILD MANAGER**

**DATE**

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**OPERATING MANAGER**

**DATE**

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**CONSTRUCTION MANAGER**

**DATE**

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**DESIGN MANAGER**

**DATE**



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## ATTACHMENTS

- **Attachment 1:** Baseline Asset Condition Report
- **Attachment 2:** Draft Renewal Work Plan
- **Attachment 3:** Draft O&M Safety Plan
- **Attachment 4:** Draft O&M Quality Management Plan
- **Attachment 5:** JAMMS User Manual
- **Attachment 6:** O&M Limits Drawings
- **Attachment 7:** Schedule 11 Performance Requirements



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## EVALUATION CRITERIA – APPENDIX I, VOLUME 2

KMP has provided a full Evaluation Criteria Matrix to align the requirements of the Maintenance Management Plan per the Project Agreement with the sections of this plan.

Sch. 11 Section	Item	MMP Section	Section Name	Check
5.2.1	<b>The MMP submitted (i) prior to the issuance of NTP2, shall include, at a minimum, the following elements in respect of both the O&amp;M Work During Construction Period and the Operating Period:</b>	<b>2.1</b>	Maintenance Management Plan Contents	<input type="checkbox"/>
5.2.1.a	A complete organizational chart and staffing plan that shows the personnel including the O&M Manager required for all maintenance activities including Routine Maintenance and Renewal Work; Emergencies; inspections; and management. A contact list shall be provided. Personnel qualifications for each position, required training, anticipated work hours, and work locations including personnel training requirements for operating in traffic zones shall be included	<b>3.0</b>	Organizational Chart and Staffing Plan	<input type="checkbox"/>
5.2.1.b	The experience and qualification requirements for personnel to be engaged in all inspection work setting out training that is to be provided for all aspects of inspections including as a minimum specialist inspections (e.g. Cover), routine inspections, and safety related inspections	<b>4.0</b>	Experience and Qualifications for Inspection Personnel	<input type="checkbox"/>
5.2.1.c	Developer's O&M Safety Plan complying with the requirements of <a href="#">Section 5.3</a> of this <a href="#">Schedule 11</a> , including procedures for providing Project-specific safety training for all personnel engaged in maintenance and inspection activities for the Project	<b>5.0</b>	Safety Plan	<input type="checkbox"/>
5.2.1.d	Developer's O&M Quality Management Plan (OMQMP) setting out arrangements for quality management and assurance that complies with the requirements of <a href="#">Section 5.4</a> of this <a href="#">Schedule 11</a>	<b>6.0</b>	O&M Quality Management Plan	<input type="checkbox"/>
5.2.1.e	Drawings, in a size and format that is legible, delineating the O&M Limits During Construction (in the case of the MMP submitted prior to the issuance of NTP2) and the O&M Limits After Construction (in the case of the MMP submitted prior to Substantial Completion) and detailing the limits of infrastructure to be maintained by the Department or by the relevant Local Agency, including the use of photos to illustrate detailed limits	<b>7.0</b>	O&M Drawing Limits	<input type="checkbox"/>
5.2.1.f	Location and layout of maintenance and storage facilities, vehicles and equipment, tools, computers, software and other major assets/items including procedures for ensuring all necessary maintenance equipment and materials are readily available	<b>8.0</b>	Location of Maintenance Facility and Equipment Storage	<input type="checkbox"/>
5.2.1.g	Procedure for communications and coordination with the Department for scheduling repairs and Closures for maintenance, including minimum time period of notification to the Department on scheduled repairs or Closures	<b>9.0</b>	Communication/Coordination with Department for Repairs/Lane Closures	<input type="checkbox"/>

## EVALUATION CRITERIA – APPENDIX I, VOLUME 2

Sch. 11 Section	Item	MMP Section	Section Name	Check
5.2.1.h	Procedure for coordination of activities, including repairs/renewals/replacements and Closures, with other stakeholders having interests within and adjacent to the Project, including Utilities	10.0	Procedure for Coordination of Activities with Other stakeholders	<input type="checkbox"/>
5.2.1.i	Approach to the identification and recording of O&M Defects and their repair including the approach and training of personnel in the correct assignment of “Category 1 – Immediate Action” and “Category 2 – Permanent Repair” O&M Defect status including procedures and scheduled frequency of safety inspections	11.0	Procedures for Responding to Deficiencies in a Timely Manner	<input type="checkbox"/>
5.2.1.j	Procedures for responding in a timely manner to Category 1 Defects and Category 2 Defects	12.0	Procedure for Responding to Category Deficiencies in a Timely Manner	<input type="checkbox"/>
5.2.1.k	Procedures for monitoring and maintaining the condition and performance of the Project to meet the General Requirements, the Performance Requirements and Defect Remedy Periods and updates thereof. Procedures shall include the inspection routines, checklists, frequency for each of the inspection routines, and equipment and tools needed for the inspections. The MMP shall set forth the conditions where the frequency of inspections for a particular asset, component or group of assets may be increased due to the ageing of an asset or increased wear and tear	13.0	Procedure for Monitoring and Maintaining the Condition and Performance	<input type="checkbox"/>
5.2.1.l	Reference to procedures for traffic control and management during periods of Closures, with inclusion or reference to Transportation Management Plan and maintenance of traffic requirements in Section 2 (Maintenance of Traffic) of Schedule 10 (Design and Construction Requirements) in respect of O&M Work During Construction and, in respect of O&M Work After Construction, the same requirements as if they applied to O&M Work After Construction	14.0	Procedures for Traffic Control and Management during Periods of Closure	<input type="checkbox"/>
5.2.1.m	Procedure for investigation and response to complaints or reports of O&M deficiencies or Noncompliance Events received from the Department or other sources	15.0	Procedures for Investigation and Response to Complaints and Deficiencies	<input type="checkbox"/>
5.2.1.n	Work Plans and schedules for undertaking Routine Maintenance activities and Renewal Work during the O&M Period During Construction based on the Baseline Asset Condition Report and during the O&M Period based on routine inspections, which plans and schedules shall include the information required by <a href="#">Section 5.2.2</a> of this <a href="#">Schedule 11</a>	16.0	Work Plans and Schedule for Routine Maintenance Activities and Renewal Work	<input type="checkbox"/>
5.2.1.o	Description of Developer’s approach to life cycle assumptions and Renewal Work and interfaces with the Renewal Work Plan during the O&M Period During Construction based on the Baseline Asset Condition Report and during the Operating Period based on routine inspections	17.0	Approach to Life Cycle Assumptions and Renewal Work	<input type="checkbox"/>
5.2.1.p	Procedure for record keeping according to Developer’s MQMP	18.0	Procedures for Record Keeping According to the OMQMP	<input type="checkbox"/>

## EVALUATION CRITERIA – APPENDIX I, VOLUME 2

Sch. 11 Section	Item	MMP Section	Section Name	Check
5.2.1.q	Procedure for tracking O&M Defects, performance compliance and corrections (repairs, renewal, replacements)	19.0	Procedures for Tracking O&M Deficiencies, Compliance, and Corrections	<input type="checkbox"/>
5.2.1.r	Procedure for maintaining a comprehensive, accurate, and auditable spare parts and inventory level to address the maintenance obligations. This information contained in the inventory shall be compatible with the Maintenance Management Information System (MMIS) as described in this <u>Schedule 11</u>	20.0	Procedures for Maintaining a Spare Parts and Inventory Levels	<input type="checkbox"/>
5.2.1.s	Description of Developer's MMIS and its functionality	21.0	Description of MMIS and its Functionality	<input type="checkbox"/>
5.2.1.t	Details and steps of transition of maintenance activities from the Department or Local Agency necessary to achieve a seamless transition to Developer, and to allow for continuity of service (24 hours per day, seven days per week, and every day of the year) to Users. The details and steps shall outline any phased transition of O&M activities, including anticipated timeline of such phased transition	22.0	Transition of Maintenance from Department to Developer	<input type="checkbox"/>
5.2.1.u	Maintenance and service manuals including detailed technical and servicing descriptions for all Elements assessed as well as software and equipment that is required for the O&M Work. The manual shall include preventative maintenance schedules, testing and diagnostic procedures, trouble-shooting techniques, corrective measures, both temporary and permanent, the location and availability of support services, point to point component wiring schematics and logic signal flows, and assembly and disassembly drawings, including exploded view drawings. Standard service manuals for unmodified commercial products are acceptable for inclusion in the MMP provided that they contain details and accurate information in order to properly service the specific equipment related to the Elements. The manual in relation to the Cover shall comply with the requirements for the TOMIE Manual that is required in accordance with <u>Section 12 of Schedule 10 (Design and Construction Requirements)</u>	23.0	Maintenance and Service Manuals-Per Part F of the ITP Section 2.3.9.a these items are not included in Draft MMP	<input type="checkbox"/>
5.2.1.v	Description of all Elements, including an inventory of facilities, systems and equipment to be maintained by Developer, including a logical system breakdown of all Elements, including facilities, equipment and systems and the levels of maintenance and summary of maintenance tasks to be provided by Developer	24.0	Description of all Elements and Inventory Facilities, Systems, and Equipment Maintained by KMP	<input type="checkbox"/>
5.2.1.w	List of the maintained Elements major systems and equipment manufacturers/vendors, including their contact information (contact person, address, telephone numbers, website address and e-mail address)	25.0	List of Maintained Elements for Major System and Equipment Manufacture/Vendors - Per Part F of the ITP Section 2.3.9.b these items not included in Draft MMP	<input type="checkbox"/>

## EVALUATION CRITERIA – APPENDIX I, VOLUME 2

Sch. 11 Section	Item	MMP Section	Section Name	Check
5.2.1.x	A list of unplanned but anticipated maintenance services for all road Elements	26.0	List of Unplanned but Anticipated Maintenance Services for All Road Elements	<input type="checkbox"/>
5.2.1.y	Repair procedures for repairs that are anticipated	27.0	Repair Procedures for Anticipated Repairs	<input type="checkbox"/>
5.2.1.z	Inclusion or reference to O&M Work activities and details necessary to comply with <u>Schedule 17 (Environmental Requirements)</u> , <u>Section 8 (Drainage)</u> of <u>Schedule 10 (Design and Construction Requirements)</u> , Section 14 (Landscaping and Aesthetics) of Schedule 10 (Design and Construction Requirements) and any other <u>Schedule 10 (Design and Construction Requirements)</u> requirements in relation to O&M	28.0	Activities Necessary to Comply with Other Schedules	<input type="checkbox"/>
5.2.1.aa	Inspection plan and copies of all inspection forms and checklists	29.0	Inspection Plan and Copies of Inspection Forms and Checklists	<input type="checkbox"/>
5.2.1.bb	How best management practices will be applied	30.0	How Best Management Practices will be Applied	<input type="checkbox"/>
5.2.2	Schedules and Associated Plans for Routine Maintenance and Renewal Work	31.0	Schedule	
5.2.2.a	Monthly Routine Maintenance Schedule	31.1	Monthly Routine Maintenance Schedule	<input type="checkbox"/>
5.2.2.b	Annual Routine Maintenance Schedule	31.2	Annual Routine Maintenance Schedule	<input type="checkbox"/>
5.2.2.c	Annual Renewal Work Schedule, which shall be consistent with the Renewal Work Plan	31.3	Annual Renewal Work Schedule	<input type="checkbox"/>
5.2.2.d	Five Year Renewal Work Schedule, which shall be consistent with the Renewal Work Plan	31.4	Five Year Renewal Work Schedule	<input type="checkbox"/>
5.2.3	<b>The MMP shall include the latest versions of:</b>	32.0	MMP Performance Requirements	<input type="checkbox"/>
5.2.3.a	The Performance Requirements in the form most recently Accepted by the Department following the procedure for updates to the Performance and Measurement Tables in accordance with Section 4.2.6 of this Schedule 11, if applicable	32.1	Performance Requirements and Procedures for Updates to Measurement Tables	<input type="checkbox"/>
5.2.3.b	The actual Useful Life for each Renewal Element, which such document shall reflect the Useful Life Baseline Requirements Table in the form most recently Accepted by the Department following the procedure for updates to the Useful Life Baseline Requirements Table as set forth in Section 6.1.4 of this Schedule 11	32.2	Useful Life for Each Renewal Element	<input type="checkbox"/>
5.2.4	<b>The MMP shall append the following :</b>			<input type="checkbox"/>
5.2.4.a	Baseline Asset Condition Report	Attch. 1	Baseline Condition Report	<input type="checkbox"/>

**EVALUATION CRITERIA – APPENDIX I, VOLUME 2**

Sch. 11 Section	Item	MMP Section	Section Name	Check
5.2.4.b	Renewal Work Plan	<b>Attch. 2</b>	Renewal Work Plan	<input type="checkbox"/>
5.2.4.c	O&M Safety Plan	<b>Attch. 3</b>	O&M Safety Plan	<input type="checkbox"/>
5.2.4.d	O&M Quality Management Plan (OMQMP)	<b>Attch. 4</b>	O&M Quality Management Plan	<input type="checkbox"/>
5.3	O&M Safety Plan	<b>Attch. 3</b>	O&M Safety Plan	<input type="checkbox"/>
5.4	O&M Quality Management Plan (OMQMP)	<b>Attch. 4</b>	O&M Quality Management Plan	<input type="checkbox"/>

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# 1. Project Summary

## 1.1 KIEWIT-MERIDIAM PARTNERS CORE VALUES

Kiewit-Meridiam Partners (KMP) is committed to delivering the Central 70 Project (Project) with a focus on client relations, achieving the Project goals, and maintaining transparency with the Department. To achieve these objectives, the KMP Team has adopted the following core values:

### KMP Core Values

Every day we strive to fulfill our role as stewards in our communities—after all, we work in our own backyards.

#### STEWARDSHIP



#### PEOPLE

We are relentless in our ongoing focus that *Nobody Gets Hurt*. We hire bright minds that are hungry for the best training available and committed to Team success.



**KMP's four core values form the cornerstone of our company and the sum of our business ethics conduct. We train on these values so that they are constantly on the minds of our leaders and workforce.**



#### INTEGRITY

We conduct ourselves with the highest levels of integrity. We are responsible, accountable, honest, straightforward, and deal fairly with everyone.



#### EXCELLENCE

We focus on quality production, commit to excellence, and encourage new and innovative ideas. We build our work *Right First Time*.



### 1.2 PLAN MANAGEMENT

This Project summary is presented at the start of each Appendix to serve as a quick reference to our core values, the Project overview, our Team’s composition, and our Key Personnel and Critical Staff. We developed each Appendix to demonstrate our understanding of the Project requirements and facilitate timely Approval by the Department after award.

This document describes KMP’s approach for the Work. KMP resubmits this Plan, including an updated Project summary, to the Department as required per the Project Agreement.

All Project plans, including this document, are stored electronically per KMP’s Document Control System (DCS) Plan. Revisions to these documents may be required as the Project progresses, and annual updates are completed in accordance with Section 4.2 of the Project Management Plan (PMP). The latest revision of all Management Plans are be stored per KMP’s DCS and submitted to the Department through Aconex.

### 1.3 OVERVIEW

The Project is a Public-Private Partnership to design, build, finance, operate, and maintain planned improvements to the I-70 corridor between I-25 and Tower Road.

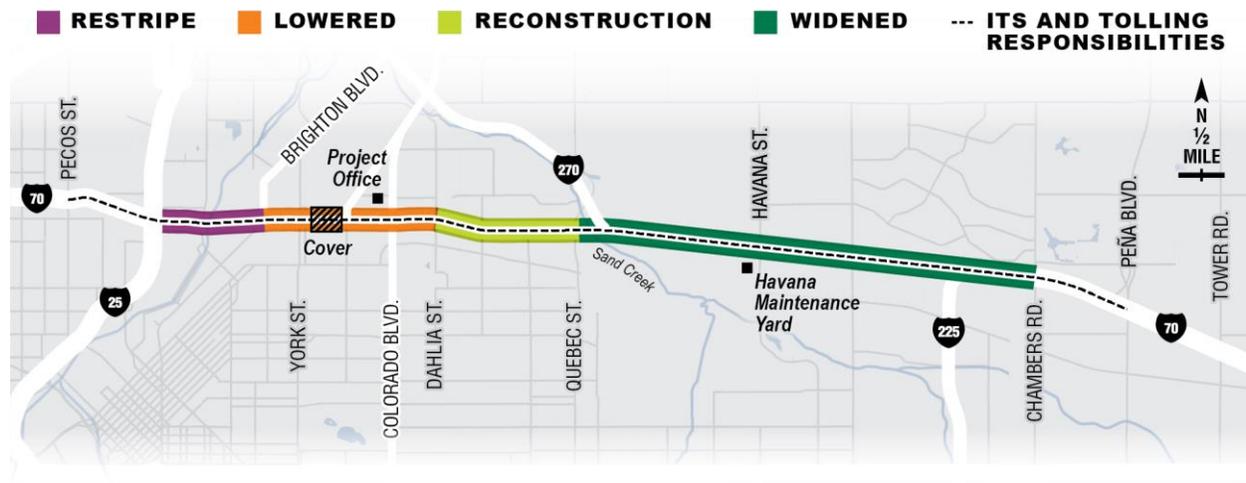
The Project’s scope is broken down into the following timeframes:

#### Project Time Frames

Time Frame	Period	Description	Estimated Duration
Notice of Award to NTP1	Submittals	Plan development, submittals, and mobilization of Quality Management staff	3 months
NTP1 to NTP2	Construction	Financial Close and Design	6 months
NTP2 to Substantial Completion	Construction	Construction and O&M During Construction (other than snow and ice control services)	45 months
Pre-Substantial Completion to Substantial Completion	Transition	Transition from Construction to Operating Period, and O&M submittals	8 months
Substantial Completion to Final Acceptance	Operating	Final submissions and inspections	4 months
Substantial Completion to Expiry Date	Operating	Operations and Maintenance (including Renewal Work)	30 years
NTP3 to Term	Construction, Operating	KMP snow and ice control services	33-34 years
62-68 months prior to Expiry Date	Operating	Handback Inspections, Handback Work, and Department training to facilitate seamless handover at Expiry Date	62-68 months

Improvements made by KMP during the Construction Period, highlighted in the figure, are described below.

### Project Scope



#### 1.3.1 RESTRIPE: I-25 TO BRIGHTON BOULEVARD

Restriping I-70 from I-25 to Brighton Boulevard to accommodate one managed lane in each direction, including:

- Design and Construction for improvements to associated drainage infrastructure

#### 1.3.2 LOWERED: BRIGHTON BOULEVARD TO DAHLIA STREET

Full reconstruction of I-70 between Brighton Boulevard and Dahlia Street, including:

- Removing the viaduct between Brighton Boulevard and Colorado Boulevard, and reconstructing the Interstate below grade to accommodate the Ultimate Project roadway configuration and associated elements
- Adding one managed lane in each direction with supporting infrastructure to accommodate a second managed lane in the Ultimate Project roadway configuration
- Removing and replacing the Interstate structures over Brighton Boulevard
- Constructing the Cover and associated elements over the Interstate between Columbine Street and Clayton Street
- Constructing cross-street structures at York Street, Josephine Street, Columbine Street, Clayton Street, Fillmore Street, Steele Street/Vasquez Boulevard, Cook Street, Monroe Street, and Colorado Boulevard
- Constructing I-70 Mainline structures at Dahlia Street
- Removing one Railroad structure, and Constructing two Railroad structures at Union Pacific Railroad (UPRR) and BNSF Railway (BNSF)

#### 1.3.3 RECONSTRUCTION: DAHLIA STREET TO SAND CREEK

Full reconstruction of I-70 Mainline between Dahlia Street and Sand Creek, including:



- Adding one managed lane in each direction with supporting infrastructure to accommodate a second managed lane in the Ultimate Project roadway configuration
- Removing and replacing Interstate structures over Holly Street, Monaco Street, Denver Rock Island Railroad, and Quebec Street

#### 1.3.4 WIDENED: SAND CREEK TO CHAMBERS ROAD

Widening I-70 from Sand Creek to Chambers Road with associated elements, including:

- Adding one managed lane in each direction with supporting infrastructure to accommodate a second managed lane in the Ultimate Project roadway configuration
- Removing and replacing the I-270 flyover structure to I-70 eastbound
- Removing and replacing Interstate structures over Peoria Street

#### 1.3.5 INTELLIGENT TRANSPORTATION SYSTEMS (ITS) AND TOLLING RESPONSIBILITIES

Additional ITS and tolling responsibilities, including:

- Closed circuit television (CCTV) camera coverage for I-70 corridor, including interchanges between Pecos Street and Airport Boulevard
- Microwave vehicle radar detection between Pecos Street and Tower Road
- Travel time indicators between Pecos Street and Tower Road
- Lane use signals between Pecos Street and Chambers Road
- Dedicated short range communications radios between Pecos Street and Tower Road

#### 1.3.6 OPERATIONS AND MAINTENANCE (O&M) WORK DURING CONSTRUCTION

Operations and maintenance of existing infrastructure within the O&M Limits During Construction as defined by the Project Agreement, including:

- I-70 Mainline and associated infrastructure
- Local Agency infrastructure
- Drainage
- Water quality
- ITS and electronic toll collection facilities
- Utility services
- Traffic signals and lighting
- Railway structures
- Fencing
- Snow and ice control services (following NTP3)

#### 1.3.7 OPERATIONS AND MAINTENANCE WORK DURING THE OPERATING PERIOD

Operations and maintenance of I-70 within the limits defined by Schedule 11 of the Project Agreement for the Operating Period (dashed line in figure above), including:

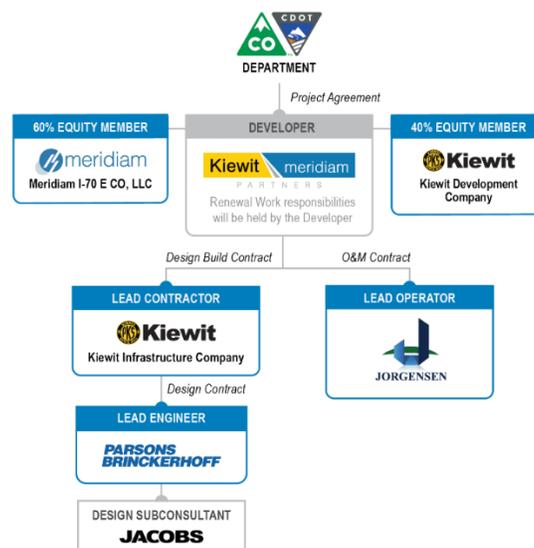
- Providing resources to safely maintain the roadway throughout the Term
- Asset preservation including repair and Renewal
- Snow and ice control services
- Courtesy patrols
- Incident response
- Meet Handback requirements

### 1.4 KIEWIT-MERIDIAM PARTNERS COMPOSITION

KMP organized a streamlined Team to successfully deliver the Central 70 Project. The Core Proposer Team Members of Meridiam, Kiewit, Parsons Brinckerhoff, and Jorgenson are united by a commitment to Project success under a common project management system. KMP’s lean approach has been cultivated from a history of working together, and by our shared cultures of safety, quality, environmental stewardship, and community service. The KMP Team needs no learning curve to start working together, and is positioned to execute on our joint Project delivery commitments from day one.

KMP’s equity members—Meridiam and Kiewit Development Company—formed KMP for the sole purpose of developing this Project. KMP’s Core Proposer Team Members, shown below, include Kiewit Infrastructure Company (KIC) as the Lead Contractor, Roy Jorgensen Associates (Jorgensen) as Lead Operator, and Parsons Brinckerhoff (PB) as Lead Engineer. Our Team is supported by the expertise of subconsultants and subcontractors who possess additional local knowledge and experience, including Jacobs as PB’s main Design subconsultant. KMP is committed to identifying opportunities to maximize the involvement of small and disadvantaged businesses. Throughout the Project, KMP remains the single point of responsibility for meeting all Project Agreement requirements.

KMP co-locates with the Department in both the Project Office and the Colorado Transportation Management Center (CTMC) to foster a collaborative approach that ensures we meet the Department’s Project goals throughout the Project.





## 1.5 KEY PERSONNEL AND CRITICAL STAFF

The table below shows KMP’s Key Personnel overseeing the Project. KMP has also identified positions, and individuals, as Critical Staff who are instrumental in the successful delivery of the Project.

### Key Personnel and Critical Staff

Staff Type	Title	Name	Employed by	Seconded to
KEY PERSONNEL	<b>Project Manager</b>	Chris Hodgkins	Meridiam	KMP
	<b>Design-Build Manager</b>	Tom Howell	KIC	
	<b>Construction Manager</b>	Barry Thoendel	KIC	
	<b>Design Manager</b>	Doug Andrew, PE	PB	
	<b>O&amp;M Manager</b>	Abraham Henningsgaard, PE	Jorgensen	
	<b>Project Quality Manager</b>	Gordon Peterson, PE	KIC	KMP
	<b>Independent Design Quality Manager</b>	James Rozek, PE	PB*	
	<b>Construction Process Control Manager</b>	Sean McAfee	KIC	
	<b>Independent Quality Control Manager</b>	Tracy Martin, PE	KIC*	
	<b>Environmental Manager</b>	Jenn Bradtmueller, PE	KIC	KMP
	<b>Utilities Manager</b>	Kevin Custy	Jacobs	KIC
	<b>Project Communications Manager</b>	Hunter Sydnor	KIC	KMP
	CRITICAL STAFF	<b>Technical Manager</b>	Martin Currie	KDC
<b>Financial Manager</b>		Christopher Couallier	Meridiam	KMP
<b>Safety Manager</b>		Ben Snow	KIC	KMP
<b>Construction Safety Manager</b>		Kenyon Manley	KIC	
<b>Civil Rights Program Manager</b>		Matt Christensen	KIC	
<b>DBE/ESB Program Manager and Outreach Training Manager</b>		Colean Bembry	KIC	
<b>Lead Scheduler</b>		Mauricio Solano	KIC	
<b>Design Integration Manager</b>		Tim Nelson	KIC	
<b>Deputy Design Manager</b>		Mark Talvite, PE	Jacobs	
<b>Cover Design Manager</b>		Heath Therrien, PE	PB	
<b>Commercial Manager</b>		Jamie Harvey, PE	KIC	

*\*Per Approved ATC 9.1 (see Attachment to the Quality Management Plan), KMP shall use in-house personnel in lieu of employees from an Independent Quality Control Firm*

## 2. Introduction

KMP has experienced personnel ready to provide 24-hour Operations and Maintenance (O&M) services to the Project seamlessly from Construction through the end of Term. Project Manager Chris Hodgkins, Technical Manager Martin Currie, and O&M Manager Abraham Henningsgaard are engaged throughout all Project periods, providing the Department with consistent points of contact. This consistency and institutional knowledge provided by our long term vision ensures the highest level of service to the asset users.

During the Construction and Operating Periods, Jorgensen is the Lead Operator for the Project and is supported by the extensive capabilities of the other KMP Team members. Jorgensen is uniquely qualified to serve as the Lead Operator for the Project. The firm currently holds 30 O&M contracts in the US encompassing over 12,000 lane miles, 900 bridges, 350 major interchanges, and other related facilities in multiple states. They provide a proprietary, established, Maintenance Management Information System (MMIS) called the Jorgensen Asset Maintenance Management System (JAMMS) designed specifically for asset management of roadway infrastructure projects. JAMMS is used for Work scheduling, asset reporting, documentation, and compliance monitoring. Kiewit and Jorgensen have collaborated to ensure that JAMMS is fully compatible with InEight Project Suite. This provides Project control consistency through Construction and the Term. Jorgensen has the experience and staffing necessary to successfully serve as the Lead Operator for the Project.

KMP improves efficiency of operations and reduces maintenance costs by using a life cycle approach that integrates maintenance and Handback considerations in every period. The table below shows some of the Design features that reduce maintenance costs.

### Design Features to Increase Maintainability

Design Feature (*ATC)	Maintainability Improvements
<b>Eliminate Sanitary Sewer and Storm Drain Utility Bridges (ATC 11.2 and 12.2)</b>	Improves safety by eliminating maintenance of a utility and bridge over a heavily traveled Interstate highway; eliminates long term groundwater impacts; provides a more durable pavement solution
<b>“Butterfly” typical section through the Lowered Section (ATC 14.2)</b>	Reduces the number of inlets; improves overall safety for maintenance crews and the public
<b>Phenolic fiberglass cable management system (ATC 56)</b>	Alternative to stainless steel with a higher fire resistance with superior long term life cycle performance; more durable material
<b>Eliminated the need for a pump for the Cover Fixed Fire Fighting System (FFFS)</b>	Upgrading a waterline creates sufficient pressure for the Fixed Fire Fighting System; eliminates a mechanical component
<b>Combined parallel drainage systems throughout the corridor</b>	Less pipe to maintain; larger diameter pipes are less likely to clog and easier and safer to inspect
<b>Native Plant Materials</b>	Less likely to need replacement and do not require irrigation with an amended soil



The Maintenance Management Plan (MMP) is KMP's technical approach to managing, implementing, and executing the maintenance necessary to meet the performance requirements of the Project given the existing and future Design Plan. KMP has based this Maintenance Management Plan (MMP) on our understanding of the Central 70 Corridor, the Department, local governments, agencies, and stakeholders, and it includes:

- Planning for reduced accessibility and available land at the Havana Maintenance Yard if the Ultimate configuration occurs during the Operating Period
- Proven communication protocols to best meet the challenges of a large number of local governments, agencies, emergency responders, and stakeholders impacted by the Project
- Priority on operating and maintaining the ITS, ETC, and Cover systems to ensure traffic flows smoothly and safely
- Training necessary to maintain a highly proficient and educated staff

The MMP meets the obligations under Schedule 11 including the performance and measurement criteria in Appendix A-1 and A-2. With this understanding and our expertise, KMP delivers a MMP that provides the organization approach, policies, and procedures to:

- Optimize lane availability and minimize impacts to the traveling public
- Optimize Project life cycle costs
- Meet asset Handback requirements
- Ensure reliable travel speeds in the managed lanes and, for all lanes, the required level of service
- Benefit from a collaborative process
- Protect the safety and health of the workforce and motorists

## **2.1 MAINTENANCE MANAGEMENT PLAN CONTENTS**

KMP's MMP details how we meet the maintenance obligations described in the Project Agreement, and it includes the procedures we use during the Project's Construction and Operating Periods. This MMP encompasses the technical approach and commitments KMP implements to meet the O&M requirements for the Project. The management, implementation, and execution of the Work, unless expressly stated within each section of this manual, is applied both during the Construction and Operating Periods.

The MMP is part of KMP's Project Management Plan (PMP), the umbrella document that includes the managerial approach, strategy, and quality procedures to Design, build, operate, and maintain the Project according to the Project Agreement requirements. Key aspects of our technical approach, designed to achieve performance and Project goals, include:

- Assemble a qualified Team
- Train the Team members to competently perform their jobs
- Proficiently execute the MMP to meet performance objectives
- Monitor MMP performance

- Report on our accomplishments, compliance, progress, challenges, and important Project data
- Improve the MMP performance based on our experience during implementation

The MMP addresses the topics in Section 5.2 of Schedule 11, including the appendices: Baseline Asset Condition Report, Renewal Work Plan, O&M Safety Plan, and O&M Quality Management Plan. KMP submits and obtains Acceptance from the Department for the MMP prior to NTP2 and updates the MMP prior to Substantial Completion. In addition, KMP updates the MMP annually no later than 60 days before the end of each Contract Year. The MMP is also updated with changes as needed.

### 3. Organizational Chart and Staffing Plan

While asset performance service levels vary between the Construction and Operating Periods, the fundamental requirements and expectations do not. To implement an effective and efficient O&M program, consistency in program management and program implementation is critical. Therefore, unless otherwise specifically stated within this MMP, O&M management, practices, performance, and Work execution are uniform between these Project periods.

#### 3.1 ORGANIZATIONAL CHART

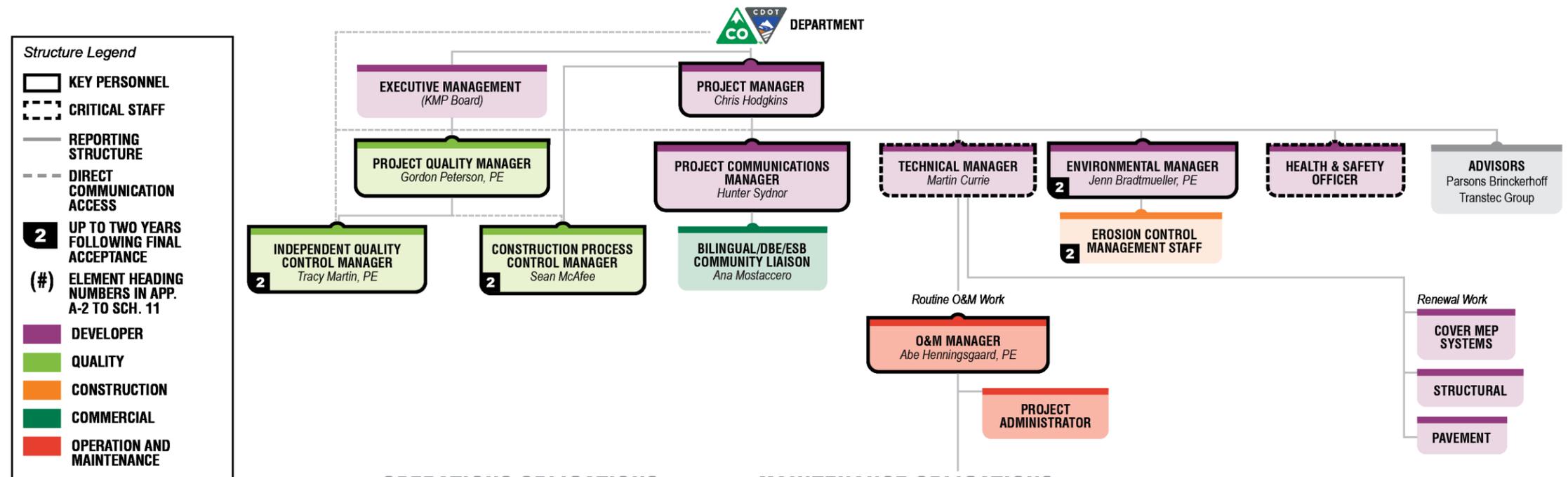
KMP has developed a dynamic, comprehensive organizational structure for the Project. Our organizational structure shown on the next page includes the essential O&M management and execution components, including:

- Routine Maintenance
- Bridge and roadway inspections
- Renewal Work
- Incident response
- Snow and ice control
- Courtesy patrol



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### O&M Organizational Chart



#### OPERATIONS OBLIGATIONS

#### MAINTENANCE OBLIGATIONS



#### TEAM MEMBER ROLES AND RESPONSIBILITIES

**Kiewit meridian PARTNERS** KMP, Developer

- Oversees work of all KMP Team Members
- Provides contractual compliance
- Develops and refines O&M strategies and plans
- Communicates and coordinates with Department, Design, Construction, and O&M Teams
- Interface with third party stakeholders and general public
- Performs Renewal Work through sub-contracts

**Kiewit** KIC, Lead Contractor

- Construction
- Responsible for O&M during construction as a subcontractor to KMP
- Engineer in Responsible Charge

**JORGENSEN** RJA, Lead Operator

- Operations and Routine Maintenance
- Subcontractor to the Lead Contractor during the Construction Period
- Subcontractor to KMP during the Operating Period

**PARSONS BRINCKERHOFF** PB, Lead Engineer, Advisor

- Engineering and design as subcontractor to the Lead Contractor
- Advisor to KMP during the Operating Period
- Undertake bridge, structural, and Specialty Inspections as a subcontractor to the Lead Operator

**THE TRANSTEC GROUP** The Transtec Group, Advisor

- Advisor to KMP during the Construction and Operating Periods
- Life cycle management and forecast overview services for Renewal Work

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## 3.2 STAFFING PLAN

The O&M management staff are skilled leaders with the requisite knowledge and experience to perform and execute the scope of work. The Management Team directs staff proactively, expeditiously solves problems, and fulfills all contractual Work requirements. Below are the roles and responsibilities for the management positions for Routine Maintenance and Renewal Work including responding to emergencies, performing inspections, and managing the Work. We include names, positions, qualifications, and contact information in the MMP submitted prior to the issuance of NTP2. The following information is the staffing plan for management positions. All personnel have the qualifications necessary to perform their position functions.

### 3.2.1 TECHNICAL MANAGER

The Technical Manager, Martin Currie, is responsible for overseeing the O&M Work during the Construction and Operating Period. Martin's experience in Public Private Partnerships (P3) covers 13 years, developing and managing complex infrastructure projects from inception to operations. His background as a building engineer, design manager, and construction manager allows him to quickly understand the various factors that must be considered from Client requirements, construction deliverables, operations, maintenance, lifecycle, investment, and risk.

Martin's responsibilities include:

- Provide continuity from Construction through end of Term
- Report to Project Manager
- Oversee DB Manager, O&M Manager, and Lead Scheduler
- Ensure compliance with the Project Management Plans
- Responsible for managing the O&M Contract with Jorgensen to perform operations and Routine Maintenance
- Oversee Renewal Work
- Manage and oversee the life cycle Work

### 3.2.2 O&M MANAGER

The O&M Manager, Abe Henningsgaard, has the overall responsibility of the O&M program. This includes facilitating the development of the technical approach, implementing and executing the program to meet contract compliances, and ensuring quality of Work. Other key responsibilities include O&M Work planning and scheduling, program budgeting, compliance and program status reporting, and staff and client communications. .

Abe has served as a Maintenance Engineer, Project Manager, and Regional Manager for the past 11 years on large highway infrastructure projects. He has experience in the development and implementation of O&M management systems, and for value engineering and capital budgeting.

The O&M Manager responsibilities include:



- **O&M Planning:** Overall management of maintenance resources including, plans, manual, and systems use to accomplish maintenance as needed for compliance with the Project Agreement
- **O&M Implementation:** Overall responsibility for management and implementation of the Maintenance Work program
- **Budget and Cost Control:** Monitor and maintain preliminary O&M cost estimates and long-range budgeting
- **Scheduling:** Programmatic scheduling of Maintenance Work Plan to establish and execute the routine, periodic, and renewal maintenance activities
- **Project Records and Reporting:** Oversee and manage the development of technical deliverables
- **Communication:** Ensure open and accurate communication with the Department and other stakeholders. Communicate with the Department through the KMP Project Communications Manager to develop customer communication procedures and practices
- **ESB and Local Hire Programs:** Collaborates with the ESB Coordinator for O&M Work to maximize recruitments and utilization efforts. Facilitates local hiring program

The O&M Manager oversees Project customization and implementation of the Maintenance Management Information System (JAMMS) and facilitates effective planning, organizing, directing, and budget control. KMP and Jorgensen have coordinated to confirm that JAMMS interacts seamlessly with InEight Project Suite. This provides the Department with the consistency of a single Project control system. The Department can use the model stored in InEight Project Suite to review the full history of inspections, As-Builts, and other data associated with all Project elements. JAMMS includes:

- Identification of maintenance needs
- Development of system performance standards and quantity standards meeting the Department's standards
- Preparation of periodic Work schedules and crew assignments
- Collection of data on the status of Work
- Review and analysis of planned versus actual progress
- Strategies for resource adjustments based on field inspections and performance indicators
- Generation of periodic maintenance status reports to the Department

### 3.2.3 PROJECT ENGINEER

The Project Engineer assists the O&M Manager and provides technical support and engineering guidance for maintenance practices, materials and heavy equipment, engineering analyses, and system evaluations.

Specific responsibilities include:

- Performs condition assessments to determine compliance with the Department's performance requirements

- Supports preparation of Monthly and Annual Routine Maintenance Schedules and budgets
- Evaluates technology enhancements
- Coordinates with utilities
- Provides quality assurance

#### 3.2.4 OPERATIONS SUPERVISOR

The Operations Supervisor is responsible for the operational activities of the Project including snow and ice control, incident response, and the courtesy patrol. The Operations Supervisor:

- Organizes and directs maintenance crews and subcontractors to respond to accidents and incidents in coordination with the Maintenance Supervisor
- Prepares a weekly 24/7 on-call schedule
- Implements the procedures for all snow and ice events
- Supports traffic operation activities such as detour set up, flagging, and lane closures for Maintenance Work
- Directs courtesy patrol responders to incidents and other unsafe conditions
- Performs quality and consistency reviews on all operations activities

#### 3.2.5 MAINTENANCE SUPERVISOR

The Maintenance Supervisor's primary responsibility is facilitating the execution of the Maintenance Work by coordinating and managing the in-house maintenance crews and subcontractors. The position assists the O&M Manager to ensure that the Annual Work Plans and Periodic Work Schedules of the crews and subcontractors are focused in the proper areas to ensure achievement of the target performance values. Specific responsibilities and tasks include:

- Executing the daily/bi-weekly/monthly plans to achieve target performance goals
- Inspecting Work Sites for safety compliance and Work quality
- Ensuring the quality, quantity, and responsiveness of the subcontractor's Work efforts, and
- Coordinating with other functional managers
- Scheduling and planning work for in-house crews
- Monitoring maintenance crew safety and efficiency
- Identifies equipment needs and specifications and facilitates equipment procurement, including inventory and spare parts
- Verifying compliance with Department safety, quality, and environmental procedures

#### 3.2.6 RENEWAL MANAGER

The Renewal Manager directs and coordinates renewal activities, including the following:

- Ensures Project Renewal Work complies with the Project Agreement
- Develops the detailed Annual and Five-Year Renewal Work Schedules



- Reviews and updates preliminary Renewal Work cost estimates and long-range budgeting
- Coordinates with the Maintenance Supervisor to establish the scheduling system for routine periodic maintenance activities
- Oversees the development of technical deliverables to the Department and other stakeholders.
- Ensures open and accurate communication with other KMP staff and the Department, facilitates transparency, and collaborates with the Project Communications Manager on customer communication procedures.

### 3.2.7 O&M TECHNICIAN FIELD PERSONNEL

O&M technicians are the in-house personnel that perform the scheduled daily Maintenance Work. The table below outlines the experience and qualifications required for technician field personnel. KMP’s Maintenance Technicians, Levels I to IV, align closely with the State of Colorado’s Transportation Maintenance positions, Levels I to III.

#### O&M Technician Field Personnel (Experience and Qualifications)

Position Description	Experience/Job Responsibilities	Qualifications
<b>Position Title: Maintenance Technician IV</b>		
<p>Advanced technical and skilled role and the highest field technician position in our organization. Requires 5-10 years of maintenance/construction experience. Assigned to a skilled crew responsible for increasingly difficult Maintenance Work requiring in-depth knowledge of local standards and specifications.</p>	<ul style="list-style-type: none"> <li>• Set and review productivity goals based on benchmarks from the industry, other KMP projects and past project performance.</li> <li>• Be knowledgeable with various parts of roadway, bridge, drainage structures and other road assets and correct work methods for various activities required to maintain and repair highway infrastructure.</li> <li>• Continuously train maintenance technicians in the most effective work methods and techniques.</li> <li>• Know the current standards and specifications required for each highway infrastructure repair.</li> </ul>	<ul style="list-style-type: none"> <li>• High school diploma or GED required; college preferred, but not required</li> <li>• Speak, read, write and comprehend English</li> <li>• Maintain company standards for background checks (e.g., criminal record, driving record, controlled substance/drug testing)</li> <li>• Knowledge of local driving rules and regulations</li> <li>• Carry out relatively complex arithmetic functions</li> <li>• Ability to use smart phone and applications</li> </ul>

Position Description	Experience/Job Responsibilities	Qualifications
<b>Position Title: Maintenance Technician III</b>		
<p>Advanced technical and skilled role. Likely assigned to a skilled crew responsible for increasingly difficult Maintenance Work requiring knowledge of local standards and specifications.</p>	<ul style="list-style-type: none"> <li>• Be familiar with various parts of roadway, bridge, drainage structures and other road assets and correct work methods for various activities required to maintain and repair highway infrastructure.</li> <li>• Continuously train maintenance technicians in the most effective work methods and techniques.</li> <li>• Know the current standards and specifications required for each highway infrastructure repair.</li> </ul>	<ul style="list-style-type: none"> <li>• High school diploma or GED preferred, but not required</li> <li>• Speak, read, write and comprehend English</li> <li>• Maintain company standards for background checks (e.g., criminal record, driving record, controlled substance/drug testing)</li> <li>• Knowledge of local driving rules and regulations</li> <li>• Carry out simple arithmetic functions</li> <li>• Ability to use smart phone and applications</li> </ul>
<b>Position Title: Maintenance Technician II</b>		
<p>Intermediate level role. Requires minimal previous experience in maintenance. Assignments are routine and repetitive, requiring brief instructions usually involving lifting, carrying, manual loading and unloading.</p>	<ul style="list-style-type: none"> <li>• Perform a variety of general maintenance tasks and follow verbal and written instructions.</li> <li>• Follow instructions and specifications to determine work activities.</li> </ul>	<ul style="list-style-type: none"> <li>• High school diploma or GED preferred, but not required</li> <li>• Speak and comprehend English</li> <li>• Maintain company standards for background checks (e.g., criminal record, driving record, controlled substance/drug testing)</li> <li>• Knowledge of local driving rules and regulations</li> <li>• Carry out simple arithmetic functions</li> <li>• Ability to use smart phone and applications</li> </ul>
<b>Position Title: Maintenance Technician I</b>		
<p>Entry level role. Does not require previous experience in maintenance. Assignments are routine and repetitive, requiring brief instructions usually involving lifting, carrying, manual loading and unloading.</p>	<ul style="list-style-type: none"> <li>• Perform a variety of general maintenance tasks and follow verbal and written instructions.</li> <li>• Follow instructions and specifications to determine work activities.</li> </ul>	<ul style="list-style-type: none"> <li>• High school diploma or GED preferred, but not required</li> <li>• Maintain company standards for background checks (i.e. criminal record, driving record, controlled substance/drug testing)</li> <li>• Knowledge of local driving rules and regulations</li> <li>• Ability to use smart phone and applications</li> </ul>



### 3.2.8 O&M PROJECT SUPPORT PERSONNEL

Staffing includes Project support personnel performing the functions as outlined below:

#### O&M Project Support

Position Description	Responsibilities
<b>O&amp;M Quality Manager</b>	<p>Leads the development and implementation of the O&amp;M Quality Management Plan (OMQMP) to ensure high quality O&amp;M and Renewal Work and to confirm the implementation of a quality assurance system to validate the accuracy and results of the OMQMP. Responsible for reviewing all audits and inspections, and certifying maintenance quality compliance. Additional responsibilities include:</p> <ul style="list-style-type: none"> <li>• Determining how best to prevent QMP nonconformities</li> <li>• Identifying, documenting, and resolving any quality control and quality assurance issues</li> <li>• Tracking performance and identifying corrective actions in JAMMS as necessary</li> </ul>
<b>O&amp;M Safety Manager</b>	<p>Coordinates with the Project Health and Safety Officer on safety aspects of all O&amp;M activities during the Construction and Operating Periods. Oversees traffic safety issues and coordinates with the Maintenance Supervisor and Operations Supervisor to ensure proper procedures for traffic control (MOT) set-ups and traffic control during emergencies and severe weather events. Facilitates Work Site safety for training, equipment operations, drug testing, OSHA and State safety compliance, and MOT certification testing.</p>
<b>Training Manager</b>	<p>Establishes the Project training goals, and develops individual training programs for Project staff. Facilitates key training courses and ensures compliance with certification and training contract requirements</p>
<b>Fleet Management</b>	<p>Coordinates equipment purchases. Monitors equipment health and utilization.</p>
<b>Human Resources</b>	<p>Supports the recruitment of staffing and overall individual employee development.</p>
<b>IT</b>	<p>Implements the technical solution for the Project communication program, including: procurement of IT devices, software management, monitoring, and tracking of utilization</p>

### 3.3 CONTACT LIST

The O&M Project Administrator distributes and maintains contact lists for O&M Work. The contact list is available on the InEight Project Suite for review and download and is made available through Aconex. The contact list provides contact information and phone numbers so that the Department has access to KMP personnel 24/7.

### 3.4 QUALIFICATIONS AND TRAINING

Specific qualifications, certifications, and training are required for all positions. Qualifications are based on the ability to fulfill the roles and responsibilities of the position. We verify all employees have fulfilled these requirements, and maintain records for recertification or retraining scheduling. The table below identifies the Key Personnel positions and additional O&M Project Team qualifications and training criteria.

## Key Personnel Qualifications and Training

Position	Qualifications	Training Certifications	Annual Training/development hours
<b>*O&amp;M Manager</b>	Minimum 10 years of experience on major highway infrastructure projects of similar size and scope of to the Central 70 Project. Experience in the management and development of Project deliverables including O&M technical approach that ensures compliance and quality.	Professional Engineer	Minimum of 30 professional development hours
<b>Project Engineer</b>	5 years of experience in highway maintenance and/or construction industry. Provide field experience to evaluate Project compliance criteria and design functional maintenance programs.	Engineer in training or professional engineer	Minimum of 20 professional development hours
<b>Maintenance Supervisor</b>	Minimum 5 year experience in highway maintenance and/or construction industry	Minimum high school diploma	Minimum of 30 professional development hours
<b>Operations Supervisor</b>	Minimum 5 year experience in highway maintenance and/or construction industry	Minimum high school diploma	Minimum of 30 professional development hours

*\*Denotes a Key Personnel position required by the Project Agreement*

### 3.4.1 TRAINING/QUALIFICATIONS

KMP hires individuals qualified to perform their work functions based on previous work experience, education, training, certifications, and technical skills. Our training ensures that individuals understand their Project-specific Work requirements and to continue to develop their skill levels. O&M staff training begins during the Construction Period, and continues through all Project periods. This is coordinated with the KMP Construction staff to enable joint training/certification activities. Initially, the Lead Operator’s Corporate Training Manager, with the support of the O&M Training Manager, leads this effort. The program includes the training described in the PMP plus these additional categories:

- **Initial Training:** New employee orientation for Project introduction, Project overview video, company policies and procedures and introductory safety training as discussed in the PMP.
- **Environmental Health and Safety (EH&S) Training:** Safety and environmental mitigation training modules designed to educate and train employees in correct safety/environmental practices for their job responsibilities.
- **O&M Maintenance Training:** Job-specific training modules to educate employees in correct processes and procedures for their job responsibilities.
- **Information Technology Training:** Training modules for specific technologies (universal and proprietary) used for O&M Work.
- **Administration Training:** Training for administrators and office positions, including mentorship and support to develop the tools necessary for success in all aspects of their jobs.
- **Management and Supervisor Training:** Training modules for managers and supervisors on leadership techniques and management methodologies.



- **Communication Training:** Training modules for key managers to develop skills for effective communication with clients and employees.

More than 100 specific courses in these seven key training categories are available in the KMP O&M training curriculum. Our most effective training delivery occurs through a combination of classroom training supplemented with On-the-Job Training (OJT). The classroom training teaches fundamentals of specific topics, and OJT develops skills for practical use.

KMP requires all Project personnel to attend orientation and safety courses prior to performing any Work. Topics include Project organization, scope, Project objectives, policies and procedures, communication protocols, reporting requirements, and the requirements and restrictions of the Project Agreement. New employees also receive training in policies and procedures, O&M requirements, work-time reporting, dress codes, and use of KMP resources. Focused training continues throughout the Project Term to increase work efficiencies, personal development, and continuously improve the delivery and execution of the O&M program.

#### 3.4.1.1 Training/Qualifications Updates

KMP uses refresher and update training courses, basic operational practices, and retraining where deemed necessary by management to increase a worker's qualifications to perform their Work function. KMP delivers training for O&M personnel by three methods:

- **Off-the-Shelf Courses:** Self-scheduled, programmed learning courses and scheduled short courses or seminars on specific topics such as ATSSA and OSHA as described in the O&M Safety Plan.
- **Customized Courses:** Developed specifically for O&M activities. Instructed by certified (or otherwise qualified) O&M personnel. We offer these courses in classrooms or offices or in the field.
- **On-the-Job (OJT) Training and Exercises:** Individuals or groups participate in drills and practice job skills in real-time. Qualified O&M personnel direct OJT sessions.

#### 3.4.2 WORKFORCE DEVELOPMENT

KMP is committed to developing new skills, creating jobs, and expanding local hiring programs in the design, construction, and maintenance industry. Because our Team members reside in the Denver metropolitan area, we have a significant presence in the local Denver community. KMP uses this opportunity to train existing and new workers in professional services and skilled crafts throughout the entire Term. KMP has developed a Workforce Development Program that is comprehensive, productive, and engaging for the entire community. See Appendix L, Workforce Development Plan, for a detailed discussion.

### 3.4.3 PROGRESS MEETINGS

Training staff hold regular training update meetings including monthly training calendar reviews and quarterly reviews of training needs and progress to date. This ensures the training for all new employees matches the training for current employees.

### 3.4.4 KMP O&M TRAINING/QUALIFICATION CURRICULUM

The figure below is a training course list for the pre-Operating Period. The training focuses on safety and incident management and is used to ensure the staff have the proper level of qualifications needed for their work function. The training matrix below is not all-inclusive but provides a minimum level of training required for O&M position categories:

**Required Training/Qualification Matrix by Position**

Category	Series	Course	Position	Credit Hrs
<b>Initial Training*</b>	<b>NEO</b>	New Employee Orientation Express (NEO Express)	All	<b>0.5</b>
		New Employee Orientation Live (NEO Live)	All	<b>1.5</b>
<b>Environmental Health &amp; Safety**</b>	<b>HAZMAT</b>	OSHA Global Harmonizing Standard (GHS)	All	<b>1.0</b>
		Hazardous Materials Communications Program HazCOMM	Supervisors	<b>1.0</b>
		HAZMAT Awareness and Spill Response	All field personnel	<b>2.0</b>
	<b>OSHA</b>	OSHA 10-Hour	Crew Leaders/Supervisors	<b>10.0</b>
		Personal Protective Equipment	Field personnel	<b>1.0</b>
	<b>CPR/First Aid</b>	CPR/First Aid	Crew Leaders/Supervisors	<b>4.0</b>
	<b>Environmental</b>	Hot Weather/Cold Weather Safety	Field personnel	<b>2.0</b>
		Working Safely Outdoors	Field personnel	<b>1.0</b>
	<b>Emergency Management</b>	Emergency Action Plan	All	<b>1</b>
		NIMS: ICS100, IS 200	Field personnel	<b>Varies</b>
		NIMS: IS700, IS800 Incident Management	Supervisors	<b>Varies</b>
	<b>Project Safety</b>	<b>Project Safety Overview</b>	<b>All</b>	<b>3.0</b>



Category	Series	Course	Position	Credit Hrs
Operations & Maintenance	MOT	Traffic Incident Management (TIM)	Field personnel	6.0
		Traffic Control Technician (TCT)/Work Zone Traffic Control	Field personnel	8.0
		Traffic Control Supervisor (TCS)	Supervisors	16.0
		Flaggers in the Work Zone	Field personnel	4.0
	Maintenance Activities	Crash Barrier Systems (Trinity, Gibraltar, Gulf Industries)	Crew Leaders/Supervisors	3.0
		Winter Weather Operations	Field personnel	8
	Tools & Equipment Operations	Defensive Driving Small Vehicles	ALL	1.0
		TMA Operations and Safety	Sponsored operators	2.0
		Hand and Power Tools	Field personnel	1.0
	TMC Operations	TMC Operations	Dispatch operators	4
		TMC Communications	Dispatch operators	4
		Incident Report Writing	Dispatch operators	8
	Information Technology	JAMMS	DWR Process	Admin, Crew Leaders, Supervisors
JAMMS Mobile			Admin, Crew Leaders, Supervisors	4.0
JAMMS Desktop			Admin, Supervisors	4.0
Management & Supervision	HR	Corrective Counseling/Write Ups	Admin, Supervisors	2.0
		Employment Law for Supervisors	Admin, Supervisors	1.0
		Human Resources (HR) Basics	Admin, Supervisors	2.0
	TPC	Third Party Claims	Supervisors	2.0
	QMS	Quality Management System Overview	Supervisors	2.0
Leadership	Leadership Basics	KMP ...A Purpose Driven Team	Supervisors	2.0

*\*KMP coordinates the initial training phase for O&M personnel with this training during the Construction Period.*

*\*\*See Appendix M, Environmental Compliance Work Plan, for further discussion on the KMP environmental compliance and mitigation training program (ECMTP) for O&M personnel. See Appendix B, Safety Management Plan (Construction), for further discussion on safety training for O&M personnel.*

In addition to the training courses listed above, the following table identifies an annual training hourly expectation per position type.

### Required Annual Training Hours

Position	Annual Training Hours
<b>O&amp;M Manager</b>	30 hours
<b>Maintenance Project Engineer</b>	30 hours
<b>Maintenance Supervisor</b>	20 hours
<b>Operations Supervisor</b>	20 hours
<b>Technician Level I</b>	20 hours
<b>Technician Level II</b>	30 hours
<b>Technician Level III</b>	30 hours
<b>Technician Level IV</b>	30 hours

#### 3.4.5 CDOT MAINTENANCE TRAINING ACADEMY

The Department formed the Maintenance Training Academy (MTA) in 1999 to provide consistent training throughout the State to standardize operating procedures for the Department’s transportation maintenance workers. Training is available for a variety of general maintenance and specialty jobs (e.g., electricians, welders). The MTA curriculum includes courses in:

- Safety
- Defensive driving
- CPR and first aid
- Equipment inspection and maintenance
- Traffic control
- Storm management
- Environmental/water quality
- National Incident Management System
- Survival skills
- Leadership
- Computer skills
- Drug and alcohol



- Diversity
- Workplace harassment

We recognize this valuable resource and intend to use the MTA to train KMP staff to ensure consistency between KMP and the Department. Therefore, if Approved by the Department, KMP registers at the MTA our O&M employees who will benefit from MTA courses to supplement their KMP training.

Jorgensen places a focused effort and emphasis on training our employees. Our key training managers are certified instructors for national programs including OSHA, and ATSSA. We extend these services to our clients including various DOT's and toll agencies as a value added. Specific examples include providing advanced traffic control training, Basic CPR, safety and hazardous material training encompassing over 1,200 credit hours annually. The Department's transportation workers are also invited to attend KMP's training courses.

### **3.5 WORK HOURS AND WORK LOCATIONS**

Work Schedules vary by workload, client requests, location, and emergency conditions. O&M responsibilities for the Central 70 Project during the Operating Period are 24/7. KMP employees understand the variability of work hours and expectations of a 24/7 operation. The staffing is structured to manage the diverse Work schedules necessary to assist with emergency situations and on-call activities, as well as both daytime and night-time maintenance operations. During the Construction Period, workers are located at the Construction Project Office and Havana Maintenance Yard. During Operations, they are located at the Maintenance Yard. KMP assigns specific employees to the CTMC.

## **4. Experience and Qualifications for Inspection Personnel**

KMP verifies operational and maintenance performance through our inspection program, which includes roadway, bridge and Cover infrastructure assets, signing, striping, lighting, and operational functional activities. The tables below present the experience and qualifications required for bridge and roadway inspection personnel, and maintenance personnel performing safety and other types of inspections. In addition, maintenance personnel also perform safety and other types of inspections. The experience and qualifications for the O&M Technician Field Personnel are discussed in Section 3. All of our inspection personnel meet any applicable Department requirements.

## O&M Bridge and Roadway Field Inspection Personnel (Experience and Qualifications)

Experience/Job Responsibilities	Professional/Academic Qualifications
<b>BRIDGE INSPECTION ENGINEER</b>	
<ul style="list-style-type: none"> <li>• Supports the O&amp;M Manager in fulfilling the requirements of the bridge inspection program</li> <li>• Provides day-to-day management of the bridge inspection teams</li> <li>• Ensures certification for bridge inspection training</li> <li>• Ensures Bridge Inspection Team members maintain training requirements</li> <li>• Plans, schedules and prepares information for the field inspection of bridges</li> <li>• Performs QC/QA reviews of bridge inspection reports</li> <li>• Reviews and approves bridge inspection reports</li> <li>• Signs and processes bridge inspection reports</li> <li>• Assists with special inspections</li> </ul>	<ul style="list-style-type: none"> <li>• Registered Professional Engineer</li> <li>• BSCE minimum</li> <li>• Completed the FHWA Approved bridge inspection training course</li> <li>• Completed 10 years of bridge inspection experience</li> </ul>
<b>BRIDGE INSPECTOR II</b>	
<ul style="list-style-type: none"> <li>• Supports the bridge inspection engineer in fulfilling the requirements of the bridge inspection program</li> <li>• Provides direction to the bridge inspection teams</li> <li>• Plans, schedules and prepares information for the field inspection of bridges</li> <li>• Coordinates with railroad companies for bridge inspections over/under Railroads</li> <li>• Performs bridge inspections</li> <li>• Performs QC reviews of bridge inspection reports</li> <li>• Signs and processes bridge inspection reports</li> <li>• Ensures the general safety of the bridge site</li> <li>• Verifies all safety procedures and the proper use of access equipment are followed</li> </ul>	<ul style="list-style-type: none"> <li>• Registered professional engineer/BSCE</li> <li>• Completed the FHWA Approved bridge inspection training course</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• Completed five years of bridge inspection experience</li> <li>• Completed the FHWA Approved bridge inspection training course</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• Certified as a Level III or IV Bridge Safety Inspector for National Institute for Certification in Engineering Technologies (NICET)</li> <li>• Completed the FHWA Approved bridge inspection training course</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• Completed a bachelor's degree in engineering from an Accreditation Board for Engineering and Technology (ABET) accredited establishment</li> <li>• Completed the National Council of Examiners for Engineering and Surveying (NCEES) fundamentals of the engineering licensing examination</li> <li>• Completed the FHWA Approved bridge inspection training course</li> <li>• Completed two years of bridge inspection experience</li> </ul>



OR

- Completed an associate's degree in engineering from an ABET accredited establishment
- Completed the FHWA Approved bridge inspection training course
- Completed four years of bridge inspection experience

**BRIDGE INSPECTOR I**

- Supports the Bridge Inspector III in fulfilling the requirements of the bridge inspection program
- Provides direction for the bridge inspections
- Plans, schedules and prepares information for the field inspection of bridges
- Performs bridge inspections
- Performs QC reviews of bridge inspection reports
- Signs and processes bridge inspection reports
- Ensures the general safety of the bridge site
- Verifies that all safety procedures and the proper use of access equipment are followed

- Registered professional engineer/BSCE
- Completed the FHWA Approved bridge inspection training course

OR

- Completed five years of bridge inspection experience
- Completed the FHWA Approved bridge inspection training course

OR

- Certified as a Level III or IV Bridge Safety Inspector for National Institute for Certification in Engineering Technologies (NICET)
- Completed the FHWA Approved bridge inspection training course

OR

- Completed a bachelor's degree in engineering from an Accreditation Board for Engineering and Technology (ABET) accredited establishment
- Completed the National Council of Examiners for Engineering and Surveying (NCEES) fundamentals of the engineering licensing examination
- Completed the FHWA Approved bridge inspection training course
- Completed two years of bridge inspection experience

OR have the following qualifications:

- Completed an associate's degree in engineering from an ABET accredited establishment
- Completed the FHWA Approved bridge inspection training course
- Completed four years of bridge inspection experience

## ROADWAY INSPECTION

- Has extensive knowledge on the condition assessment of a wide variety of roadway features (e.g., pavements, drainage appurtenances, safety hardware (e.g., guardrail), traffic appurtenances (e.g., signs, pavement markings)
- Supports the O&M Manager in fulfilling the requirements of the roadway inspection program
- Provides day-to-day management of the roadway inspection teams
- Ensures certification for roadway inspection training
- Ensures Roadway Inspection Team members maintain training requirements
- Plans, schedules and prepares information for the field inspection of roadways
- Performs QC/QA reviews of roadway inspection reports
- Reviews and approves roadway inspection reports
- Signs and processes roadway inspection reports
- Assists with special inspections
- BSCE

## 5. Safety Plan

During the Construction and Operating periods, KMP monitors all O&M activities according to Attachment 3 of Appendix I, the O&M Safety Plan. KMP Work activities fully comply with all occupational safety and health regulatory requirements. KMP follows a multi-dimensional, proven approach to developing and maintaining a safe workplace for all employees and the public. In many cases, our policies and procedures exceed existing regulations.

## 6. O&M Quality Management Plan

To ensure that our O&M Work meets the performance requirements of the Schedule 11, our O&M Team employs a QMP that has four components—self-monitoring, quality control (QC), quality assurance (QA), and management review. Attachment 4 of Appendix I presents KMP's detailed O&M Quality Management Plan (OMQMP) that complies with Section 5.4 of Schedule 11.



## 7. O&M Drawing Limits

The drawings in Attachment 6 of Appendix I present the O&M limits during the Construction Period and the Operating Period. The drawings detail the limits of infrastructure to be maintained by the Department or by the relevant Local Agency. Where necessary, the physical limits are identified Onsite. For interchanges where other agencies are adjacent to the Project right-of-way (ROW), KMP places reflective markers outside the clear zone to delineate Project limits. We identify Mainline limits with signage at the Project's beginning and end.

## 8. Location of Maintenance Facility and Equipment Storage

KMP uses the existing Havana Maintenance Yard for our maintenance facility. The proximity of the Site to the Project limits facilitates cost effective and efficient response times for incidents and special events. The current yard provides ample staging area for KMP's equipment, materials, resources, and personnel. KMP's preliminary analysis estimates that the existing parcel is approximately 6.5 acres, which includes a 140 ft. by 60 ft. material storage building and a 100 ft. by 45 ft. warehouse and office building.

KMP uses the Havana Maintenance Yard in its current configuration until the Ultimate design is constructed. At that time, any necessary upgrades are implemented. If needed throughout the Term, KMP may supplement the existing Havana Maintenance Yard with the Aurora Maintenance Yard until the final Central 70 configuration for the Operating Period is complete. The Aurora Yard includes more than 50 acres located just off the end of the Project Limits at Smith Road and Picadilly Road, just northwest of the I-70/E470 interchange.

During the Construction Period, the Project Office used to house Project management and support functions is separate from the Havana Maintenance Yard. Operations personnel are located at the Project Office, at the CTMC, and at the Havana Maintenance Yard. Staff coordinate through regular communications and meetings. During the Operating Period, O&M staff are located at the Havana Maintenance Yard.

KMP recognizes that the Ultimate Central 70 configuration reduces the usable area and limits access to the Havana Maintenance Yard. We work with the Department during its planning of the Ultimate configuration of the I-70 East corridor to maximize the use of the Havana Maintenance Yard throughout the Operating Period.

We hand back the Havana Maintenance Yard, built around the envisioned improvements, to the Department at the end of the Term. This eliminates the need for the Department to procure storage space, and assists in facilitating a seamless transition of Department staff back to the service provider role. However, if KMP transfers its base to the Aurora Maintenance Yard, the Department may need to procure storage space when it assumes the role of service provider after Handback.

The Ultimate design may reduce the available acreage but still supply sufficient area for equipment and material storage, office space, and a salt dome. The estimated acreage of the existing parcel is approximate 6.5 acres and includes a 140 ft. by 60 ft. salt/sand material storage building and 100 ft. by 45 ft. warehouse and office building. Reduction of the parcel acreage by up to 2/3rds, as anticipated for the Ultimate design, provides enough serviceable space to continue using the location as a maintenance yard. Additionally, the facility is handed back to the Department at the end of the Term, eliminating the Department's need to procure storage space, and allow for seamless transition of Department staff back to the O&M service provider role.

## 9. Communication/Coordination with Department for Repairs/Lane Closures

### 9.1 OBJECTIVES

KMP routinely employs Work zone traffic control applications identical to those defined by the Department's standard O&M activities, capital construction projects, and regular operational needs. The KMP Transportation Management Plan (TMP) in Appendix F includes detailed procedures for traffic control and management during periods of traffic operations restrictions and lane closures. The TMP procedures comply with Schedule 10, Section 2, and include a policy guide and detailed planning to accomplish the MOT program for all Construction and Operating periods. All of our Work activities are coordinated with the Denver Traffic Management Center and the CTMC.

KMP's Design, Construction, and O&M Teams have reviewed the Project corridor and Work activities and collaboratively developed the preliminary MOT. The MOT Team created plans that minimize impacts to local and Department roadways as follows:

- Combining multiple Work activities and events into single closures
- Identifying potentially impacted businesses and major civic events
- Issuing early and definitive notices to the affected parties and general public
- Coordinating with the Denver Traffic Management Center
- Facilitating public media outreach and coordination with CTMC and the Department's Traffic Web Portal ([www.cotrip.org](http://www.cotrip.org))
- Minimizing long term ramp closures
- Limiting major traffic switches
- Reducing neighborhood impacts
- Prioritizing business access and local traffic signing and access



## 9.2 MOT/LANE CLOSURE PROCEDURES

KMP employs proven methods to minimize negative traffic impacts on the public and neighboring businesses. Our MOT Manager reviews the impacts of all proposed temporary MOT applications within the corridor and ensures the MOT complies with the Project Agreement. KMP submits lane closure requests to the Department at least 14 days prior to the requested closure (except in cases of unforeseen emergencies, which require shorter notice).

KMP avoids scheduling closures during Holidays and special events because of the amplified impact on the traveling public. Local and federal Holidays are blackout dates when Department Approvals for lane closures are required. Specific dates include:

### Local and Federal Holidays

Holiday	Day
Labor Day	First Monday in September
Veterans Day	November 11
Thanksgiving Day	Fourth Thursday in November
Day after Thanksgiving	Fourth Friday in November
Christmas Eve Day	December 24
Christmas Day	December 25
New Year's Eve	December 31
New Year's Day	January 1
Martin Luther King, Jr. Day	Third Monday in January
President's Day	Third Monday in February
Memorial Day	Last Monday in May
Independence Day	July 4

KMP avoids traffic operations restrictions during special events such as the National Western Stock Show and Cinco de Mayo.

The KMP Communications Team works closely with the MOT Team to include easy-to-understand, accurate information for distribution in the weekly Lane Closure Reports. We coordinate with the Department to identify report submission frequency and dates through Aconex. We submit reports each Thursday to the list of contacts provided by the Department, and outline activities for the following week (Saturday-Friday), as Schedule 10, Section 2, of the Project Agreement requires. KMP can repackage technical information for social media, presentations, and other external communications, and for updates and traffic alerts. KMP coordinates with the MOT Team to plan road closures in advance by reviewing upcoming road closures at the MOT meetings and confirming entries in the MOT checklist. KMP notifies affected motorists of lane closures as early as possible to allow ample time for alternative route and schedule planning. We post the time, location, and duration of closures on InEight Project Suite, and post information on extended closures on VMS message boards at least one week in advance of the closure.

The MOT Manager monitors and controls the Approval process for closure Work zone requests. KMP uses the following guidelines when considering requests for closures at Work zones:

- **Holiday Hours:** Unless otherwise stipulated, Holiday hours begin at 7 pm the day before the Holiday date, and end at 5 am the day following the Holiday date.
- **Permissions:** Unless the Department or Federal agency directs otherwise, closures for incident management are allowable without exception.
- **Exclusions:** In consultation with the Department, the MOT Manager can permit closures for Work zones if anticipated traffic volumes are significantly less than those during similar non-Holiday periods.

### 9.3 LANE CLOSURE TRACKING

Each scheduled and Approved lane closure is entered as a Work order, and scheduled in JAMMS. Additionally, specific lane closure Traffic Control Plans are attached to the Work order in JAMMS. As the lane closure is performed, the beginning and end time is entered real-time through the mobile application. Lane closure reporting summaries are provided from the JAMMS reports module. The basic process is:

- Service request is entered into JAMMS and a designated Work order is issued the lane closure
- The Work order schedule start date is identified and shows up on the weekly schedule report produced in JAMMS
- The Approved lane closure Traffic Control Plans are attached to the Work order
- Once the lane closure begins a daily Work report is issued out of JAMMS that shows beginning and ending times, and materials, equipment, staff, and resources
- All information is tracked real-time and accessible instantaneously
- A summary of all closures for the previous month are reported in the monthly report, which includes dates and durations

## 10. Procedure for Coordination of Activities with Other Stakeholders

### 10.1 STRATEGIC COMMUNICATIONS PLAN

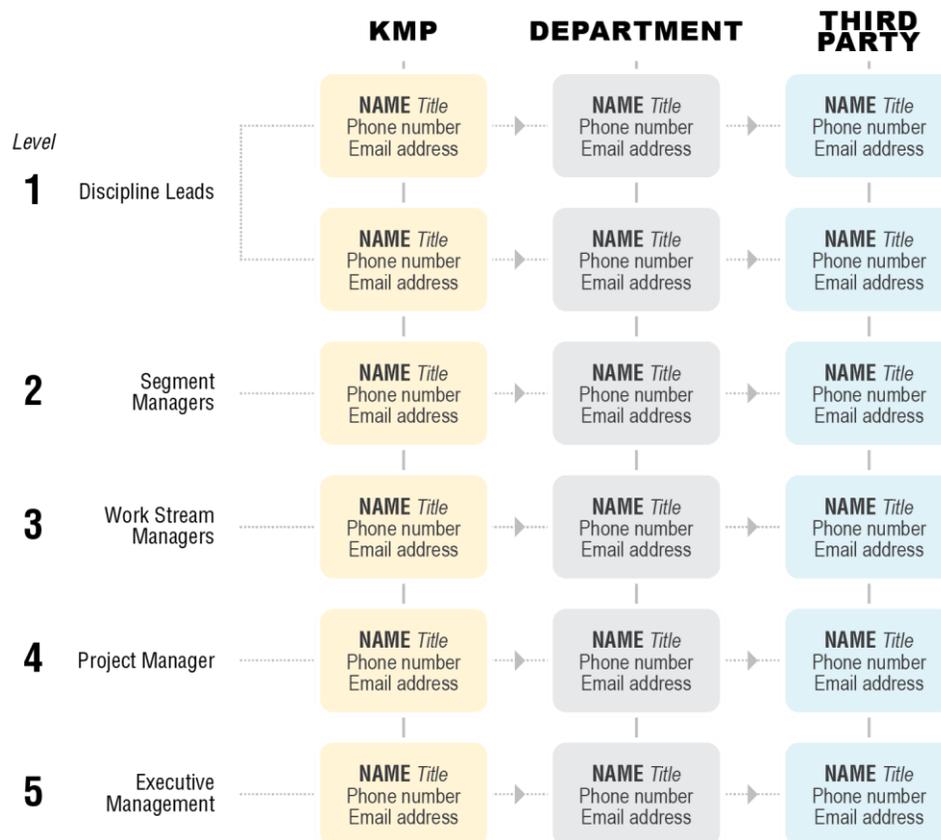
Appendix J, Strategic Communications Plan presents KMP's overall, comprehensive strategy for meeting the requirements of Schedule 14. The plan documents KMP communications strategies and primary stakeholder communication lists, and identifies all Public Information (PI) issues and proposed outreach. The Construction Period Communications Plan (CPCP) also applies to O&M activities during the Construction Period. The Maintenance and Operations Communications Plan (MOCP) is specifically for the Operating Period. The MOCP continues the two-way communication of Project information and dialogue with the Department, other stakeholders, and public started during the Construction Period. The MOCP adapts the CPCP tools for use during the Operating Period to manage the communications process. The KMP Project Communications Manager provides the overall leadership for achieving the Project communication goals and objectives throughout all Project periods.



# APPENDIX I

During the transition between Construction and Operating periods, we update the zipper plan in the Project Management Plan to reflect the Operating Period’s organizational structure. The zipper plan includes the various touch points with the Department, stakeholders and agencies with interests in the Project, including managed lanes. The zipper plan identifies Project Team members and their respective counterparts across the Project organization. This Plan aids in understanding lines of communication by depicting both the vertical and horizontal lines which provides accurate information, effective communication, and aids in solving problems at the best level. The KMP Team has used this Plan on other projects with excellent success.

## Example Zipper Plan



## 10.2 COORDINATION WITH THE DEPARTMENT

KMP maintains open communication and transparency in our O&M program to promote mutual trust, confidence, and information exchange with the Department and other stakeholders of the Project, including managed lane operations. We provide the Department with activity schedules and updates, weekly planning meetings with supervisors, in-house progress meetings, bi-annual partnering meetings, and details on significant operational changes. We notify the Department and other stakeholders and agencies at least two weeks in advance, providing locations, Traffic Control Plans, schedules, and Work descriptions for lane closure requests. We post this information on the InEight Project Suite for easy Department access, and to communicate with the appropriate stakeholders and agencies.

KMP provides the following detailed reports and information to coordinate with the Department:

- Three week Work Schedule updated on a weekly basis and submitted to the Department weekly or accessible through JAMMS at any time
- Three month Work Schedule updated and provided to the Department monthly in Gannt chart format identifying planned cyclical Routine Maintenance Work
- Annual Work Plan

KMP meets with the Department on a regular basis, and as frequently as necessary, to explain planned maintenance activities and lane closure requirements for the upcoming month.

KMP's Project Manager is the direct contact and interface between KMP and the Department for all maintenance-related Project responsibilities. At the discretion of the Project Manager, key O&M staff and maintenance subcontractors are requested to provide additional information and/or attend meetings with the Department.

Maintenance service providers, or other third parties under the authority of KMP, schedule regular coordination meetings with the applicable maintenance stakeholders, the Department, and other local agencies. These coordination meetings optimize the needs of the Project and enhance value added deliverables to the customer.

Information sharing facilitates understanding of compliance requirements and responsibilities, so we provide the Department real-time access to JAMMS for current Project status details on all O&M Work activities. This approach fosters open communication and timely responses from all parties.

### **10.3 COORDINATION WITH OTHER STAKEHOLDERS**

KMP has built strong, positive, relationships with the myriad stakeholders, customers, and other third parties that work on, or are impacted by, the Project. KMP is committed to providing high levels of customer service and developing effective interfaces through the following principles:

- Defined communication channels
- Strong framework for a seamless customer service interface
- Consistency of communications

A preliminary list of stakeholders with which KMP coordinates during the Construction and Operating periods, includes:

- CDOT High-Performance Transportation Enterprise
- CDOT Office of Emergency Management
- CDOT Public Relations
- CDOT Region 1
- CDOT Transportation System Management and Operations (TSM&O)
- City of Aurora
- City and County of Denver
- Colorado Motor Carriers Association
- Colorado State Patrol (CSP)
- Denver Council of Regional Governments (DRCOG)
- Denver Emergency Management
- Denver Fire Department



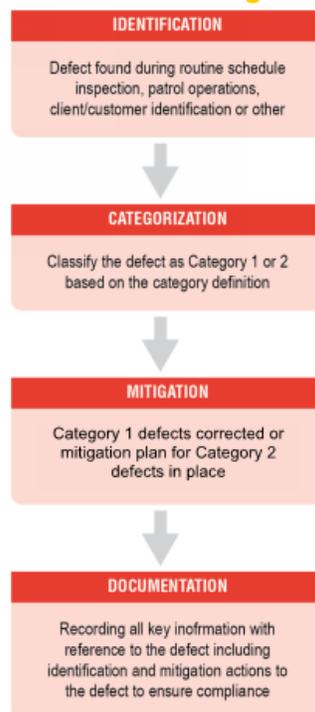
- Denver Police Department (DPD)
- Aurora Fire Department
- Denver Police Department
- National Western Stock Show
- Federal Highway Administration (FHWA)
- Mobility Transportation & Service
- Regional Transportation District (RTD)

In addition to the agencies and stakeholders named above, KMP works closely with the Cover Top Maintainer to ensure a seamless interface between Cover Top O&M Work and our Cover O&M Work. This close coordination includes being an active partner throughout the Term by providing information, recommendations, and as-needed support during the analysis of any proposed changes. Prior to Substantial Completion, KMP provides a Cover Top O&M Manual that outlines the pertinent Cover Design and Construction information, recommended O&M requirements, and recommended procedures and protocols for coordination between the Cover Top Maintainer and KMP.

### 11. Procedures for Responding to Deficiencies in a Timely Manner

Project performance evaluation requires performance measurement criteria. The Department has included these in Appendices A-1 and A-2 in Schedule 11. These criteria are in Attachment 7 of Appendix I. The figure below illustrates KMP’s deficiency identification and management process:

#### Deficiencies Management



KMP categorizes maintenance deficiencies based on the condition of the asset, and determines appropriate maintenance based on category severity. The Department has defined two deficiency categories:

- Category 1—Immediate Action: An immediate or imminent health or safety hazard to patrons or staff
- Category 2—Permanent Repair: Any other deficiency not falling under Category 1; KMP monitors Category 2 deficiencies to prevent degradation.

KMP trains our O&M staff in the correct practices and methodologies of asset inspection, including the identification of deficiencies based on the performance requirement in Appendices A-1 and A-2 of Schedule 11. Our staff identifies operational deficiencies with two programs—systems notification and inspections. Courtesy patrols can identify safety-related deficiencies (asset damages, debris, pavement failures) effectively. The inspection program identifies in detail the asset conditions and their anticipated deterioration rates. The figure below illustrates this process:



JAMMS manages and tracks the compliance times associated with found deficiencies. Once a deficiency is identified and entered into JAMMS, the Work priority and compliance time is assigned based on the requirements of Table A-1 and A-2. As part of the KMP scheduling process, we prioritize deficiencies in the weekly schedule to ensure we meet the compliance deadline. In addition, JAMMS has an alert function to automatically issue email alerts of pending deadlines so deficiency remedy time frames are met. A compliance report is also accessible in JAMMS to confirm and verify compliance.

## 12. Procedure for Responding to Category Deficiencies

Repair priorities for deficiencies vary. KMP meets the response times and remedies established in Appendices A-1 and A-2 of Schedule 11. Our repairs meet all applicable Department standards, specifications, and maintenance practices. Individual records, including start and end dates, engineering documentation (if required), labor, equipment and material usage, and photographic documentation for deficiencies and mitigation actions, are included in JAMMS.



## 13. Procedure for Monitoring and Maintaining the Condition and Performance

### 13.1 STANDARDS FOR PERFORMANCE COMPLIANCE

In addition to the performance criteria in Appendices A-1 and A-2 of Schedule 11, KMP follows Department, AASHTO, FHWA, and other relevant manuals, specifications, and standards to ensure quality O&M management and performance on the Project. We use current versions of the documents provided in Section 1.1.5.b of Schedule 11.

From the commencement of the Construction Period to the conclusion of the Operating Period, KMP verifies maintenance performance through our inspection, monitoring, and quality program as described in Attachment 4 in Appendix I, the O&M Quality Management Plan. We record and track information in JAMMS as discussed in Section 21.

### 13.2 INSPECTION PROCEDURES AND FREQUENCIES

#### 13.2.1 OBJECTIVES

The major goal of the inspection program is to determine the condition of all Project assets and to reflect the findings in the Annual Routine Maintenance Schedule and the Annual Renewal Work Schedule. We developed the Inspection Plan based on the Final Design with the objectives to:

- Verify the continuing safety for users
- Prioritize Category 1 deficiencies requiring immediate and urgent attention if the potential to create a danger to users exists
- Identify Category 2 deficiencies for repair
- Respond to reports or complaints received from customer groups
- Respond to incidents and emergencies affecting the facility
- Monitor the effects of extreme weather conditions
- Collect data to monitor performance of the Project assets and to establish priorities for future O&M Work

#### 13.2.2 SUMMARY OF INSPECTION PROGRAM

The figure below shows details for specific inspections.

## Inspection Program

Element Reference	Element	Inspection/Measurement Method	Frequency	Documentation/ Verification
<b>1.</b>	<b>PAVEMENT</b>			
1.1	Obstruction and Debris	Visual inspection	Daily patrol	JAMMS
1.2	Smoothness/Skid Resistance	Visual inspection; IRI; Skid Resistance Testing	Daily patrol and annual IRI/skid testing	JAMMS
1.5	Hard Capped Surface	Visual Inspection	Daily patrol and annual condition inspection	JAMMS
<b>2.</b>	<b>DRAINAGE SYSTEMS</b>			
2.1	Storm Sewer Systems	Visual inspection following heavy rain	Daily patrol & annual condition inspection.	JAMMS
2.1	Storm Sewer Systems	CDOT Level of Service Manual (Drainage Inlets and Structure	As specified in the manual	JAMMS
2.2	Open Water Carriers	CDOT Level of Service Manual (Drainage Inlets and Structure	As specified in the manual	JAMMS
2.2	Open Water Carriers	Visual inspection following heavy rain and cyclical inspection for function	Daily patrol & annual condition inspection.	JAMMS
2.3	Pavement Drainage	Visual inspection of water on surface	Daily patrol	JAMMS
2.4	Culverts	Visual inspection following heavy rain and cyclical inspection for function	Daily patrol & annual condition inspection.	JAMMS
2.5	End Treatments	Cyclical inspection for structure and function	Daily patrol & annual condition inspection.	JAMMS
<b>3.</b>	<b>STRUCTURES</b>			
3.1 to 3.5	Structures (and Structure Components) Meeting FHWA Definition of a "Bridge." Includes Cover. Also, non-bridge class culverts	Inspection and assessment in accordance with the NBIS requirements, the Department's. PONTIS Bridge Inspection Guide, and the <i>FHWA Bridge Inspector's Reference Manual</i> .	Biennial inspection or more frequent based on structure inspection requirements	NBI Report Stored in JAMMS
3.6	Retaining walls	Visual inspection & cyclical inspection for function	Daily patrol & annual condition inspection.	JAMMS



Element Reference	Element	Inspection/Measurement Method	Frequency	Documentation/ Verification
3.8	Sign Structures	CDOT Recording and Coding <i>Guide for the Inventory and Inspection of Colorado's Overhead Signs, Signals and High Mast Lights</i> , and CDOT M&S Standard Plans.	Per CDOT Guide	JAMMS
3.9	Load Rating	<i>AASHTO Manual for Bridge Evaluation</i> , the current version of the <i>CDOT Pontis Bridge Inspection Coding</i> , and <i>CDOT Bridge Rating Manual</i>	Per Manual	JAMMS
<b>4.</b>	<b>ROADWAY MARKING</b>			
4.1	Pavement Markings	Nighttime visual inspection at 300 ft with low beams. ASTM/AASHTO retro-reflectometer standard	Daily patrol & annual retroreflectivity inspection	JAMMS
4.2	Reflective Markers	Night time visual inspection	Daily patrol & annual condition inspection	JAMMS
<b>5.</b>	<b>GUARD RAILS, BARRIERS, IMPACT ATTENUATORS</b>			
5.1	Guard rails and barrier walls	Visual inspection and cyclical inspection for structure and function	Daily patrol & bi-annual condition inspection	JAMMS
5.2	Impact Attenuators	Visual inspection and cyclical inspection for structure and function	Daily patrol & bi-annual condition inspection	JAMMS
<b>6.</b>	<b>SIGNS</b>			
6.1	General—All Sign Panels	Visual inspection at 300 ft with low beams. Retro-reflectivity based on MUTCD requirements	Daily patrol & annual condition inspection	JAMMS
6.2	Safety Critical Signs	Visual inspection and cyclical inspection for structure and function	Daily patrol & annual condition inspection	JAMMS
7.	TRAFFIC SIGNALS	a) General condition visual inspection b) Damage visual inspection c) Structural soundness visual inspection	Daily patrol & weekly outage check	JAMMS and report provided to CCD and Department
8.	LIGHTING	a) Mainline lights operable based on night time inspection b) Mainline lights out of action based on night time inspection	Daily patrol & weekly outage check & annual condition inspection	JAMMS and notification to Xcel and Department

Element Reference	Element	Inspection/Measurement Method	Frequency	Documentation/ Verification
9.	FENCES AND WALLS	Visual Inspection Structural assessment if visual inspection warrants	Daily patrol & annual condition inspection	JAMMS
10.	<b>ROADSIDE</b>			
10.1	Vegetated Areas— Except Landscaped Areas—General	a) Urban areas: Visual inspection of height of grass and weeds b) Encroachment: Visual inspection of encroachment of vegetation c) Sight lines: Visual inspection	Daily patrol and quarterly inspection	JAMMS
10.2	Landscaped Areas	Visual inspection	Daily patrol and annual inspection	JAMMS
11.	<b>EARTHWORKS &amp; EMBANKMENTS</b>	Visual inspection by geotechnical specialist (for failures) and further tests as recommended by the specialist	Daily patrol & annual condition inspection	JAMMS
12.	<b>GRAFFITI</b>	Visual inspection	Daily patrol inspection	JAMMS
13.	<b>INCIDENT RESPONSE</b>	See Attachment 2 of Appendix H	Ongoing Courtesy patrol	JAMMS
14.	<b>MAINTENANCE YARD</b>	Visual Inspection	Daily monitoring and weekly Site inspection	JAMMS
15.	<b>SNOW AND ICE REMOVAL</b>	See Attachment 1 of Appendix H	As required	JAMMS
16.	<b>COURTESY PATROL</b>	See Attachment 3 of Appendix H	See Attachment 3 of Appendix H	JAMMS
17.	<b>SWEEPING AND CLEANING</b>	Visual inspection	Daily patrol	JAMMS
18.	<b>COVER</b>	Visual inspection and National Tunnel Inspection Standards, Highway and Rail Transit Tunnel Maintenance and Rehabilitation Manual, and the Tunnel, Operations, Maintenance, Inspection, Evaluation (TOMIE) Manual and the Specifications for the National Tunnel Inventory (SNTI)	Daily patrol and inspection per SNTI	JAMMS
19.	<b>ITS AND ETC FACILITIES</b>	Visual inspection	Daily patrol	JAMMS



As stipulated in Appendices A-1 and A-2 of Schedule 11, and as reflected in KMP's Inspection Program table above, compliance for several of the performance elements is based on standardized testing methods. KMP has extensive experience in using, interpreting, and responding to the testing results. The following provides a discussion on two of these methods.

As stipulated in Appendices A-1 and A-2 of Schedule 11, and as reflected in KMP's Inspection Program table above, compliance for several of the performance elements is based on standardized testing methods. The following provides a list of the major Project elements from Appendix A-2 in Schedule 11 that are subject to standard testing methods:

- **Element 1.2 Pavement:** International Roughness Index for ride quality, measurement of pavement edge drop-off, Standard Test Method for Skid Resistance, and pavement noise as measured by AASHTO TP 76
- **Element 2.1 Storm Sewer Systems:** Rate condition according to *CDOT Level of Service Manual* and measurement of several deficiencies (e.g., settlement, cracking, spalling)
- **Element 3 Structures:** Measurements as required by the *National Bridge Inspection Standards*, *CDOT Pontis Bridge Inspection Coding Guide*, and FHWA/AASHTO Inspection Manuals (e.g., foundation settlement, rotational movement of girders)
- **Element 3.9 Load Ratings:** Ratings according to the *AASHTO Manual for Bridge Evaluation*
- **Element 4.1 Pavement Markings:** Retro-reflectivity according to AASHTO TP111
- **Element 6 Signs:** Retro-reflectivity according to the MUTCD
- **Element 10.1 Vegetated Areas:** Measurement of height of grass and weeds
- **Element 15.3 (Snow) Plowing Material Application:** All units operating as measured by AVL monitoring systems (Note: AVL measurements also apply to several additional Snow and Ice Removal sub-elements)
- **Element 16.1 Courtesy Patrol:** Measured according to AVL system
- **Element 18 Cover:** Measurements of many sub-elements based on the *National Tunnel Inspection Standards*, TOMIE, and Specifications for the National Tunnel Inventory; testing of electrical and communication systems based on NFPA 72, NFPA 110/111, and NFPA 780

KMP has extensive experience in using, interpreting, and responding to the measurement and testing results. With the final MMP we incorporate detailed information for the inspections for each element. The following provides a discussion on two of these methods.

### 13.2.3 INTERNATIONAL ROUGHNESS INDEX

Schedule 11, Appendix A-2, Table Reference 1.2.b includes evaluation requirements for ride quality. The measurement selected for this is the International Roughness Index (IRI), which is the most commonly used metric for this purpose. The IRI calculation is standardized by ASTM E 1926.

IRI is calculated from an elevation profile of the pavement surface. This is most commonly measured with an inertial profiler, consisting of a laser height sensor coupled to an inertial reference plane derived from measurements of both horizontal distance and vertical acceleration. Appendix A-2 includes the specific technical requirements for the inertial profiler equipment to be used. Three standards are cited:

- AASHTO M 328, “Standard Specification for Inertial Profiler”
- AASHTO R 56, “Standard Practice for Certification of Inertial Profiling Systems”
- AASHTO R 57, “Standard Practice for Operating Inertial Profiling Systems”

The Central 70 Project is divided into 0.1-mile increments in conformance with Appendix A-2 requirements. IRI is calculated for each of these increments and compared to the performance targets. Localized roughness is also evaluated with a 25-ft. continuous moving average. We use the latest version of the ProVAL software to conduct these analyses.

#### 13.2.4 SIGN RETRO-REFLECTIVITY

Signs are essential to communicating regulatory, warning, and guidance information both day and night, however, their retro-reflectivity degrades as the signs age in the field. The Manual on Uniform Traffic Control Devices (MUTCD) requires agencies maintain traffic signs to a minimum level of retro-reflectivity as specified in MUTCD Table 2A-3.

As signs degrade and become less retroreflective, their effectiveness in communicating regulatory, warning, and guidance messages to drivers at nighttime diminishes, decreasing safety. To maintain effectiveness, we inspect signs periodically to determine their effectiveness before they reach the end of their useful retroreflective life.

##### 13.2.4.1 Retro-Reflectivity Maintenance Methods

The MUTCD summarizes five methods to maintain traffic sign retro-reflectivity at or above the minimum levels. Depending on a variety of factors, KMP uses a combination of these methods as determined on individual O&M projects:

- **Nighttime Visual Inspection:** Sign retro-reflectivity is assessed by a trained sign inspector following a formal visual inspection procedure from a moving vehicle at night. Signs with retro-reflectivity below the minimum levels are scheduled for maintenance or replacement.
- **Measured Sign Retro-reflectivity:** Sign retro-reflectivity is measured using a retro-reflectometer. Signs with retro-reflectivity below the minimum levels are scheduled for maintenance or replacement.
- **Expected Sign Life:** The installation date is labeled or recorded when a sign is installed, so that its age is known. The expected sign life is based on the experience of sign retro-reflectivity degradation in a geographic area. We schedule signs older than their expected life for maintenance or replacement.
- **Blanket Replacement:** All signs in an area/corridor or of a given type are replaced at specified intervals. This eliminates the need to assess retro-reflectivity or track the life of individual signs. The replacement interval is based on the expected sign life for the shortest-life material used in the area/corridor or on a given sign type.

- **Control Signs:** The performance of a sample set of signs is used to guide replacement. The control signs are monitored to determine the end of retroreflective life for the associated signs. All signs represented by a specific set of control signs should be replaced before the retro-reflectivity levels of the control signs reach the minimum retro-reflectivity levels.

Because the signs installed on the Project are new at time of installation, we plan to assess sign retro-reflectivity at an interval of two years.

### 13.2.4.2 Retro-Reflectivity Most Commonly Used Assessment Methods

#### Nighttime Visual Inspections

The visual inspection technique uses trained personnel to observe traffic signs during the nighttime to assess the overall appearance of a sign and determine if it meets the required minimum retro-reflectivity level. The observation is typically done through the windshield of the vehicle at, or near, the speed limit of the roadway.

The key to this method is having trained inspectors. One way to train the inspectors is to have them observe sample signs at a variety of known retro-reflectivity levels before conducting the inspections. Training helps facilitate an inspector's ability to discern sign retro-reflectivity levels that are at the minimum levels prior to conducting actual inspections.

For nighttime visual inspection, we use low-beam headlamps as the source of illumination for the signs. As our vehicle approaches the sign, the sign's overall appearance in terms of brightness and legibility is assessed. The sign is given a rating of good, fair, or poor under the following criteria:

- **Good:** visible at night with low beams at night all no more than 95% of the panel material is defective or obscured
- **Fair:** Visible at night with low beams no more than 85% of the face panel material is defective or obscured
- **Poor:** Sign message is not readable at night with low beams or sign panel material is defective or obscured

Signs rated as poor scheduled for replacement as soon as possible.

#### Measured Sign Retro-reflectivity

In this method, the retro-reflectivity of a sign is measured with a handheld or mobile retro-reflectometer and directly compared to the minimum level appropriate for that sign. ASTM E1709, Standard Test Method for Measurement of Retroreflective Signs Using a Portable Retro-reflectometer provides the standard method for measuring sign retro-reflectivity. If the measured sign retro-reflectivity value is less than the appropriate level in MUTCD Table 2A-3, the sign should be replaced.

In general, there are two ways that sign retro-reflectivity can be measured in the field: with handheld contact instruments or with non-contact instruments. Contact instruments require the measurement device to be in physical contact with the sign surface. Non-contact instruments, which measure the retro-reflectivity from a distance, include both a handheld device and vehicle-based systems. There are several commercially available handheld retro-reflectometers that can be used to measure sign retro-reflectivity.

## 14. Procedures for Traffic Control and Management During Periods of Closure

KMP often uses Work zone traffic control for standard O&M activities, capital construction projects, and regular operational needs. The Transportation Management Plan includes detailed procedures for traffic control and management during periods of lane closure. The procedures comply with Schedule 10, Section 2. KMP updates the Transportation Management Plan as Work progresses from the Construction Period to the Operating Period. Also, see Section 9 of Appendix I for more discussion on lane closures.

## 15. Procedures for Investigation and Response to Complaints or Deficiencies

KMP maintains a 24/7 customer call line. During regular office hours, the Project Administrator routes calls directly to the Project Office for disposition by the appropriate staff. We report and track all customer requests we receive in JAMMS and summarize in detail requests and resolutions for the Department through Aconex. The Department can access the real-time call tracking data through InEight Project Suite. JAMMS can also sort reports based on location, date, and activity. Each log entry includes the customer name, contact information, time and date of request, and all resolution activities. The procedure for collecting and tracking includes:

- Immediate JAMMS entry for all phone, email, or in-person customer contacts
- Prioritization based on severity and immediacy
- Scheduled response based on priority level
- Progress and resolution follow ups to the customer
- Activity time stamped and maintained for future review

The Department can access InEight Project Suite at any time to review the logs and the Client Accomplishment Report by Maintenance Area. Reports are also automatically sent to the Department through Aconex at predetermined times. The following is an example of the Customer Service Request Log:



# CENTRAL

## Example Customer Service Request Log Entries

Project in (I-595 Express) AND SR.Received Date >= 01/01/2015 AND SR.Received Date <= 12/31/2015

Call Time and Date Information	Source Name / Phone	Nature of Complaint	Zone / Seg / Route / Facility / Location	Date Closed
SR # 161628 ROADWAY Call Received: 1/6/2015 9:28:00 AM Depart to Scene: Arrived: 24Hr Call Req'd Y 1/6/2015 9:36:00 A 09:36 Compl Call Req'd Y 1/6/2015 12:33	SR Status: CLOSED Req. By: Mr. Elliot Phone: (954)553-1151 Source: CLIENT	Assess the area reported to us with debris left behind from the homeless camp	MM 86080550 WB SR84 Lat Begin / End Long Begin / End	1/6/2015 11:00:00 AM
Field Notes Verify Notes WO # 400241 WO Stage COMPLETED Job Supervisor SV Date WO Completed: 1/6/2015 11:00:00 AM				
DWR Nbr Work Date Crew Ldr Work Performed 693869 01/06/2015 SV assessed area and pickup debris around area				
SR # 161814 ROADWAY Call Received: 1/8/2015 7:48:00 AM Depart to Scene: Arrived: 24Hr Call Req'd Y 1/8/2015 8:28:00 A 08:28 Compl Call Req'd Y 1/8/2015 12:42	SR Status: CLOSED Req. By: Kelley Hall Phone: (954)777-4205 Source: CLIENT	Inspect bridge access hatches to ensure they are properly closed and lock	7 - Zone 7 595 I-595 Lat Begin / End Long Begin / End	1/8/2015 12:30:00 PM
Field Notes Verify Notes WO # 400520 WO Stage COMPLETED Job Supervisor SRC Date WO Completed: 1/8/2015 12:30:00 PM				
DWR Nbr Work Date Crew Ldr Work Performed 694373 01/08/2015 SV confirmed that the access hatches on Bridges 860476 and 860477 were properly closed and locked.				
SR # 162143 ROADWAY Call Received: 1/14/2015 9:58:00 AM Depart to Scene: Arrived: 24Hr Call Req'd N Compl Call Req'd Y 1/15/2015 05:36	SR Status: CLOSED Req. By: Natalie Vallina Phone: (954)513-3200 Source: CLIENT	Check All underpasses on I-595	All 595 I-595 Lat Begin / End Long Begin / End	1/14/2015 5:13:00 PM
Field Notes Verify Notes FROM I-95 TO NEW RIVER BRIDGE EAST / WEST BOUND CENTER MEDIAN				
01/14/15- Rcv'd an email regarding debris at the underpasses on I-595. Sent out the crews to check this. 01/15/15- Sent an e-mail back to Natalie informing her that this had been taken care of.				

KMP is committed to strong customer service and satisfaction, and promotes this as part of our corporate culture. KMP staff is well trained and empowered to resolve service requests quickly and fairly. To ensure effective customer service, KMP has established open communication with stakeholders, travelers, and the O&M Team. We promote positive relationships with the leaders and residents of surrounding communities, and hold meetings with special interest groups and citizen representatives. We clearly define customer service roles and responsibilities. Key elements for our customer service process include:

- Management commitment
- Clear explanations of the Work
- Project staff accessibility
- Prompt and courteous responses
- Personalized response whenever possible
- Simple, clear customer communications
- Objectivity and flexibility in determining proper resolutions
- Uniform, consistent, and accessible documentation

See Appendix J, Strategic Communications Plan for a detailed discussion on this topic.

## 15.1 CUSTOMER SERVICE RESOLUTION

KMP records and tracks all customer service requests in JAMMS daily. As part of our Weekly Scheduling Meeting we review the customer service log with supervisors and identify any problems regarding scheduled responses, mitigation requirements, or customer satisfaction.

KMP's customer service resolution principles include these concepts:

- Customer service requests are any Project issue not meeting the customer's needs, requirements, or expectations
- Customers include the residents living along the Project ROW, the corridor's travelers, and stakeholders affected by the highway's maintenance
- KMP staff is well trained and empowered to respond quickly to inquiries and service requests
- We handle all service requests professionally and courteously
- We handle requests as expeditiously as possible
- We track each service request in JAMMS and summarize them for Department review
- We promptly follow up with customers regarding service resolutions
- KMP is committed to customer service and successful request resolutions—our management reviews, and improves, related processes on an ongoing basis
- Effective customer service communication and coordination are priorities
- The staff who are assigned customer service and response roles are accessible and capable of effectively resolving service requests
- We consider all Team members to be a part of our overall customer service program

## 15.2 RESPONSE PROCEDURES

We staff the Project Office from 7:00 AM to 4:00 PM, Monday through Friday, and maintain a dedicated phone number for customer service requests 24/7. A designated staff member receives after-hours calls and begins the appropriate response based on the request's priority level. Staff will:

- Note the call's time, caller name, address, and phone number, and the location and nature of the request in the Customer Service Log database.
- Call the customer within 24 hours with status and pending action updates if the request cannot be resolved immediately.
- Assign a number and a priority level (emergency, urgent, or routine) to the request based on the nature of the complaint.
- Forward telephone requests both verbally, and in writing, to the appropriate supervisor for investigation and resolution. The supervisor reviews the request, visits the Site if necessary, and begins appropriate actions.
- Establish a follow-up schedule for requests unresolvable within one Working Day. Relay follow-up schedule to the customer and note in the Customer Service Log.
- Add the final resolution date to the Customer Service Log.

We summarize the Customer Service Log for management review monthly, and the full log is available for Department review.



## 16. Work Plans and Schedule for Routine Maintenance Activities and Renewal Work

This section discusses the maintenance activities and preventative maintenance methods in KMP’s proactive asset preservation model—this applies to both the Construction Period and the Operating Period. The Baseline Condition Asset Report provides the foundation for this Work for the Construction Period and routine cyclical asset specific inspections during the Operating Period.

There are three Stages of development inputs, analysis, and outputs that generate a comprehensive Work plan. The following is a list of steps enlisted in developing the Central 70 Project Work Plan.

1. Work plan inputs: How the Work needs are generated
  - a. OM contractual requirements
    - i. Asset specific Inspections: Inspection performed to verify the asset condition and define asset Work needs
    - ii. Specified cyclic activities: Contract-required cyclical Work activities
  - b. Project specific inputs: Work needs generated by Project specific needs
    - i. Client driven: Expectation of the client in the performance of specific Work activities
    - ii. Customer driven: Customer specific requests
  - c. Work backlog: Work identified by the continuous evaluation of asset condition
    - i. Asset inspection
    - ii. Condition assessments
  - d. Establish a baseline: Estimated Work needs based on Work history experience
    - i. Historical annual accomplishments of similar type projects
2. Analysis: Review and assessment of the inputs to detail the Work program
  - a. Define what activities generate most of the Work
  - b. Identify individual Work activities and breakdown frequency and volume of individual Work activity.
  - c. Execution of the Work activity analysis and risk allocation
    - i. In-house analysis to define the following resource needs: man-hours, equipment/materials, and production rates.
    - ii. subcontractors analysis to define: unit cost/activity, production rate, and associated risk of outsourcing
3. Outputs: Generated from the Work plan and its execution
  - a. Annual Work Schedule

- b. Detailed Monthly Work Schedule (OC and Project input) by location of Work , schedule, Work quantities, resource levels (personnel, material, and equipment)
- c. Production rates to identify Work efficiencies
- d. Reconciliation of proposed Work plan against performed Work plan including: planned vs actual accomplishments, planned vs actual costs, schedule, planned vs personnel use

Each Work activity generates its own detailed Work plan that is revised and updated based on results of the inspection and the age of the asset. The following is an example of individual activity Work plan analysis.

### Example Activity Work Program Development Debris Removal

Obstruction and Debris Removal Work Program-Daily							
Limits	Centerline Miles	Passes *estimate	Approx. Total Miles	Estimated # Cycles/Periods	Extended Total Miles (Annually)	Cycle Duration *measured in hours	Resource Type
<i>I25 to Brighton Blvd</i>	1.10	1	1.10	250	275.00	0.37	INH: Maintenance Patrol Unit
<i>Brighton Blvd to Chambers</i>	8.40	1	8.40	250	2100.00	2.80	INH: Maintenance Patrol Unit
<i>Chambers to Tower Road</i>	1.45	2	2.90	250	725.00	0.97	INH: Maintenance Patrol Unit
<b>Total Man Hours</b>						<b>4.13</b>	

### Example Activity Work Program Development Mowing

Vegetated Areas- (Mowing Work Program)							
Limits	Centerline Miles	Approx. Total Acres	Estimated # Cycles/Periods	Cycle Months	Cycle Duration (25 acre/day)	Extended Total Acres (Annually)	Resource Type
<i>I25 to Brighton Blvd</i>	1.10	35.41	2	April Aug Dec	1.5	70.82	In-house Crew
<i>Brighton Blvd to Chambers</i>	8.40	271.00	3	April Aug Dec	11	813.00	In-house Crew
<i>Chambers to Tower Road</i>	1.45	82.92	2	April Aug Dec	3.32	165.84	In-house Crew
Total Acres		389.33			375.8		



We perform this detailed Work programming process for each needed activity and generate the comprehensive Work plan and Schedule. This process is implemented prior to start of Construction, and continues throughout Construction into the Operating Period, with revision as needed to adjust for baseline asset conditions, asset inspection finding, and programmed renewal activities.

The following sections identifies additional detailed of the generating Work programs. Including types of activities and associated methods.

## 16.1 PROCEDURES FOR THE PERFORMANCE OF THE PRINCIPAL MAINTENANCE DURING OPERATING PERIOD

KMP has used the element categories in Appendix A-2 of Schedule 11 to organize Project assets. The following subsections discuss selected Maintenance Work performed on system assets to ensure asset performance compliance. The attached Routine Maintenance Schedule shows the types of maintenance and timing.

### 16.1.1 PAVEMENT

This section briefly discusses Routine Maintenance activities for managing obstructions and debris on the travel lanes and addressing pavement deficiencies.

#### 16.1.1.1 Obstructions and Debris

Remediation activities for obstructions and debris are typically quick and require little supplemental equipment or specialty support. Courtesy patrols and maintenance crews monitor the Project daily.

The courtesy patrols swiftly remove debris and road kill to avoid hazards on the travel lanes and shoulders. We use MOT traffic control when necessary.

#### 16.1.1.2 Pavement

This section discusses routine pavement Work to repair pavement deficiencies. The measures help ensure pavement meets the performance criteria. This approach uses a systematic method for determining O&M Work plans for pavement. We have organized the plan first by location—shoulder, Mainline, or ramp—and second by pavement type.

Potential deficiencies include depressions, pavement shoving, concrete spalls, rumble strip damage, poor joint sealant, potholes, and edge raveling. The repair measures described below apply to both asphalt and concrete pavement.

- **Low Shoulder Maintenance:** Heavy equipment operation performed by O&M technicians. The technicians use motor graders, dump trucks, bobcats, and backhoes as needed to add fill to restore shoulder elevations to the performance criteria. Technicians survey the Site as necessary to verify compliance. We install erosion control measures such as sod or seed to preserve the roadside stability in vegetated areas.

- **High Shoulder Maintenance:** Similar procedures and equipment as for Low Shoulder Maintenance. Technicians correct high shoulders by removing excessive materials and re-establishing grade and drainage paths. When possible, any material removed to correct high shoulders is added to correct low shoulders.

O&M field staff monitors Mainline pavement conditions for pavement deficiencies. We perform all Routine Maintenance on the pavement; significant pavement repairs are part of the Renewal Work. Routine pavement maintenance includes:

- **Pothole Repairs:** Includes using cold patch asphalt from the Department's material producer list or plant-Approved products to fill potholes and drop-offs. Courtesy patrols monitor their respective routes to ensure timely emergency repair completion, within the specifications of the asset performance criteria and the emergency repair guidelines.
- **Skim Patching/Minor Mill and Overlays:** Used for small areas, usually less than 100 sq. ft., by experienced operators using rollers, packers, milling attachments, and supplemental equipment when necessary.
- **Crack Sealing/Crumb Rubber Sealing/Spray Patching:** Specialty O&M subcontractors use asphaltic tar or crumb rubber sealant techniques in deficient areas. Typically used in the spring or summer.
- **Incident Damage:** Specialty subcontractors repair pavement damage caused by traffic accidents, fuel fire, and hazardous liquids.

KMP uses routine pavement maintenance to eliminate punch-outs, corner breaks, spalls, excessive cracking, and misalignments. Trained technicians complete minor repairs and, similar to flexible pavement significant repairs. Maintenance crews and subcontractors complete the following pavement maintenance activities:

- **Emergency Spall Repairs:** Routine Maintenance crews use cold patch asphalt to fill potholes and drop-offs. We use cyclic seasonal mobile operations for asphalt patching.
- **Permanent Spall Partial and Full-Depth Repairs:** Both in-house crews and subcontractors complete partial depth and full-depth concrete repairs. These typically require lane closures and require cleaning the spalled areas and reinforcing steel, new concrete, and surface finishing. We complete partial depth repairs, as needed, throughout the year.
- **Crack Sealing:** Concrete crack sealing measures are the preferred preventative technique for avoiding full depth slab repairs. We complete these measures during the spring and summer to reduce premature slab failures due to storm water and debris infiltration into sub-base surfaces.
- **Pressure Grouting:** Functionally depressed pavement slabs often result from failures in the base course and are corrected with pressure grouting techniques.



- **Asphalt Pavement Potholes and Rigid Pavement Patching (CRC punch-outs):** Routinely repaired by our courtesy patrols and full time in-house equipment crews as part of their daily Work assignment. Immediate response capabilities include patches of 0.25 tons or less.
- **Broken Rigid Concrete:** Equipment crews make temporary repairs, which typically include asphalt or fast-cure rigid concrete. Permanent repairs, either partial depth or full depth, are used with MOT when necessary.

### 16.1.2 DRAINAGE SYSTEMS

The Project's proximity to major water features and the intensity of area rainfalls necessitates an effective drainage system to accommodate potential water loads. Peak loads must flow smoothly with minimal flooding. We discuss our sweeping maintenance procedures to clear the system are discussed in Section 16.1.17 "Sweeping and Cleaning."

#### 16.1.2.1 Drainage Structures and Barrier Wall Inlets

A wide range of preventative measures is included in the routine and preventative maintenance Work plan. The methods described below are effective countermeasures.

- **Spot Aquatic Herbicide Applications:** Herbicide applications effectively reduce invasive species and nuisance vegetation. When appropriate, O&M crews apply herbicides with surfactant and dye to drainage components.
- **Manual Ingress/Egress Clean-outs:** Maintenance crews perform routine preventative maintenance on drainages structures, including manually clearing debris, vegetation, sedimentation, and other accumulations from the inlet and outlets of drainage structures. In many cases, these simple manual methods allow the drainage system to flow as intended.

We inspect existing drainage features on the roadway for maintenance needs and repair as needed to ensure proper function. Possible repairs include:

- **Pipe Desilting/Pressure Blasting/Vac-con Operations:** Piping systems with excessive build-up and sedimentation require non-destructive hydro-blasting and vac-con desilting.
- **Concrete Repairs:** We repair infiltrations, joint damage, and minor deficiencies with concrete joint collars, using simple excavation when necessary. Third party accidents and vehicular traffic are common causes of damage to concrete structures, box inlets, drop inlets, curbs, and gutters.
- **Pump Station:** We periodically inspect and maintain the pump station for operational efficiency.

The Project includes the Cover and the pump stations keep the roadway clear from flooding during rain. KMP has developed a maintenance schedule and list of spare parts necessary for the operation of the pumps.

Because major storm events are infrequent, we have developed a comprehensive preventative maintenance program to ensure that pump stations function properly when needed. We use instruments such as hour meters, and number-of-start meters on each pump to help schedule maintenance. The pump station Design includes ladders, stairwells, and other access points to facilitate use by maintenance personnel.

If pump stations are classified as a confined space, access requirements and any safety equipment are all defined by Occupational Safety and Health Administration (OSHA) standards. We design pump stations to be secure from entry by unauthorized personnel and to have as few windows as possible.

### 16.1.3 STRUCTURES

Routine structure maintenance is essential to preserving the facility and protecting the traveling public. In conjunction with the Federal Highway Administration National Bridge Inventory (FHWA NBI) biennial inspections, the O&M Work Plan includes a proactive process to avoid significant structural deficiencies. All bridges and culverts with a centerline length of 20 ft. or more are a NBIS defined structure with a deck, superstructure, and substructure components. The Project also includes overhead sign structures and Dynamic Message Signs (DMS) units. These structures also require specific maintenance programs.

KMP performs Routine Maintenance for bridge deck, superstructure, and substructure components and culverts. The most critical goal of the program is to reduce structural deficiencies and failures. The O&M bridge maintenance program has three categories—preventative maintenance, periodic maintenance, and other Routine Maintenance. Preventative maintenance reduces the deterioration of the components and increases lifespan. Periodic maintenance includes repairs for components with significant deterioration that are no longer functioning as designed. We typically use additional maintenance activities to correct structural impacts due to unforeseen events.

#### 16.1.3.1 Routine Preventative Maintenance

Key maintenance tasks to ensure that structures comply with NBIS and key performance and asset standards include:

- **Mechanical Sweeping on Bridges:** Extensive mechanical sweeping operations are a first step in keeping bridge drainage structures clear of debris, and are essential for achieving asset performance criteria. We schedule mechanical sweeping during off-peak hours (typically at night) as a mobile maintenance operation. Mobile vacuum sweepers remove debris, and MOT trucks with attenuators protect the mobile operation. Debris is disposed according to Approved methods. We sweep roadway features bordering drainage structures, barrier walls, bridge abutments, curb edges, traffic islands, and medians in these operations.

- **Herbicide on Bridges:** We use herbicide applications in bridge and structure maintenance, and focus applications on slope pavement joints, substructure joints, drainage canals, and other locations where spot application can be effective.
- **Joint Cleaning:** Water and debris accumulation in the seam, preventing the joint from compressing properly, is a common cause of joint deficiencies. This accelerates deterioration of the joint material, causing it to become ineffective and leading to additional deficiencies (such as spalling) in surrounding concrete. Preventing premature joint failure includes a two-part approach: 1) reducing the amount of debris threatening the joint using mechanical sweeping, and 2) removing the debris already in the joint using pressure washing or compressed air.
- **Pressure Washing Structure Components:** Debris accumulation in superstructures and substructures can also lead to premature component failures; bridge seats and bearings are most vulnerable. Our maintenance program is also a two-part process: 1) control vegetation with herbicide, and 2) use pressure washing or compressed air to remove existing buildup.
- **Manual Drainage Cleaning:** Effective drainage to clear corrosive chemicals and standing water from bridges helps protect both travelers and bridge components. Routine Maintenance Work includes a variety of manual cleaning tasks on drains, scuppers, inlets, and other drainage features linked to the structure.
- **Sign Maintenance:** Maintenance crews clean sign panels to ensure visibility and message readability.

### 16.1.3.2 Emergency Maintenance Methods

We address damage from severe weather events with these procedures:

- **Identification:** Identify the damage and dispatch responder(s)
- **Mobilization:** Mobilize maintenance crews, specialty bridge contractors, emergency bridge inspectors, and Bridge Engineering Design firm (if needed)
- **Corrective Measures:** Secure the Site and mitigate potential hazards to motorists, clear debris field, and begin repairs
- **Post Assessment and QC:** Review to confirm that the repair is safe and secure

### 16.1.4 ROADWAY MARKINGS

System striping materials include thermoplastic and preformed tape. Reflective pavement markings help delineate safe traffic lanes and offer good retro-reflectivity in darkness. Object markers and delineators also offer better visibility of potential hazards.

The maintenance of roadway markings along the Central 70 Corridor facility is a challenge, especially during the winter months. Poor markings often elicit public complaints. Therefore, KMP places priority on meeting the performance criteria for roadway markings.

- **Long Line Striping:** These are usually thermoplastic applications for asphalt pavement and pre-formed tape for rigid pavement and bridges (paint striping is adequate for severe deficiencies or fast response.) We assess long line or Mainline striping effectiveness annually. We repair mechanically or chemically damaged striping as necessary.
- **Ramp Striping, Words, Symbols, and Gore/Bridge Hatching:** Equipment for thermoplastic, paint, and preformed tape applications are available. We typically schedule these applications two to three times annually and focus on ramps, gore areas, and bridge approaches. Crews perform symbol installations (8 in. to 24 in.), arrows and messages, and standard (less than 4 in.) solid and skip line maintenance.

We use a variety of delineator systems on the Central 70 Project including barrier wall delineators, vertical-adhered, and u-channel mounted reflectors. Most delineators are located at the interchanges, horizontal curves, bridges, and entrance/exit ramp gores (with the exception of barrier-wall bridge delineators). Maintenance crews carry a full inventory of the systems and replace damaged and poorly reflective delineators as needed.

Maintenance crews service barrier wall delineators, using epoxy systems for anchoring. Drainage, bridge, and other hazard object markers typically offer good reflectivity, but often become bent and incur damaged posts. During Routine Maintenance, O&M Teams correct object marker, delineator, and attenuator deficiencies.

#### 16.1.5 GUARDRAILS, BARRIERS AND IMPACT ATTENUATORS

Timely guardrail and attenuator repairs are critical to ensure the safety of the motoring public, but the variety of materials needed for each system, plus the changing specifications, can present challenges. Repaired safety appurtenances must meet the current specifications for crash worthiness based on the *AASHTO Manual for Assessing Safety Hardware (MASH)* to ensure safety. We maintain adequate inventories at the Havana Maintenance Yard and explicit directions on the proper repair of safety appurtenances. Our regular repair measures for guardrail maintenance include:

- **Blocks:** Deficiencies identified in this process include loose blocks, excessive cracking, wear/breakage, misalignments, and deterioration. Remedies include block replacements (steel, block, and poly), re-alignments, and hardware tightening.
- **Posts:** Deficiencies include misalignments, excessive cracking/wear/breakage, deterioration, and spacing. Remedies include post replacements (steel, concrete, wood), re-alignments, and hardware tightening.
- **Rail:** Deficiencies include improper splicing, third party damages, improper rail types, misalignments, and improper height (requiring post adjustments). Remedies include rail replacements and re-alignments.
- **Hardware:** Deficiencies include improperly installed hardware and linkages. Remedies include tightening and replacement.
- **Reflectors:** Deficiencies include poor reflectivity and cracked or missing reflectors. Remedy is usually cleaning or replacement.

Meeting the exact specifications during installation is critical. Many systems, including ET 2000, SRT 350, and Flared Energy Absorbing Terminal (FLEAT), use proprietary components. Common deficiencies include mismatched parts, loose cables, loose hardware, incorrect spacing, incorrect breakaway post systems, and height installation issues. Correcting these systems is usually an extensive effort requiring the re-installation of individual components.

### 16.1.6 SIGNS

Maintenance technicians follow the technical plan for maintenance of both small and large signs. Sign work trucks are equipped with high intensity strobe beacons, pole racks, and power invertors for equipment operations.

We train Courtesy Patrols in minor regulatory sign maintenance, and they supplement the sign crews. Daily patrols and maintenance crews help determine sign maintenance needs using:

- Annual sign inspections to review sign structures for hardware, panel, and post deficiencies
- Annual retro-reflectivity inspections to review panels for compliance and to identify cleaning and replacement needs
- Daily programs to identify leaning, missing, or defaced signs
- Reports to identify signs damaged in traffic accidents
- Third party reports

In-house technicians perform these inspections using bucket trucks. Lane closures or mobile operations with traffic mounted attenuator devices may be required, depending on the location and type of deficiency, to ensure safety during maintenance.

KMP assigns crews to ensure the timely completion of maintenance deficiencies on traffic signs and delineation systems:

- **Regulatory Signs:** We stock maintenance trucks with key red signs (and related hardware and tools) including ‘stop’, ‘do-not-enter’, ‘yield,’ and ‘wrong-way.’ Traffic crews repair downed signs within hours of discovery, and their efforts are continuous. Other *Manual on Uniform Traffic Control Devices (MUTCD)* regulatory signs, such as speed limits and ‘no parking,’ are in the panel inventories located at the Havana Maintenance Yard.
- **Warning Signs/Guide Signs/Other:** Through measures similar to those for performance on regulatory signs, we repair all other signs on the system. Crews carry solvents for panel cleaning, removal of graffiti, and removal of stickers and decals.
- **Graffiti Removal:** For signs vandalized with graffiti, maintenance includes washing, chemical removal, and panel replacement.
- **Overhead Panel Replacements:** Maintenance crews overlay and replace panels to correct excessive cracking of reflective sheeting and poor reflectivity.

- **Structural Members Maintenance:** We routinely inspect structural members for damage, excessive corrosion, failing welds, loose hardware, and un-safe conditions. We address damage from third party incidents or major weather events as soon as possible.

Courtesy Patrols, supervisors, and maintenance crews identify damaged and out-of-specification signs and enter them into the repair program. Active mobility, good equipment, and properly equipped trucks enable sign crew efficiency. We prioritize repairs for downed/damaged regulatory signs. Large sign and small sign maintenance require different work methods and equipment. Large multi-post signs are assembled in indoor shops and installed Onsite. Sign maintenance program effectiveness depends on expedited panel and material procurement. Hundreds of sign types with a wide range of hardware, bases, poles, panels, and installation configurations are available. Work trucks also carry a large variety of components needed to ensure quick response and efficient installation. Regulatory signs are ready to install quickly, with wind beams pre-assembled.

#### 16.1.7 TRAFFIC SIGNALS

Signal maintenance includes identifying and understanding the scope of Signal Work required on the Project. Knowing the locations and characteristic load control centers for every system is critical to properly diagnose and maintain the system's operability, because it enables technicians to maximize pre-planning diagnostics and maintenance schedules prior to arriving on Site.

The typical process for identifying necessary Maintenance Work includes several components. O&M supervisors and crew leaders run scheduled routes to identify deficiencies and outages and enter these into the Routine Maintenance repair cycles. Traffic incidents, customer requests, and third parties can help identify deficiencies.

Maintenance activities for traffic signal assets include:

- **Signal Poles:** Crews perform maintenance from shoulders and emergency lanes during peak and non-peak hours with high reach bucket trucks. Routine repairs include lamp changes, fuse changes, and downed-pole signal structures.
- **Circuitry Diagnostics:** Diagnostics include individual and main circuit evaluation performed at the load center.
- **Extreme Weather Event Preparation:** The Department may require the lowering of high masts. Electricians and other technicians participate in annual training exercises to ensure effective response to storms.

Necessary equipment resources include:

- Bucket trucks, high and low reach
- Truck mounted attenuators for mobile repair operations
- Underground utility locators for utility location reports and circuit diagnostics
- Utility work trucks with power invertors for compact mobile maintenance needs



### 16.1.8 LIGHTING

Xcel Energy maintains all the electrical and operational features of all lighting structures.

### 16.1.9 FENCES AND WALLS

Proactive maintenance Work plans for fences and barrier walls include preventative measures for reducing vegetative growth in joints, removing drainage obstructions, and crack sealing measures. Additional Routine Maintenance Work is required for excessively cracked or damaged wall sections and, in some instances, involves new concrete installations.

Maintenance associated with fences includes:

- **Routine Repairs:** Routine fence maintenance includes re-splicing or replacing sections of damaged or deteriorated fence fabric, resetting footings, and realigning fence posts. The daily patrol, maintenance crews, and third parties identify these deficiencies. We secure the area and perform initial mitigation and Routine Maintenance.
- **Terrestrial Herbicide Application:** Invasive species and weeds can affect the base of fence fabric. Eradicating them is critical and the preventative maintenance plan includes herbicides.
- **Accident Damage Repair:** Traffic accidents can easily damage chain link fences within the ROW. Fence post replacement, post foot replacement, and fence fabric re-splicing are typical repairs.

Concrete barrier wall maintenance includes:

- **Mechanical Sweeping:** Debris accumulation affects drainage structures and drop inlets, and impedes storm water run-off. Accumulated debris also leads to nuisance vegetation. The maintenance plan includes frequent mechanical sweeping to remove accumulations. KMP ensures all sweeping activities comply with the Denver Regional Council of Governments (DRCOG) PM-10 air quality requirements. We accomplish this by 1) using sweepers to remove sand and grit as soon as possible, 2) reducing air-borne dust during operations through equipment selection, and 3) cleaning and replacing air filters as required.
- **Terrestrial Herbicide Application:** Invasive species and weeds can proliferate in barrier wall joints, impede surface runoff, and harm the integrity of the structure and joint. Preventative maintenance includes herbicide application.
- **Concrete Joint and Structure Repairs:** In isolated incidents (for example, when a third party causes damage), crews mitigate the Site and install steel tie-ins, form and pouring new structures, and installing new joints as needed. Preventative measures for crack failures and misalignments include joint sealing and partial concrete patches.
- **Drainage Inlet Cleaning:** Barrier wall drainage inlets require periodic cleaning. Maintenance measures include surface debris removal by the courtesy patrol. Specialty subcontractors clear inlets with measures such as Vac-con for pipe de-silting and hydroblasting.

Routine Maintenance for walls includes:

- **Graffiti Removal:** Hydro-blasting, solvents, power washing, and paint matching.
- **Nuisance/Excessive Vegetation Removal:** Spot herbicide applications to help eliminate noxious vegetation growing around joints and other visible areas.
- **Concrete/Damage Repair:** Specialty concrete subcontractors repair third party damage. Preventative measures such as joint sealing and partial repairs help maintain the long term integrity of these roadside features.

#### 16.1.10 ROADSIDE

Routine roadside management focuses grooming grassy areas and controlling weeds through mechanical and chemical applications. Routine efforts include:

##### 16.1.10.1 Mowing and Litter Removal

KMP’s dynamic approach to mowing and litter control involves dividing roadway sections into sub-areas based on mowing requirements, turf conditions, and customer needs. We then determine each area’s acreage and categorize by large machine, small machine, slope, and litter removal. Each area has a prescribed number of cycles to meet the minimum and maximum height performance requirement per Schedule 11 requirements.

We use traditional mowing methods: A manual litter crew picks the road, large machine operations follow, then small operations and weed eating crews finish. ROW litter typically is disposed at the appropriate local landfill location.

KMP’s mowing operation, in addition to the standard ROW line, is responsible for ramps, arterial supplemental roadway limits, fenced-in retention ponds, wet ditches and outfalls, mitigation areas, in-fields, and other designated areas. When necessary, areas flooded by heavy rainfall in the spring receive herbicide to ensure proper vegetative control.

##### 16.1.10.2 Vegetation Management Methodologies

Strong turf conditions for native grasses are essential roadside erosion control, which helps protect shoulder and slope areas. In conjunction with front slope and shoulder repair Work, long term maintenance can benefit from sodding. We re-establish diseased and bare turf as part of this effort.

Hydroseeding is most effective during the spring and summer due to frequent rainfall and sunlight. Sodding can be effective in any season except the winter.

##### 16.1.10.3 Landscaping Maintenance

Landscape maintenance for the Central 70 Project landscape plots includes:

- **Mulching:** Used rarely and only for fertilization and noxious weed control.



- **Pruning, Shearing, Tree Trimming:** Strict guidelines for trimming flowering bushes and other plantings. Usually completed manually, assisted by bucket truck, if needed. Site aesthetic enhancement is the goal.
- **Manual Weeding, Spot Herbicide:** Weed control improves aesthetic appearance and improves beneficial plant growth. Crews use spot herbicide and manual weed control.

#### 16.1.10.4 Trees and Brush Trimming

As necessary, we trim brushes and trees, and clear dead trees from the greenery areas in the ROW. Customer requests are a common source for this maintenance action.

Severe weather events can cause high tree fall rates. We train teams for quick response and rapid tree removal.

#### 16.1.11 EARTHWORKS AND EMBANKMENTS

Earthwork maintenance for a large acreage of shoulders, front slopes, ditches, berms, and back slopes is necessary in the Project area. Heavy equipment maintenance crews consisting of trained equipment operators and skilled maintenance technicians complete these routine activities.

Washouts on un-established turf are the cause of front slope maintenance needs.

Deficiencies are normally located at headwalls, side drains, drainage structures, or slopes with continuous and heavy water flow. Similar to shoulder repair, the operation adds or re-uses fill as necessary to re-compact the existing grade elevation so we can add new turf or seed.

Slope stabilization treatments may be required where drainage runoff from bridge abutments is present.

#### 16.1.12 GRAFFITI

In general, summer months are typically the time when most graffiti appears. Patrols travel the roadway daily, and are usually the first to identify and remove easily accessible graffiti. We schedule lift equipment and maintenance crews to remove graffiti in difficult locations. We expect traffic signs, barrier walls, and retaining walls to be common targets. Graffiti removal and abatement procedures include:

- **Spot Detergent Cleaning:** We remove graffiti on non-penetrating surfaces with household detergents and water when possible.
- **Solvent Cleaning:** We use mild solvents and commercial cleaners for stubborn graffiti on surfaces such as traffic signs and galvanized metal. We ensure these cleaners do not enter the stormwater drainage system.
- **Anti-Graffiti Coatings:** For repeated graffiti in difficult locations, we use bonding materials with non-volatile anti-graffiti coatings. We select appropriate options from the Department's qualified products list

- **Murals:** KMP understands that the murals and local art throughout the Project cannot rely solely on repainting as the primary solution. KMP conducts a full life cycle analysis of the Project and determines the appropriate application and product selection for anti-graffiti coating.

#### 16.1.13 INCIDENT RESPONSE

See Attachment 2, Incident Response Plan to Appendix H, the Operations Management Plan.

#### 16.1.14 SNOW AND ICE REMOVAL

See Attachment 1, Snow and Ice Plan to Appendix H, Operations Management Plan.

#### 16.1.15 HAVANA MAINTENANCE YARD

Section 8 of Appendix I discusses the Havana Maintenance Yard in more detail. During the Construction Period, KMP uses the existing Havana Maintenance Yard for our maintenance facility. The proximity of the site to the Project limits facilitates cost effective and efficient response times for incidents and special events. KMP recognizes that the Ultimate Project configuration reduces the usable area and limits access to the Havana Maintenance Yard. We will work with the Department during its planning of the Ultimate improvements to the I-70 East corridor to maximize the use of the Havana Maintenance Yard throughout the Operating Period.

#### 16.1.16 COURTESY PATROL

See Attachment 3, Courtesy Patrol Service Plan, to Appendix H, Operations Management Plan.

#### 16.1.17 SWEEPING AND CLEANING

We closely supervise mechanical sweeping to ensure the effective clearing of dirt, debris, and sediment to remove these impurities from the drainage system. Vacuum sweeping focuses on areas bordering bridges, barrier walls, abutment walls, and shoulder/valley gutters. The sweeping operation also helps maintain a professional appearance for the Project.

Mechanical sweeping is routine, and uses mobile operations. A vacuum mechanical sweeper truck(s) (Elgin or equivalent; the number of vehicles depends on the amount of debris accumulation) leads the mobile operation. Truck Mounted Attenuator (TMA) units follow the mechanical sweeper(s) at prescribed distances. Warning arrow boards are at the rear of the operation to alert nearby traffic.



### 16.1.17.1 Structures and Barrier Wall Inlets

Edging and sweeping curb and gutter structures help prevent excessive siltation, debris, and vegetation from entering the storm water system. Manual weed-eaters and blowers can be very effective for this. Most of these systems are located and connected to slope drains near exit and entrance ramps.

O&M in-house crews perform routine preventative maintenance such as manually cleaning debris, vegetation, sedimentation, and other accumulations from the inlet and outlets of drainage structures. Often, these simple manual methods are sufficient to allow the drainage system to flow as intended.

### 16.1.18 COVER

Our knowledgeable and able inspection teams inspect the Cover to ensure safe conditions and reliable service in accordance with FHWA's *Tunnel Operations, Maintenance, Inspection, and Evaluation Manual*. The KMP plan consists of the following inspections:

- **Initial:** This inspection is conducted as part of commissioning prior to opening the Cover to traffic and the public. This inspection ensure all physical and functional elements of the Cover are fully operational, including all MEP systems.
- **Routine:** Routine inspections are used to identify trends and predict the future life expectancy of components. These inspections consist of observations and measurements of the structural, civil, mechanical, electrical, lighting, fire and life safety, security, signage, and protective systems. These inspections are conducted at a minimum of every 24 months, and results are recorded in accordance with the Specifications for the National Tunnel Inventory (SNTI).
- **Damage Due to Impact:** Impact inspections occur within 24 hours of an incident. If damage is severe, the Cover is closed until a damage inspection has been complete. At a minimum, and as applicable, the impact inspection addresses the following components of the Cover:
  - Cover wall panels, ceilings, and lighting
  - Cover waterproofing membrane
  - Cover structures
  - Mounted equipment including anchorage systems (i.e. jet fans, lighting systems, communication equipment)
  - Other elements such as railing, bollards, curbs, and walkways
  - Drainage areas (in the instance of fuel spills, the detention tank is inspected and emptied)
- **Damage Due to Fire:** Following a fire event, inspections similar to those for impacts are conducted. In addition, follow-up evaluations are conducted regarding the intensity of the fire, and identification of potential operational impacts to Cover elements.
- **Damage Due to Flood:** Following a flood event, excess water is pumped from the Cover and debris is removed. The extent of the water damage is assessed through visual inspection and testing of all electrical systems and equipment.

- **In-depth:** We perform an in-depth inspection of the Cover every 2 years at a minimum, or as-needed, to support a structural analysis of a functional system evaluation. The in-depth inspection consists of extensive testing, disassembly and cleaning of equipment and parts.
- **Special:** If significant deficiencies are identified and cannot be immediately rectified, special inspections occur on an as-needed basis to monitor the condition until the deficiency is repaired, the component is removed from service, or a further study determines that the conditions are no longer deteriorating.

#### 16.1.19 ITS AND ETCS EQUIPMENT

KMP is responsible for the maintenance and operation of the ITS and ETC elements of the Project as indicated in Appendix B, Responsibility Matrix. from Section 3 of Schedule 10.

##### 16.1.19.1 Maintenance/Operation

The O&M for the ITC/ETC elements under KMP's area of responsibility involve three scenarios—no failures, failures reported, and preventative maintenance (PM). No failures indicates that all ITS systems are functioning as intended and meeting the performance requirements of Schedule 11. System failures include, for example, reports of critical CCTV failure or critical DMS failures. The preventative maintenance activities are planned and scheduled maintenance servicing functions to maximize asset life and avoid catastrophic asset failure.

To develop a reliable and effective preventative maintenance program, KMP uses JAMMS to automate and streamline the maintenance of ITS/ETC devices. JAMMS automates technician dispatch for preventative and responsive maintenance activities, tracks maintenance activities in real time, and provides representative reports for maintenance activities.

Upon receiving notification through a JAMMS ticket, the assigned technicians open the ticket in JAMMS and log in accordingly. The preventative maintenance plan is loaded with the respective device's PM schedules so the system automatically generates preventative maintenance tickets prior to the scheduled date of the assigned Work schedule.

##### 16.1.19.2 Project Reports

JAMMS generates status reports for the O&M Team review. This report includes detailed descriptions of all services performed and the results of testing conducted during the report period. The report is a collection of events, data, calculations, decisions, instructions, notifications, circumstances, and Work performed each day.



### 16.1.19.3 Diagnostics and Troubleshooting

Upon detection of an ITS/ETC device failure, JAMMS creates a trouble ticket. The Maintenance Supervisor (or designee) verifies and prioritizes the problem and dispatches a technician to resolve the failure by performing repairs, either remotely or via trouble shooting in the field. The technician's assessment determines the cause of the failure based on a storm event, workmanship, power services, communications, electrical/mechanical components, and/or software failures. The diagnostic results define the type of repair needed to restore the device(s) to a functional status. The ticket includes all issues, which the technician updates to "complete" after service restoration. The technician notifies operations if the device will be down for an extended duration.

### 16.1.19.4 Coordination

KMP coordinates maintenance activities for all ITS/ETC Work as necessary with the appropriate parties. After diagnostics, troubleshooting, and repair, we confirm that the ITS/ETC element is operating properly prior to departure from the Site.

## 16.2 RENEWAL WORK

Attachment 2, Renewal Work Plan provides KMP's approach to life cycle assumptions and Renewal Work. Included in the Renewal Work Plan is a table detailing our approach that indicates the timing and extent of Renewal Work expenditures throughout the Term.

## 16.3 INSPECTION FEEDBACK INTO SCHEDULES

The KMP inspection program is provides essential feedback for KMP's Annual Routine Maintenance Schedule and Annual Renewal Work Schedule. The inspections identify the nature and scope of the needs, and the Schedules provide the formal mechanism to accomplish the Work. The following provides an example of the feedback based on our bridge inspection program.

### 16.3.1 PROCESS

Bridge maintenance is an essential element for extending the service life of structures. Maintenance and preservation activities assist in protecting the structural and operational performance of bridge structures and in minimizing future repair costs.

KMP inspects every bridge in the Central 70 Project corridor at least once every two years. Bridge inspectors enter the bridge inspection findings and recommendations into JAMMS.

The bridge inspectors recommend maintenance and preservation/renewal activities for each bridge. The activities are prioritized as high, medium, or low and are classified as Routine Maintenance, signing, safety features or preservation/renewal activities, as described in the following:

- **Routine Maintenance:** Prioritized maintenance activities completed by the KMP maintenance staff every spring and fall. We perform Routine Maintenance semi-annually, so bridge inspectors only recommend Routine Maintenance items that need attention.

- **Signing:** Indicates inadequate or misplaced signage on the structure, such as object markers, load posting signs or vertical clearance signs, to be replaced by the KMP maintenance staff.
- **Safety Features:** Indicates issues regarding transition elements, approach guardrail, attenuation, parapets and any other safety items to be addressed by the KMP maintenance staff.
- **Preservation:** Bridge needs outside of the scope of routine/responsive maintenance. The needs are addressed in the Renewal Work Program.

## 16.4 EXAMPLES OF ROUTINE MAINTENANCE AND RENEWAL WORK

The following table provides examples of the Routine Maintenance and Renewal Work that are included in the associated Routine Maintenance Schedules and Renewal Work Schedules.

Routine Maintenance	Preservation/Renewal Work
• Remove debris from drains	• Apply deck overlay treatment
• Remove debris from around bearings	• Repair spalls/delamination/potholed areas
• Sweep deck	• Clean and seal parapets
• Remove weeds and seal slope protection joints	• Replace deck
• Overlay approach slab settlement	• Replace parapets
• Patch structural potholes	• Repair parapets
• Remove debris from expansion joints	• Replace approach slab
• Seal relief/backwall joints	• Replace expansion joints
• Remove large vegetation debris and vegetation growth from channel	• Remove and close expansion joints
• Remove debris from culvert barrels and inlets/outlets	• Repair settlement/ride
• Remove loose concrete from structures over traffic lanes	• Apply healer/sealer on the deck and parapets
• Remove graffiti	• Extend drain pipes below superstructure
• Repair chain link fence	• Remove and patch all loose concrete from structures
• Extend drain pipes below superstructure	• Repair girder ends
• Repair erosion around wingwalls	• Replace girders
• Repair concrete slope protection	• Repair bent cap
• Crack seal deck asphalt	• Repair collision damage in girders
• Crack seal approach asphalt	• Place riprap around abutments/bents to repair or prevent scour
• Power wash structural elements	• Fiber wrap columns
• Repair bridge parapet	• Install scour countermeasures
• Update approach barrier to current standards	• Repair and restore channel



Routine Maintenance	Preservation/Renewal Work
<ul style="list-style-type: none"><li>• Update bridge parapet to current standards</li><li>• Replace object markers</li><li>• Replace missing parapet delineators</li><li>• Update/install clearance signs</li><li>• Update/Install load limit signs</li><li>• Update/repair other signing</li><li>• Install advance warning signs</li></ul>	<ul style="list-style-type: none"><li>• Remove asphalt surface</li><li>• Remove concrete bridge deck</li><li>• Jack approach slab</li><li>• Modify parapet</li><li>• Modify parapet end treatment</li></ul>

### 17. Approach to Life Cycle Assumptions and Renewal Work

Attachment 2, Renewal Work Plan provides KMP’s approach to life cycle assumptions and Renewal Work. Included in the Renewal Work Plan is a table detailing our approach that indicates the timing and extent of Renewal Work expenditures throughout the Term. This approach is based on:

- Estimated Useful Life and Residual Life
- Handback Requirements
- Level of Routine Maintenance
- Optimization of costs for Renewal Work

KMP assumptions are based on the Baseline Asset Condition Report using local knowledge and experience along with elemental review both with designers, specialist consultants, Construction and O&M Contractors. These assumptions take into consideration:

- Design life of each element
- Current wear and tear of New and Existing Infrastructure utilizing the Baseline Asset Condition Report
- Performance level of the asset for the User
- Data collated from at each Work Stage (Construction and Operations) assessed against the Department’s performance requirements.

The result is a comprehensive production of the Project specific life cycle analysis.

For greater clarity, KMP estimates the Useful Life of each element using the replacement cycle based on assumptions including initial cost, projected maintenance cost, reliability, and obsolescence. We analyzed the Design and predicted performance for each element. We populated the replacement model with Design inputs and assumptions and compared using baseline, aggressive, and conservative alternatives where applicable. We also included the Design and performance requirements from the Schedule, traffic predictions and pavement Design inputs, and multiple replacement strategies in the analysis. The result was an estimate for replacement life for the life cycle cost analysis.

As an example for pavements:

- We analyzed pavement functional and structural performance using Pavement-ME software
- We used the results to predict pavement replacement requirements for each combination of initial construction alternative and intervention strategies
- We emphasized ride quality (IRI), because we anticipate it to be a key Renewal Work during the Operating Period

During the Operating Period, KMP actively monitors the asset through daily patrols, weekly maintenance reporting, and specialist consultant annual engineering reviews. We use the predicted Useful Life as a guide for scheduling inspections to determine actual replacement needs based on performance requirements. KMP uses experienced staff to look at each element of the asset and create renewal schedules to prevent performance reductions. Elements are monitored and conditions reported to confirm better performance or highlight reduced performance. With this condition assessment information, KMP adjusts the life cycle (renewal) schedule. The same process occurs each year to ensure the Handback process meets the Department's requirements.

The Renewal Work Schedule guides Renewal Work, and we update it annually. We also submit a written report of the preceding calendar year's Renewal Work on Renewal Work Schedule elements. The report describes each element by location, Work performed, dates Work started and ended, and the total cost of all Renewal Work performed.

## 18. Procedures for Record Keeping According to the OMQMP

### 18.1 GENERAL

Document management is critical to controlling information and ensuring compliance with maintenance requirements, as discussed in Attachment 4, OMQMP. KMP uses the Maintenance Management and Information System, JAMMS, to track, inventory, and record Maintenance and Inspection Work for the Project. KMP uses InEight Project Suite to seamlessly integrate our internal document control system with the Department's document control system, Aconex. We use JAMMS to:

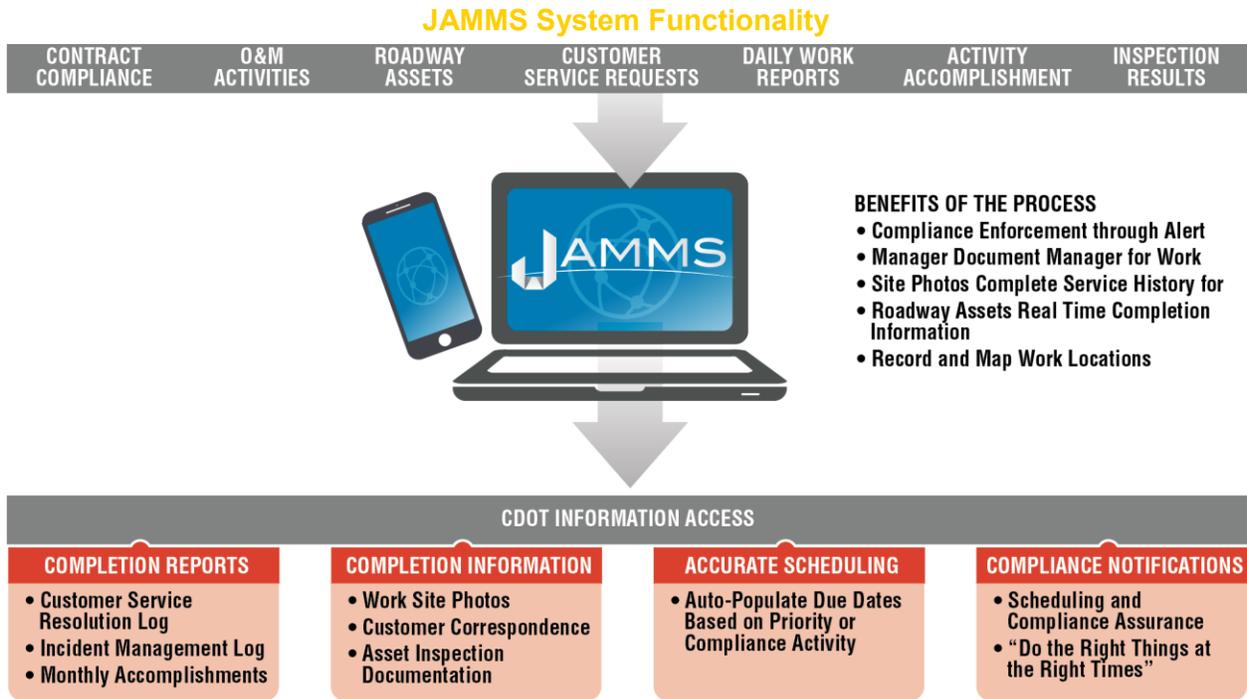
- Manage O&M-required assets and performance verifications
- Track all O&M Work



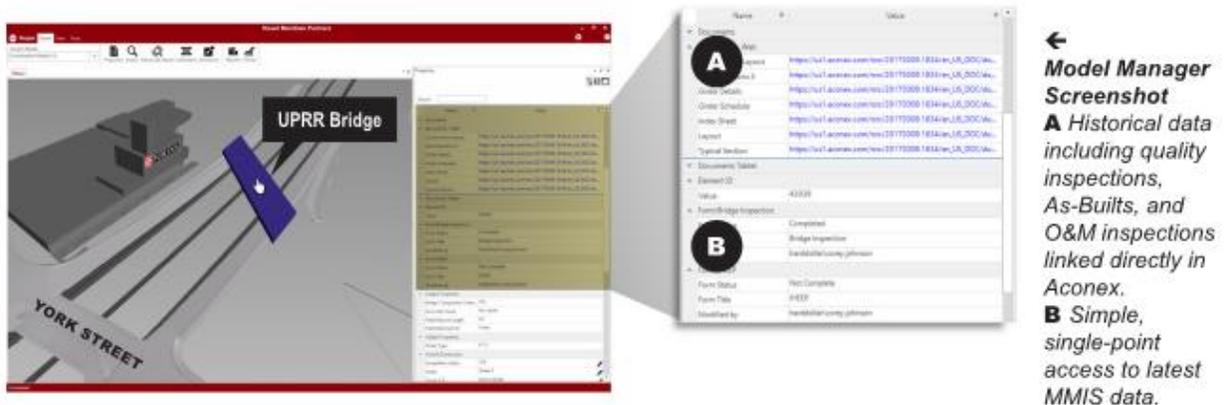
# OPERATIONS

- Track the Department’s maintenance codes, O&M costs, compliance, equipment and material inventory levels, quality management, scheduling and reporting
- Store all accident and customer request information

JAMMS includes real-time tracking of O&M data through a mobile device application. The figure below shows the key functions:



JAMMS fully integrates with InEight Project Suite as described in Appendix B. During the Operating Period, InEight Project Suite facilitates simple and efficient access to all Project data. All As-Built data, inspection reports, Work site photos, and other information are linked from the model to the Department’s Aconex. The figure below highlights the simplicity of accessing Project data using InEight Project Suite.



All required O&M documentation including submittals, reports, inspections, and manuals are stored in JAMMS.

KMP collects and appropriately stores all relevant records. They are:

- Legible, readily identifiable, and retrievable
- Include records of changes to processes and old versions of documents.
- Maintained in accordance with the information and procedures within the Schedules

The system backs up all O&M-related documents nightly, and the data is stored Offsite weekly.

## 18.2 DOCUMENT MANAGEMENT PROCEDURES

Prior to the start of the Construction Period, and then continuing into the Operating Period, we populate JAMMS with the following information:

- Department maintenance activity codes to identify and describe Work activities and the measurement units for the code
- Roadway segments by roadway identification code and route name
- Equipment, materials, and personnel

When the post-Operating Period commences, we follow these document management procedures:

- Identify and Record Source in JAMMS: Occurs immediately.
- **Define Priority Level:** This automatically associates schedule priority metrics to the Work action and occurs when the request information is entered into JAMMS
- Schedule Work: Based on the priority level of the request and the Schedule requirements for response time.
- **Issue Work:** Issue a Work order using Department codes to the appropriate maintenance crew.
- **Work Documentation:** Record completed Work volumes, times, locations, and resources real-time through a mobile application immediately following completion.
- **Quality Review:** If applicable, complete additional quality checks of completed Work to verify compliance and quality. Reviewers can use the mobile application for these reviews.
- **Customer Contact:** When applicable, issue a prompt call back for customer requests.

All records and user actions in JAMMS are automatically time stamped. Work records cannot be deleted from the system.

## 19. Procedures for Tracking O&M Deficiencies, Compliance and Corrections

KMP trains our O&M staff in the correct practices and methodologies of asset inspection, including the identification of deficiencies based on the performance requirement in Appendices A-1 and A-2 of Schedule 11. Tracking of deficiencies using JAMMS follows the same process described in Sections 11, 13, and 21.



## 20. Procedures for Maintaining a Spare Parts and Inventory Levels

A range of inventory supplies, spare parts, materials and tools are needed to support the maintenance program. KMP has identified, based on the *anticipated* Routine Maintenance program, the volume and type of spare parts that are included in the spare parts inventory for the Project in the figure below. The Spare Parts Inventory table provides an estimate of the minimum spare parts inventory for annual consumption. The inventory of spare parts fluctuates over time.

During the mobilization period prior to NTP2, KMP procures the spare parts to ensure they are available at NTP2. KMP uses local and national suppliers for the procurements of the parts. We currently have an extensive list of national suppliers for products such as guardrail end treatments and reflective sheeting. KMP also contacts local suppliers for materials such as sand and aggregate. KMP evaluates the product procurement based on both cost and access.

We use JAMMS to control the inventory levels and requirements. JAMMS defines the critical components, minimum and maximum inventory levels, suppliers, lead times, costs, usage history, and other associated data. JAMMS is the primary data-tracking tool for spare parts use. The figure below is an example of the information provided by JAMMS to demonstrate the tracking of spare parts.

Example Spare Parts Inventory Table

Asset Category	Item Type	Maintenance Activity	Units	Min. Quantity
Attenuators	Unit	Attenuator Repair	Each	1 Per vendor type installed on the system
Attenuators	Hardware	Attenuator Repair	Each	1-2 for various individual parts (i.e. diaphragms, cartridges, etc.
Guardrail	End Treatment full system	Guardrail Repair	Each	1 per vendor type installed on the system
Guardrail	End Treatment-Hardware	Guardrail Repair	Each	1-2 for various individual parts (i.e. specialized panel, cable anchor box, etc.
Guardrail	Panel- Standard W-Beam 25'	Guardrail Repair	Each	25
Guardrail	Panel- Standard Tri-Beam 25'	Guardrail Repair	Each	5
Guardrail	Panel- Grd to bridge transition	Guardrail Repair	Each	5
Guardrail	Hardware various	Guardrail Repair	Various	Stock of washers, bolts, nuts, etc.

Asset Category	Item Type	Maintenance Activity	Units	Min. Quantity
Guardrail	Posts- wood, metal	Guardrail Repair	Each	25
Guardrail	Poly, wood, and metal spacer block	Guardrail Repair	Each	90
Paving	Asphalt cold mix	Asphalt Patching	Tons	2
Paving	Misc- Oil Dry	Incident Management	Cu Yd	6
Slopes	Dirt/Aggregate	Erosion repair	Tons	3
Signs	Sign Panel	Sign Repair	Each	5 for regulatory sign panels
Signs	Base break away	Reset or Replace Sign Post	Each	5
Signs	Post	Reset or Replace Sign Post	Lin ft	200
Striping	Tape- 6"	Reflective Marking/Message	Lin ft	300
Traffic services	Object markers/ Reflector	Spot Guardrail Repair, sign post	Each	50
Signs	Hardware	Reset or Replace Sign Post	Each	Stock of washers, bolts, nuts, etc
RPM	RPM	Pavement Marker Work	Each	50
Vegetation	Herbicide	Pesticide Application	Gal	50
MOT Devices	Barricades	Incident Management	Each	250
MOT Devices	Signs	Incident Management	Each	25
Winter Events	De-Icing	Anti-Icing	Gal	See Attachment 1 of Appendix H
Covered Lowered Section	Electrical	Electrical Repair	Each	20
Bridge	Joint	Bridge Joint Material	Lin ft	200



## 20.1 REPORTING METRICS

JAMMS tracking and reporting functions ensure effective management of spare parts. JAMMS outputs these reports and metrics:

- **Materials Suppliers:** Qualified suppliers, contact information, available services and/or products, product costs
- **Materials Inventory:** Descriptions, numeric designations, inventory levels, re-order points, expected lead times, costs, and suppliers
- **Usage History:** Usage history across variable time frames, individual assets, asset elements, whole system assets, and by O&M crew type and/or Work performed

Spare parts are primarily stored at the Havana Maintenance Yard, either in the warehouse or the yard.

## 20.2 QUALIFIED PRODUCTS LIST

KMP uses the Department's most current Qualified Products List (QPL) when acquiring products for use. We regularly compare inventory against the Approved QPL database to ensure we continue to use Approved products. Before we renew inventory, KMP reviews the QPL to confirm that we are restocking with products on the QPL.

# 21. Description of MMIS and Its Functionality

## 21.1 OVERVIEW AND FEATURES

The Jorgensen Asset Maintenance Management System (JAMMS) is an MMIS that helps optimize roadway management with comprehensive online database tools. JAMMS is a proven system—it is currently used on 35 O&M contracts in the US. JAMMS helps maximize production through a proactive maintenance approach, allowing O&M managers to manage all aspects of roadway maintenance including schedules, Work status, asset service history, and inspection service details. Work completion documentation and photographs provide transparency and actionable information. The *JAMMS Manual* provides additional information on the system's functionality and is included as Attachment 5.

JAMMS is used to:

- Program, schedule, manage, and report all aspects of O&M Work
- Receive automated Project alerts
- Make quick and informed decisions
- Access and update weekly Work orders, annual Work plans, Work status, completion documentation, inspection details, asset service history, by using text, photos, and GPS data in real-time using mobile devices
- Provide ongoing, detailed communication for efficiency and transparency

JAMMS features include:

- Definition and customization of project parameters and data capture and storage.
- Detailed reports based on queries on operations, management, schedules, finances, training, assets, and staff.
- Customization of user access and privileges.
- Daily management of all aspects of the O&M activities.
- Customized settings and notifications

## 21.2 ALERTS

JAMMS includes a customizable alert system to automatically send alert emails to designated managers and supervisors. We use the alert system to ensure compliance with contractual response times and the expectations of our clients. Alerts can be triggered by a number of key JAMMS events, including:

- New priority 1 service requests
- Work order status changes
- Compliance activities with deadlines
- One day turnaround Work orders
- Low inventory levels

## 21.3 DOCUMENT MANAGER

JAMMS can attach all O&M documentation to photographs to easily prepare Work completion information for asset inspections, incident management, and O&M activities and submit through Aconex.

## 21.4 QUALITY MANAGEMENT

Service requests are central to the features of JAMMS. After entering service requests, the user can create appropriate Work orders and assign the orders to in-house staff or subcontractors. The system handles many Quality Management elements, including:

- Routine Maintenance Service Requests
- Customer Service Requests
- Compliance Summaries
- Client Accomplishments
- Accident Service Reports
- Incident Management logs and reports



## 21.5 JAMMS ASSET MANAGER

All O&M assets receive a unique asset ID. The system then tracks GPS locations, maps, photographs, service life data, inspection data, cost details, and repairs for each asset ID. With this data, the system assembles actionable reports on stock levels, reorder quantities and dates, and service life milestones.

For vehicles and equipment, the system can also track and present data on usage hours, rental rates, operational costs, mileage, fuel use, and repair and maintenance needs.

## 21.6 JAMMS REPORTS

JAMMS includes report templates for performance-based asset maintenance Work and can also create custom reports. Standard JAMMS reports include:

- **Client:** Project progress and compliance for Aconex reporting
- **Operation:** Tracking and reviewing Work
- **Management:** Project management details to aid operational decisions
- **Asset Management:** Service history and cost summary by individual asset
- **Invoicing:** Invoice and service history details
- **Financial:** Budget tracking data
- **Timesheets:** Times and activities
- **Training:** Training tracking and compliance
- **HCM:** Personnel information

## 21.7 MONTHLY AND YEARLY REPORTS

KMP's monthly O&M Work report is a detailed derivation of our annual plan, and includes data on the previous month's completed maintenance Work and plans for the next month. JAMMS maintains these reports real-time and uses the Department's maintenance activity definitions and location descriptions (including GPS coordinates). We develop the estimated Monthly Work Schedules before the beginning of the operational year. We consider O&M needs, growing seasons, travel seasons, and specific customer needs when planning the Work program. Key components of these reports include:

- Customer Service Logs
- Environmental Management System data
- Incident Management Logs
- Risk management and risk registers, outlining possible risks to O&M activity completion and risk mitigation measures
- Summary of inventory and materials used
- Open Work orders "on hold for materials" and associated costs
- Performance based on scope of services to evaluate requirements vs. performance

- Work order details and cost report
- Asset service history
- Training activities including safety, MOT, herbicide, equipment operation training, provided on a six-month basis
- Compliance activity report
- Quality Control summary
- Financial Year Reconciliation—budget and variances on both monthly and O&M Work-to-date basis.

## 22. Transition of Maintenance from Department to Developer

KMP meets with the Department to plan a seamless transition of maintenance obligations from the Department to KMP and to transition the Havana Maintenance Yard to KMP. During this meeting, lessons learned and best practices, including those used for snow and ice control on the viaduct, are discussed. We develop a transition plan providing procedures and schedule to ensure that maintenance obligations are met.

The following table shows the main periods and their key tasks and activities.

### Transition During Project Periods

Phase	Tasks	Activity
Post Award	<b>Develop preliminary transition plan for the Project</b>	Develop preliminary transition plan outlining the schedule of events to enable smooth transition into O&M Works. Provide drafts to Department for Acceptance of key plan components. Ensure transition activity aligns with Design and Construction Schedules
	<b>Deliver Draft Maintenance Management Plan (MMP) and OMP</b>	Ensure plans align with Design and Construction activities. Provide drafts and revisions of required plans to Department
NTP1	<b>Provide O&amp;M input to the Design Team</b>	Provide maintenance input to the Design Teams as it relates to Useful Life and residual life of the key asset elements
	<b>Deliver transition plan</b>	Coordinate with DB for final key Project dates (e.g., substantial completion and Final Acceptance) to finalize and submit plan to the Department
	<b>Implement transition plan</b>	Implement transition plan according to planned schedule
	<b>Start mobilization tasks (e.g., training, staff, material, &amp; equip. procurement)</b>	Develop mobilization schedule with timeline of key activities; complete activities based on the Schedule to be prepared for O&M Work start
	<b>Performing construction inspection reviews and providing punch list</b>	Work with the Construction Team to ensure assets are in compliance with maintenance requirements
	<b>Coordinating with Construction Team</b>	Coordinate with Construction Team for schedule of activity transitions and implementing O&M requirements specified in the MMP and OMP



<b>Baseline Condition Assessment (BARC)</b>	Perform baseline condition assessment, consolidated findings and submit report to Department for Approval
<b>Asset Inventory Delivery</b>	Review As-Built plans and field review to determine final asset inventory
<b>Construction review for O&amp;M compliance</b>	Field review of newly constructed Work and Work assets to confirm compliance with maintenance specification and provide punch list to constructor
<b>O&amp;M Works</b>	Begin O&M Work activities. Utilization of Maintenance Management System (MMS) to track O&M Work activities according to JAMMS
<b>NTP2</b>	
<b>Coordination with DB Team for warranted assets</b>	Monitor and track performance of warranted assets through assets inspections cycles. All non-performing assets within warranted period are reported to DB Team for review and rectification

### 23. Maintenance and Service Manuals

Maintenance and Service Manuals are not required for the Draft MMP. The manuals are included with final MMP submittal.

### 24. Description of All Elements and Inventory Facilities, Systems, and Equipment Maintained By KMP

KMP bases the O&M operations on the requirements outlined in the performance and measurement table in Appendices A-1 and A-2 in Schedule 11. The table in Section 13.2 of Appendix I identifies the element categories from the Schedule 11 Appendices.

During O&M implementation, KMP divides these categories into routine, preventative, and operational maintenance. For example, the traffic sign and roadway markings categories are routine and preventative maintenance; incident response and snow and ice control are operational activities. Typically, routine and preventative maintenance inventories are quantified units based on the System Design, and operational activities need estimates of quantities, resources, and the number of operational incidents.

We further subdivide each routine and preventative maintenance category into elements with specific performance measures based on their critical assets.

This information is provided in Attachment 1, Baseline Asset Condition Report.

### 25. List of Maintained Elements for Major System and Equipment Manufacturer/Vendors

KMP provides this list upon submission of the final MMP.

### 26. A List of Unplanned but Anticipated Maintenance Services for All Road Elements

Unexpected events that result in a need for maintenance repairs are inevitable on a major highway projects such as this. Examples include:

- **Traffic Accidents:** Vehicular accidents, especially those involving heavy vehicles, can cause significant damage to a wide variety of highway assets (e.g., guardrail, crash cushions, traffic signs, pavements, pier supports). In some cases, a rapid repair response is essential to the safety of the traveling public and to the mobility of the traffic service. For example, if an accident destroys a significant portion of a guardrail run, the roadside barrier is not able to sustain a second impact without repair. In addition to safety, timely repair avoids a liability exposure.
- **Natural Disasters:** Including floods, tornados, and more. Every element of the highway facility can be at-risk for damage, and some lengthy segments of the facility may become unusable.
- **Geotechnical Events:** The structural soundness of the highway facility is only as good as the materials providing support. Roadway embankments, pavement subgrades, and bridge piers/abutments, all depend on the geotechnical stability of the underlying foundation. Compounding the consequences of a geotechnical failure is the lack of warning inherent to these failures. A frequently reported national news item, for example, is the sudden development of a sink hole that beneath a pavement.
- **Asset Deterioration:** Every highway asset has a service life and will fail at some point. KMP designed our asset management strategy to detect impending failure and proactively correct the problem. We are prepared to react quickly to the unexpected failure of an asset.
- **Haz/Mat Incidents:** These incidents are unique and initial response can be complex, however we are prepared to respond rapidly. See Attachment 2 of Appendix H for details.
- **Human Activity:** The most obvious example is vandalism (e.g., damage to the ROW fencing). Less likely, for example, would be the use of explosive devices. See Attachment 2 of Appendix H for details.

## 27. Repair Procedures for Anticipated Repairs

KMP's approach to executing the required Maintenance Repair Work includes the use of the maintenance management system (JAMMS), self-monitoring, quality control and quality assurance program, and structured management reviews. Section 21 (above) and Attachment 4, OMQMP, discuss JAMMS and our quality control process in detail.

The technical and management plans address the complexities of the repair strategies depending on Project Design. Relying on our operational history, we have adapted many new repair strategies based on lessons learned.

Specifically, for maintenance repairs, JAMMS tracks repair needs by specific roadway location and develops Work programs tailored to these specific location deficiencies. KMP systematically evaluates our past maintenance repair methods and operational Work plans, gauging their results, enabling us to make changes to the repair techniques for improved future performance.

KMP has developed repair procedures for the maintenance elements as shown in the table below.



Maintenance Elements	Repair Activities
Pavement and Roadway Maintenance	<ul style="list-style-type: none"><li>• Flexible Pavement Pothole</li><li>• Flexible Pavement Edge Raveling</li><li>• Flexible Pavement Shoving</li><li>• Flexible Pavement Depression/Bump</li><li>• Flexible Paved Shoulders/Turnouts</li><li>• Rigid Pavement Pothole</li><li>• Rigid Pavement Depression/Bump</li><li>• Rigid Pavement Joints and Cracks</li><li>• Rigid Shoulders/Turnouts</li></ul>
Roadside Maintenance	<ul style="list-style-type: none"><li>• Shoulder Unpaved</li><li>• Front Slope</li><li>• Slope Pavement</li><li>• Sidewalk</li><li>• Fence</li></ul>
Vegetation/Aesthetics Maintenance	<ul style="list-style-type: none"><li>• Roadside Mowing</li><li>• Slope Mowing</li><li>• Landscaping</li><li>• Tree Trimming</li><li>• Curb/Sidewalk Edge</li><li>• Litter Removal</li><li>• Turf Condition</li></ul>
Traffic Service Maintenance	<ul style="list-style-type: none"><li>• Raised Markers</li><li>• Striping</li><li>• Pavement Symbols</li><li>• Guardrail</li><li>• Attenuators</li><li>• Signs less than or equal to sq. ft.</li><li>• Signs greater than 30 sq. ft.</li><li>• Object Markers</li><li>• Lighting</li></ul>
Drainage Maintenance	<ul style="list-style-type: none"><li>• Side/Cross Drains</li><li>• Roadside/Median Ditch</li><li>• Outfall Ditch</li><li>• Inlets</li><li>• Miscellaneous Drainage</li><li>• Sweeping</li></ul>

The following provides selected examples of KMP’s procedures for repairing pavements, which is likely to be the largest maintenance and renewal activity. These are draft procedures subject to change.

## 27.1 FLEXIBLE PAVEMENT

Flexible pavement is the primary pavement type on the roadway system for many of our projects. We patch potholes in isolated sections or by mobile operations on larger sections. Our road patrols can repair damages requiring less than 0.20 tons of material; our mobile operation is used for roadway sections requiring 5 tons or more. KMP's heavy equipment crews, attenuator trucks, and dump trucks comprise our mobile operation. This nighttime operation moves continuously down the traveled way applying asphalt and, if necessary, can safely and effectively achieve high production rates. The second main component of our pavement repair and maintenance plan includes isolated milling and resurfacing repair operations.

Where pavement patching is not effective, we can subcontract to a paving specialist contractor to install full-depth asphalt pavement. Our experience shows that our pavement maintenance plan can effectively remedy many pavement deficiencies. As Work progresses through our contract maintenance projects, KMP closely monitors the performance outcomes of Pavement Repair Work, and modifies the Maintenance Work plans and Schedules accordingly. Our key methods for performance compliant pavement repair, rehabilitation, and maintenance are described in the sections below.

## 27.2 FLEXIBLE PAVEMENT REPAIR

Our priorities are areas indicated as poor and, secondly, those that scored fair. Our first step is to prioritize the system needs. Common deficiencies are depressions, pavement shoving, potholes, ruts, and edge raveling.

KMP periodically uses in-house maintenance crews and subcontractors for the following asphalt pavement maintenance repairs:

- **Pothole Repairs:** Includes cold patch asphalt to manually fill potholes and drop-offs. Road patrols continuously monitor their respective areas to ensure the timely and Department performance-compliant completion of emergency repairs.
- **Skim Patching/Minor Mill and Overlays:** In-house equipment operators skilled and experienced with rollers, packers, milling attachments, and supplemental equipment needed for installation of small asphalt patches, complete small areas, less than 500 sq. ft. These repairs occur as needed throughout the year, with completion priorities continuously adjusted to accommodate safety concerns.
- **Mill and Resurface Sections:** Our specialty pavement subcontractors, with access to Colorado-Approved asphalt plants and materials supply, resurface asphalt with significant damage. We group these repairs by season, and complete them in three periods throughout the year.
- **Crack Sealing/Crumb Rubber Sealing:** Our specialty subcontractors repair asphaltic tar and/or crumb rubber sealant techniques in areas that KMP has identified as deficient. These methods are typically be used as preventative measures during the spring or summer periods.
- **Incident Damage:** Our specialty subcontractors repair pavement damage from major incidents (traffic crashes), ruts and cuts, and damage from fuel fires and hazardous liquid spills.



### 27.3 PAVED SHOULDERS

Paved shoulders provide the critical space needed for traveler aversion, breakdowns, use for emergency vehicles, MOT detours and, ultimately, provide the primary backup for alternative travel use. The repair measures are similar to those described above on asphalt pavement.

### 27.4 CONCRETE PAVEMENT REPAIR

KMP has maintenance repair measures to eliminate punch-outs, broken slabs, corner breaks, spalls, excessive cracking, and miss-alignments. Trained KMP Maintenance Technicians perform minor repairs, and specialty subcontractors perform complex concrete pours and crack sealing measures.

KMP uses in-house maintenance crews and subcontractors for the following rigid pavement repair activities:

- **Emergency Spall Repairs:** We manually fill potholes and drop-offs with cold patch asphalt. Our in-house operations complete this task on an ongoing basis. We also use cyclic seasonal mobile operations for asphalt patching.
- **Permanent spall partial- and full-depth repairs:** A combination of in-house crews and subcontractors complete partial depth and full-depth concrete repairs. These typically require lane closures and cleaning of spalled areas, installing dowel bars or reinforcing steel, pouring new concrete, and finishing the repaired surface. We complete partial-depth repairs throughout the year, as needed. For full-depth repairs, we put temporary measures in place and perform the Work in groups, unless there is an emergency situation.
- **Crack Sealing:** Concrete crack sealing measures are KMP's preferred preventative technique for avoiding full-depth slab repairs. We complete these measures during the spring and summer to reduce stormwater and debris infiltration into sub-base surfaces that can precipitate premature slab failures.
- **Overlays:** We use asphalt overlays on rigid pavement where excessive cracking or depressions exist and severe ride quality issues exist.
- **Pressure Grouting:** Functionally depressed pavement slabs are often result from failures on the base course and can be corrected with pressure grouting techniques. Specialty subcontractors complete these tasks.

## 28. Activities Necessary to Comply with Other Schedules

KMP understands the requirement for O&M Work activities to comply with the Project Agreement schedules including:

- Schedule 17, Environmental Requirements
- Section 8, Drainage
- Schedule 10, Design and Construction Requirements

The MMP is consistent with the activities, processes, and procedures described in the other Project plans.

## 29. Inspection Plan and Copies of Inspection Forms and Checklists

KMP has developed a draft Inspection Plan, with inspection forms and checklists that are finalized upon Final Design. Section 21 includes a discussion of information management for inspections.

### Coding Bridge Inspection Data

FHWA and AASHTO provide rating systems to aid in the inspection of bridges. The two primary rating systems are the NBI rating system and the *AASHTO Manual for Bridge Element Inspection*. Both rating systems promote uniformity for rating the structural condition of a bridge. Each rating system relates the element distress found at the bridge to the effect on the structure strength and safety.

The bridge inspector collects NBI data in accordance with the procedures in the *FHWA Recording and Coding Guide*. A NBI inspection evaluates the deck, superstructure, substructure, channel, channel protection, and culvert and waterway adequacy for each bridge.

The *AASHTO Manual for Bridge Element Inspection* describes the element based rating system. An element level inspection identifies each bridge component as a separate element, based on both function and material type. The inspection evaluates each element by subdividing the total quantity into different condition states or states of physical deterioration or damage.

KMP uses the standardized forms provided in the *AASHTO Manual* and the *FHWA Recording and Coding Guide* (as adapted by the Department) to report the findings from the bridge inspections. The following graphics provide examples of our checklists. See the table in Section 13.2 for the frequency of KMP inspections.

### Example Checklists for Repairs

Asphalt Roadway Repair Procedure	
December 2009	Sheet 1 of 1
<b>Code</b> MA 120	<b>Name</b> Crack Sealing
<p><b>Description</b></p> <p>Sealing cracks in pavement helps minimize water infiltration because the crack opening is reduced or eliminated. Crack sealing consists of the repair and sealing of cracks (0.125-in. to 0.75-in. wide) that appear in the pavement. The crack is repaired by removing the old sealant, if necessary, routing the crack, as specified, cleaning the crack and placing the crack sealing material. Perform a crack analysis to determine whether crack sealing would be effective. Non-working cracks narrower than 0.125 in. that do not exhibit spalling should not be sealed. These cracks generally do not penetrate through the surface nor do they pose a source of pavement deterioration. The practice of sealing this type of crack by the method of pouring sealant is seldom of value.</p>	
<p><b>Special Considerations/Comments</b></p> <p>Crack sealing may have negative effects. Undesirable visual impacts may occur, which include tracking of sealing material by tire action, obscuring lane markings and adversely affecting skid resistance. Crack sealing may result in a rougher pavement surface where the sealant material is forced out of the cracks during warm</p>	



months. The use of an asphalt-based sealant may cause a hot mix asphalt surface to become over-rich in the vicinity of the crack, resulting in a softened pavement and a potential depression.

**Safety**

Personal protection: safety glasses, ear protection, hard hats, steel-toed boots, neoprene and leather work gloves and safety vest.

**Pre-Repair Coordination**

Develop a plan with the Design and Traffic Divisions.

Coordinate with utilities that are affected by the Work.

Notify the appropriate parties in regard to lane closures.

No.	Personnel Classification	Code	No.	Key Series	Equipment Description
1	Trades Specialist IV 4C		1	008 UF	Pickup truck with radio
1	Trades Specialist III 3D		1	009 UF	Crew cab
1	Trades Specialist III 3B		1	011 UK	2 ton flatbed
1	Trades Specialist II 2E		1	013 T8	Dump trucks with spreaders
6	Trades Specialist II 2B		1	014 T7	Asphalt distributor
			1	025 TY	Sign trailer
			1	034 BD	Sand blaster
<b>Material Description</b>		<b>Code</b>			
Asphalt-Liquid		1001	1	061 CG	Air compressor (185 cfm)
FA 13-Aggregate		1110	2	076 CL	30" concrete saws
Joint Sealant		1047	1	201 XA	Power broom
Backer rod		5039	2	234 AA	Arrow boards
Rubberized Asphalt			1	240 PB	Hot joint material applicator

**Procedural Steps**

- Discuss job requirements with the crew.
- Identify areas in need of sealing or resealing. Generally, only consider cracks that are between ¼ in. and 2 in. for sealing.
- Set up temporary traffic control.
- Clean loose debris from cracks using air compressor. Ensure air pressure at nozzle is within OSHA guidelines.
- Use concrete saw or router (if routing crack) to square edges on the cracks, and also clean out existing joint material in longitudinal joints before cleaning out loose debris with air.
- Use propane torch to dry and/or soften asphalt shoulder.
- (Optional) Sandblast joint to remove old sealant or other foreign material.
- Air blast again to remove sand and debris.
- Concrete:
- Install proper size of backer rod to give snug fit.
- Place sealant material according to manufacturers' recommendations.
- Remove temporary traffic control.
- Complete necessary reports.
- Install proper size of backer rod to give snug fit.
- Place sealant material according to manufacturers' recommendations.
- Remove temporary traffic control.
- Complete necessary reports.

<b>Bridge Repair Procedure</b>	
<b>December 2016</b>	
<b>Sheet 1 of 1</b>	
<b>Code</b>	<b>Name</b>
BRP-004	Pile Splicing-Steel
<b>Description</b>	
This repair procedure is for splicing a steel pile that has corroded or been damaged by collision, by strengthening the affected area with additional steel. Only use this procedure for steel piles with minor damage.	
<b>Safety</b>	
Personal protection: safety vests, hard hats, steel-toed boots, leather work gloves, goggles, safety harness (if needed) and life vests (if needed).	
Sandblasters must be certified, fitted with a mask and have a recent physical that allows them to sandblast.	
Welders must be certified.	



**Pre-Repair Coordination**  
 Develop a repair plan with the Bridge Maintenance Office.  
 Coordinate with utilities that are affected by the repair.  
 Notify the appropriate parties in regard to lane closures.  
 Check with Environmental Office for sandblasting. No blasting allowed with lead paint.

No.	Personnel Classification	Code	No.	Key Series	Equipment Description
3	Trade Specialists		1	009 UF	Utility body pickup
			1	012 UI	Flatbed truck
			1	207 WA	Portable welder
			1		Scaffolding or lift
			1		Sandblasting equipment
			1		Spray painting equipment
Material Description		Code	1		Air compressor
Material for temporary supports			1		Acetylene torch
Steel as needed			1		Jack
Steel as needed					Jack
Sandblasting sand					
Paint or other coating					
Jacking material					

**Procedural Steps**

- Discuss the job with the crew.
- Place temporary traffic control.
- Place temporary supports.
- Gain access to the repair site either by building a cofferdam and dewatering, or by using scaffolding, a lift, or another type of equipment that facilitates access.
- Remove rust as needed by sandblasting, if there is no lead paint, or by hand. Put tarps down to capture as much waste material as possible.
- Straighten the steel if that is part of the repair plan. Use heat only if it is part of the repair plan and is supervised by a qualified person.
- Clamp the steel plates onto the deteriorated area, extending above and below it as planned (usually 2 ft. above and below). Affix the plates by either bolting (preferred) or welding, depending on the repair plan.
- Clean the area and apply a coating to it.
- Remove temporary traffic control.
- Complete the necessary reports.

## 30. Applying Best Management Practices

We apply best management practices (BMPs) in accordance with applicable regulations and permits. The KMP Storm Water Pollution Prevention Plan includes the means and methods for soil erosion management and pollution prevention practices.

## 31. Schedule

### 31.1 MONTHLY ROUTINE MAINTENANCE SCHEDULE

The Monthly Routine Maintenance Schedule, included below, shows the anticipated timing, durations, and frequency of tasks for each month for a one-year period.

Legend:

(A – 10/Month; B – 22/Month; C – 182.5/Month; D – Daily; E – 20/Month; V – Various/As Needed)

Maintenance Group	J	F	M	A	M	J	J	A	S	O	N	D
<b>PAVEMENT (ROADWAY, RAMPS, ACCESS ROADS AND OTHER PAVED AREAS)</b>												
Mainline Asphalt Mobile Patching*	3	3	3	3	3	3	3	3	3	3	3	3
Crack Sealing				2	2	2	2	2				
Roadway Inspections	D	D	D	D	D	D	D	D	D	D	D	D
<b>DRAINAGE SYSTEMS</b>												
Roadside Culvert Cleaning			3	3	3			3	3			
Bridge Scupper Cleaning	1		1		1		1		1		1	
Barrier Wall Repair	1	1	1	1	1	1	1	1	1	1	1	1
Roadside Ditch Clean and ReShape	1		1	1	1	1	1	1	1	1		
Concrete Drainage Structure Repair	1	1	1	1	1	1	1	1	1	1	1	1
Slope Drain/Flume/Rip Rap	2	2	2	2	2	2	2	2	2	2	2	2
<b>STRUCTURES</b>												
Joint Cleaning and Minor Repair		1		1		1		1		1		1
Rigid Deck Full/Partial Depth Repair										1		
Substructure Maintenance Repair*										1		
Superstructure Maintenance Repair*										1		
General Cleaning/Vegetation Removal			2	2	2	2	2	2	2	2		
Bridge Approach Slab Repair*	A	A	A	A	A	A	A	A	A	A	A	A
Bridge Inspection	B	B	B	B	B	B	B	B	B	B	B	B
<b>ROADWAY MARKING</b>												



# CENTRAL

Maintenance Group	J	F	M	A	M	J	J	A	S	O	N	D
Striping (Paint) <i>Maintenance Only*</i>					1	1	1					
Object Markers/Delineators*	A	A	A	A	A	A	A	A	A	A	A	A
RPM's (Snowplowable)					5	5	5					
<b>GUARD RAILS, BARRIERS, IMPACT ATTENUATORS</b>												
Guardrail*	6	6	6	6	6	6	6	6	6	6	6	6
Guardrail End Treatments	6	6	6	6	6	6	6	6	6	6	6	6
Barrier Wall Repair*	1	1	1	1	1	1	1	1	1	1	1	1
Attenuators (Crash Cushions)*	1	1	1	1	1	1	1	1	1	1	1	1
<b>SIGNS</b>												
Small Signs*	5	5	5	5	5	5	5	5	5	5	5	5
Large Signs*	1	1	1	1	1	1	1	1	1	1	1	1
Illegal Signs/banners, flags, posters*	4	4	4	4	4	4	4	4	4	4	4	4
<b>TRAFFIC SIGNALS</b>												
Traffic Signal Notification CCD*	4	4	4	4	4	4	4	4	4	4	4	4
<b>LIGHTING</b>												
Highmast Inspection and Monitoring	4	4	4	4	4	4	4	4	4	4	4	4
Street Lighting Inspection and Monitoring	4	4	4	4	4	4	4	4	4	4	4	4
Underdeck Lighting Inspections and Monitoring	4	4	4	4	4	4	4	4	4	4	4	4
<b>FENCES AND WALLS</b>												
ROW Fence Repair			2	2	2	2	2	2	2	2	2	
Fence/Wall Structure Inspection			1	1	1	1	1	1	1	1	1	
<b>ROADSIDE</b>												
ROW Full Cycle Mowing				1			1			1		
ROW Tree/Brush Trimming						1					1	
Landscaping area maintenance					2	2	2		2	2		
ROW Herbicide Application			4			4			4			
<b>EARTHWORKS AND EMBANKMENTS</b>												
Unpaved Shoulder Repair				2		2	2					
Turf Repair			1	1	1	1	1	1	1	1	1	
Slope Repair		2	2	2	2	2	2	2	2	2		
<b>GRAFFITI</b>												
Removing Graffiti*	8	8	8	8	8	8	8	8	8	8	8	8

<b>Maintenance Group</b>	<b>J</b>	<b>F</b>	<b>M</b>	<b>A</b>	<b>M</b>	<b>J</b>	<b>J</b>	<b>A</b>	<b>S</b>	<b>O</b>	<b>N</b>	<b>D</b>
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**INCIDENT RESPONSE**

<b>Specialty MOT Detours</b>	1	1	1	1	1	1	1	1	1	1	1	1
<b>Vehicle Towing</b>	7	7	7	7	7	7	7	7	7	7	7	7
<b>Response to Incidents</b>	C	C	C	C	C	C	C	C	C	C	C	C

**MAINTENANCE YARD**

<b>Grounds Maintenance*</b>	3	3	3	3	3	3	3	3	3	3	3	3
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**SNOW AND ICE REMOVAL**

<b>Snow and Ice Removal (Light)</b>	3			1							3	3
<b>Snow and Ice Removal (Medium)3</b>	3	3	3									3
<b>Snow and Ice Removal (Heavy)</b>			1									

**COURTESY PATROL**

<b>Patrol</b>	V	V	V	V	V	V	V	V	V	V	V	V
---------------	---	---	---	---	---	---	---	---	---	---	---	---

**SWEEPING AND CLEANING**

<b>Mechanical Sweeping</b>	1	1	1	1	1	1	1	1	1	1	1	1
<b>ROW Litter Removal</b>	6			6			6			6		

**COVER**

<b>Inspections and Testing</b>												
<b>Tunnel Ventilation System Servicing</b>	E	E	E	E	E	E	E	E	E	E	E	E
<b>Tunnel System Services</b>	E	E	E	E	E	E	E	E	E	E	E	E
<b>Tunnel Lighting</b>	2	2	2	2	2	2	2	2	2	2	2	2
<b>24/7 CTMC Staff</b>	D	D	D	D	D	D	D	D	D	D	D	D

**ITS AND ETC FACILITIES**

<b>ITS &amp; ETC Infrastructure Visual Inspections</b>	2	2	2	2	2	2	2	2	2	2	2	2
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*\*Note: Activities are completed as required*

**Legend:**

**(A – 10/Month; B – 22/Month; C – 182.5/Month; D – Daily; E – 20/Month; V – Various/As Needed)**



### 31.2 ANNUAL ROUTINE MAINTENANCE SCHEDULE

The Annual Routine Maintenance Schedule, included below, provides the anticipated activities over the Term.

Table A-2 Element Group Activity	Contr. Period Est. Annual Work Quantity	Year 1-5	Year 5-10	Year 10-15	Year 15-20	Year 20-25	Year 25-30
<b>PAVEMENT (ROADWAY, RAMPS, ACCESS ROADS AND OTHER PAVED AREAS)</b>							
Repair Asphalt Potholes, Depressions, raveling, irregularities with Cold Mix	1-5 Tons						
Repair Asphalt Cracking	**						
Repair base of subgrade failures	**						
<b>DRAINAGE SYSTEMS</b>							
Cleaning, disilting	**						
Clean Bridge Deck Drainage	14						
Repair and Cleaning of Inlets	10 to 20						
Cleaning and Reshaping retention areas	-						
Cleaning / Repair Paved Ditch	**						
Cleaning / Repair Pipe Slope	**						
Pipe Stations	**						
<b>STRUCTURES</b>							
Cleandek joint and/or repair joint materials	**						
Deck Mnt. & repair (spalls, crack)	**						
Mnt. And/or repair to bridge rail structure	**						
Super. Mnt. And repair (bearings, beams)	**						
Mnt. & repair to substructure	**						
Replace large multi-post sign panel structural members and/or foundation	-						
Repair Overhead / Cantilever Sign Structure	0 to 2						
Routine Bridge Inspections (NBIS)	7 to 14						
Inspections from special circumstances	As Needed						
<b>ROADWAY MARKING</b>							
Renew Long Line Striping	**						
Renew Pavement Symbols	**						
Replace Reflective Markers	**						

Table A-2 Element Group Activity	Contr. Period Est. Annual Work Quantity	Year 1-5	Year 5-10	Year 10-15	Year 15-20	Year 20-25	Year 25-30
Replace Object Markers / Delineator & Posts	50 to 100						
<b>GUARD RAILS, BARRIERS, IMPACT ATTENUATORS</b>							
Mnt. / Repair Guardrail	7500 to 10000						
Mnt. / Repair Guardrail End Treatments	5 to 10						
Barrier Wall Repair	-						
Attenuator Routine Mnt.	12						
Repair Attenuator (Partial)	1 to 5						
<b>SIGNS</b>							
Replace Small (<30 Sqft) Sign Panels	100 to 200						
Replace Small Sign Posts	20 to 50						
Repair / Replace (>30 Sqft) Sign Panels	-						
Illegal Signs / Banners, Flags, Posters	52						
<b>TRAFFIC SIGNALS</b>							
Traffic Signal Inspection and Monitoring	52						
<b>LIGHTING</b>							
Highmast Inspection and Monitoring	52						
Street Lighting Inspection and Monitoring	104						
Underdeck Lighting Inspection and Monitoring	78						
<b>FENCES AND WALLS</b>							
Repair Fence Damage	-						
Maintain Sound and Retaining Walls	-						
Fence / Wall Structure Inspection	39						
<b>ROADSIDE</b>							
Full Cycle Mowing Large	2 to 4						
Full Cycle Small Machine / Hand Mow	3 to 6						
Full Cycle Slope Mowing	1 to 2						
Landscape Area Maintenance	-						
Tree and Brush Removal	1 to 5						
Herbicide Spray	0 to 2						
<b>EARTHWORKS AND EMBANKMENTS</b>							



Table A-2 Element Group Activity	Contr. Period Est. Annual Work Quantity	Year 1-5	Year 5-10	Year 10-15	Year 15-20	Year 20-25	Year 25-30
Misc. Slope & Ditch Repair	0 to 2500						
Repair Non-Paved Shoulder	0 to 2500						
Repair Curb / Sidewalk Failures	-						
<b>GRAFFITI</b>							
Removing Graffiti	78						
Removing Offensive Graffiti	78						
<b>RESPONSE TO INCIDENTS</b>							
Responses to Minor Incidents (Includes Towing)	3650						
Response to Major Incidents	864						
<b>SNOW AND ICE REMOVAL</b>							
Snow and Ice Removal	10 to 20						
Removal of Sand and Debris	5 to 12						
Event Management	320						
<b>COURTESY PATROL</b>							
Patrol	14372						
<b>SWEEPING AND CLEANING</b>							
Cycle Sweeping	12 to 16						
Spot Sweeping	234						
Full Cycle Litter Removal	3 to 6						
<b>COVER</b>							
Replace Tunnel Luminars	5 to 10						
3000 Kva Backup Generator Servicing							
Emergency Telephones Servicing							
Fire Alarm Boxes Servicing							
Overhead Signs							
Ventilation System – Jet Fans Servicing							
Tunnel Lights Maintenance							
Suppression System Nozzles Replacement							
Batteries / UPS Replacement							
Compressor Servicing							

Table A-2 Element Group Activity	Contr. Period Est. Annual Work Quantity	Year 1-5	Year 5-10	Year 10-15	Year 15-20	Year 20-25	Year 25-30
Cover Drainage Maintenance / Repair							
Fireproofing Area - Cleaning							
<b>ITS AND ETC FACILITIES</b>							
ITS and ETC inspection and monitoring							
<b>OM PROGRAM MANAGEMENT</b>							
Tracking Reporting and Monitoring for Compliance	1560						
Responding to Customer Requests	416						
Analysis of Permit Load	1 to 2						
24 / 7 CTMC Staff	10798						

### 31.3 ANNUAL RENEWAL WORK SCHEDULE

The Renewal Work Schedule is included in Attachment 2, Renewal Work Plan. It is prepared and submitted to the Department for Acceptance no later than 60 Calendar Days before the end of each Contract Year. The Renewal Work Schedule for the following year is consistent with the Five Year Renewal Work Schedule, and is based on the asset condition, the applicable General Requirements, and the Work necessary to meet or exceed the applicable Targets.

### 31.4 FIVE YEAR RENEWAL WORK SCHEDULE

The Five Year Renewal Work Schedule is submitted with the Annual Renewal Work Schedule. The Five Year Schedule includes:

- The estimated Residual Life of each Residual element and the proposed strategy and activities that are carried out to meet the Handback Requirements
- The performance of the Renewal elements, including any instances where a Renewal element has not achieved its originally intended Useful Life
- A description of any Routine Maintenance required to ensure that each element of the Project continues to comply with the applicable General Requirements and meet or exceed the applicable Targets
- A description of the type of Renewal Work anticipated to be performed at the end of the element's Residual Life
- A schedule of anticipated planned maintenance needed to perform the Renewal Work including the nature, timing and duration of any associated closures

To be included with the Final Renewal Work Plan.



## **32. MMP Performance Requirements**

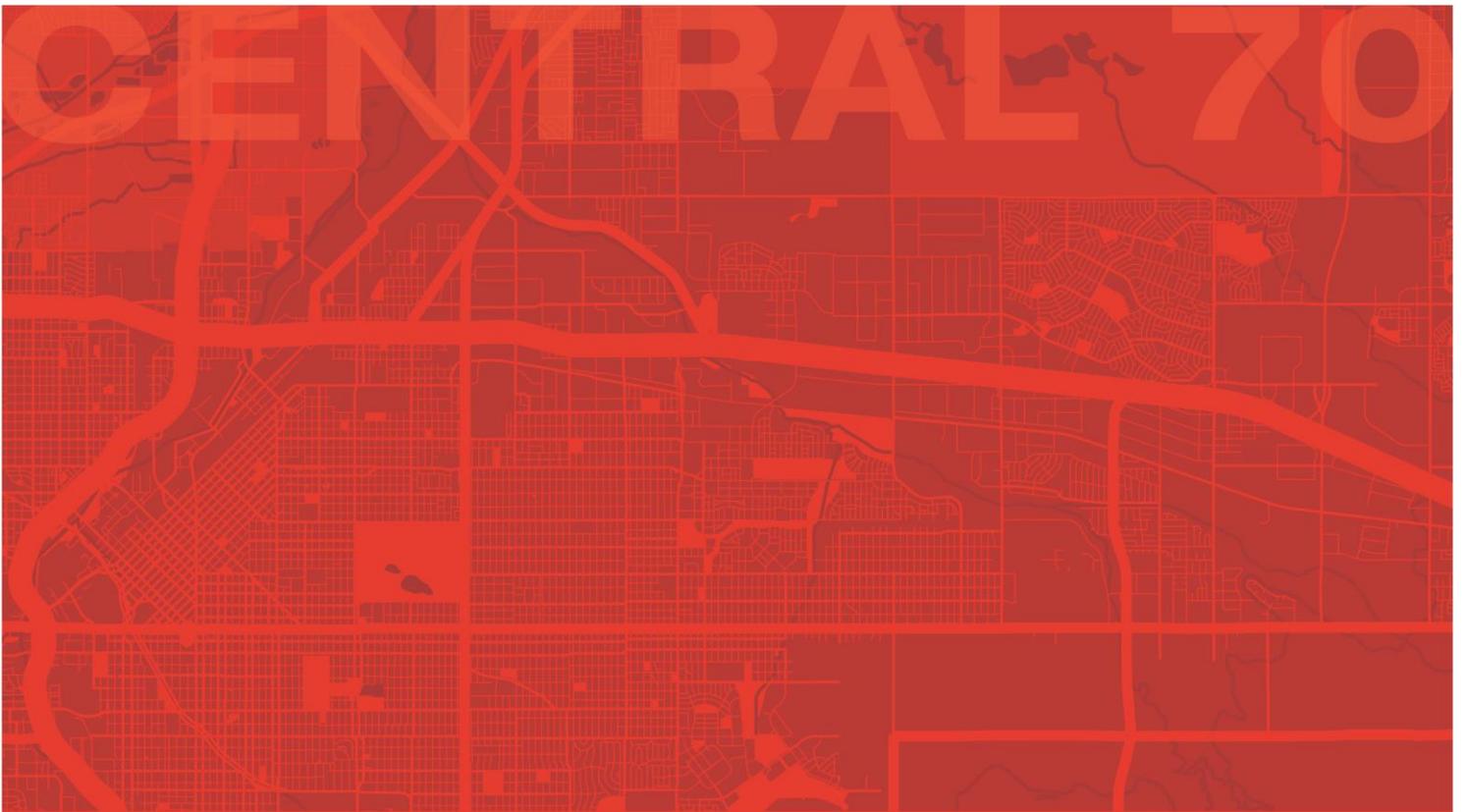
### **32.1 PERFORMANCE REQUIREMENTS AND PROCEDURES FOR UPDATES TO MEASUREMENT TABLES**

The most recent Performance Requirements Accepted by the Department are located in Attachment 7 of this Appendix. KMP provides any recommended revisions to the performance requirements based on the procedure in Section 4.2.6 of Schedule 11, at least 90 Calendar Days before the Substantial Completion Date.

### **32.2 USEFUL LIFE FOR EACH RENEWAL ELEMENT**

The actual Useful Life will be consistent with the Baseline Requirements Table. Updates to the Useful Life Baseline Requirements Table are submitted for Acceptance no later than 60 Calendar Days before the end of each Contract Year and 90 Calendar Days before the anticipated Substantial Completion Date. The actual Useful Life will be consistent with the Baseline Requirements Table. Updates will reflect Good Industry Practice and specific attributes of the final plan set.

**– END OF SECTION –**



ATTACHMENT 1

*Relates to Appendix I*



# Baseline Asset Condition Report



**SUBMITTED TO:**

Colorado Bridge Enterprise  
High Performance Transportation Enterprise  
c/o Colorado Department of Transportation



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## RECORD OF REVISIONS

Revision number	Date issued	Pages affected	Comments
0	5/18/2017	All	Proposal Draft Submittal





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## EVALUATION CRITERIA: APPENDIX I, ATTACHMENT 1

KMP has provided a full Evaluation Criteria Matrix to align the requirements of the Maintenance Management Plan per the Project Agreement with the sections of this plan.

Sch. 11 Section	Item	QMP Section	Section Name	Check
<b>2.3.1.b</b>	Prepare a report (the "Baseline Asset Condition Report (BACR)"), which shall:			<input type="checkbox"/>
<b>2.3.1.b.i</b>	List in detail all such Elements that are required to be subject to the Baseline Inspections	<b>1.0</b>	Content of Baseline Asset Condition Report	<input type="checkbox"/>
<b>2.3.1.b.ii</b>	Assess and describe the existing condition of all such Elements, which description and condition assessment reporting shall: A. Be in reference to the Department's Highway Level of Service Manual; and B. At a minimum, include, but not be limited to, all such Elements listed in Appendix A-1 to this Schedule 11, referencing additionally any other assessment criteria identified in Appendix A-1;	<b>2.0</b>	Scope and Methodology of Baseline Inspections	<input type="checkbox"/>
<b>2.3.1.b.iii</b>	By updating the Performance and Measurement Table set out in Appendix A-1 to this Schedule 11, list the Target minimum baseline asset condition in accordance with which such Elements will be maintained by KMP during the O&M Period During Construction, which such Target minimum baseline condition shall allow for the safe and reliable operation of the existing asset and shall meet or exceed the existing condition of the relevant Element, except to the extent that a Target is specified for such Element in Appendix A-1 of this Schedule 11, in which instance the specified Target condition shall be the minimum baseline asset condition.	<b>3.0</b>	Performance and Measurement Table	<input type="checkbox"/>

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## 1. Content of Baseline Asset Condition Report

KMP prepares and submits the Baseline Asset Condition Report (BACR) prior to NTP2. We conduct inspections and tests to determine the existing condition of each Project element to be maintained during the O&M During Construction as required by Schedule 11. The report contains:

- Details of all elements listed in Appendix A-1 of Schedule 11
- Descriptions of existing conditions according to the Department’s *Highway Level of Service Manual*
- An update of the Performance Measurement Table in Appendix A-1 of Schedule 11

We conduct a complete asset inventory of the infrastructure assets within the O&M Limits of the Project prior to NTP2. This inventory is the basis of the calculations for refining the O&M Plan and Maintenance Management Plan.

KMP has conducted a preliminary survey (a “windshield” survey) within the Project limits and noted the type, number, and condition of the existing assets. This information provides preliminary data for planning the BACR effort and maximizing our efficiency in conducting the Work effort.

The following list of assets is a preliminary count provided as a placeholder for this Draft document—we provide a list of assets with the Final Baseline Condition Report. We use these designations:

- **Segment A:** Brighton to Dahlia
- **Segment B:** Dahlia to Sand Creek
- **Segment C:** Sand Creek to Chambers

### Preliminary Count of Project Assets for O&M

Section	Unit	Pecos to Brighton Blvd.	Seg. A	Seg. B	Seg. C	Chambers to Tower	TOTAL	System Provider * Cover only
<b>ROADWAY</b>								
Mainline	Lane Miles	10.82	21.94	12.72	46.93	9.76	<b>102.17</b>	
Ramps	Lane Miles	5.31	3.55	2.87	10.76	4.93	<b>27.42</b>	
Cross streets	Lane Miles		3.88	0.00	0.00		<b>3.88</b>	
Shoulders	Lane Miles		7.88	6.80	14.72		<b>29</b>	
Curb and Gutter	LF		27,664	11,090	994		<b>39,747</b>	
Asphalt pavement	SY		206,475	170,858	209,299		<b>586,632</b>	



Section	Unit	Pecos to Brighton Blvd.	Seg. A	Seg. B	Seg. C	Chambers to Tower	TOTAL	System Provider * Cover only
Concrete pavement	SY				65,755			
Interchanges	EA		3	2	5		10	
Overpasses	EA		2	5	3		10	
Underpasses	EA		9	0	1		10	
Ramps	EA		10	6	11		27	
Mainline	Mile						12.6	
Sidewalks	SF		306,058	136,777	8,578		451,413	
Sidewalks	LF		61,212	27,356	1,715		90,283	
Concrete slope paving	SF		166,744	60,082	4,027		230,853	
Concrete Medians and Islands	SF		2,158				2,158	
Simple structures	EA		13	7	2		22	
Bridge deck area	SY		37,343	14,293	7,083		58,719	
Havana bridge deck area	SY				4,773		4,773	
Deck spans	EA		24	7	5		36	
Deck area	SF		336,090	128,639	63,743		528,472	
Approach slabs	SF		39,234	43,439	10,250		92,923	
MSE walls	SF		129,850	208,199	0		338,049	
MSE wall	EA		8	13	0		21	
Concrete Barrier (on Bridges)	LF		4,780	4,198	2,675		11,653	
Concrete Barrier (not on Bridges)	LF		54,160	42,419	29,668		126,248	
Bridge joints	LF		11,369	2,449	497		14,315	
Concrete girders	EA		440	128	26		594	
Concrete Pier (bent)	EA		14	0	4		18	
Steel girders	EA		120	0	0			
Concrete girders	SF		337,161	267,484	73,634		678,279	
Concrete pier	SF		55,631	63,359	7,000		125,990	

Section	Unit	Pecos to Brighton Blvd.	Seg. A	Seg. B	Seg. C	Chambers to Tower	TOTAL	System Provider * Cover only
Steel girders	SF		225,682				225,682	
Bridge bearings	EA		1,302	252	84		1,638	
<b>Row</b>								
Vegetation (mowable area)	Acre		5.9	1.1	2.3		9.3	
Slope mowing areas	Acre		14.0	13.9	60.3		88.2	
Stormwater ponds	Acre		3.6	.2	4.7		8.5	
Stormwater ponds	EA		9	1	2		12	
Trees	EA		513	53	108		674	
Shrubs	EA		2,428	532	1,080		4,040	
Grasses and Perennials	EA		9,710	2,130	4,320		16,160	
Sound barrier walls	LF		28,800	0			28,800	
Row fencing	LF						0	
36" Splash Guard Fence on Barrier	LF		21,359	4,577	4,577		30,513	
60" Special Fence on Mainline	LF		3,134	672	671		4,477	
96" Galvanized Special Fence on Mainline	LF		748	160	160		1,068	
Decorative Fence on Bridges	LF		2,503	536	536		3,575	
Cable rail fence	LF		272	58	59		389	
6' wood privacy fence	LF		2,303	494	493		3,290	
Gates	EA		-	-	-		0	
Landscaping	Acre		23.5	15.2	67.3		106.0	
Slopes	SY						0	
<b>DRAINAGE</b>								
Box culverts	LF		2,268				2,268	



# CENTRAL

Section	Unit	Pecos to Brighton Blvd.	Seg. A	Seg. B	Seg. C	Chambers to Tower	TOTAL	System Provider * Cover only
Subsurface drain outlets	EA		23	8	4		35	
Pump stations	EA						0	
Catch basin grates	EA		251	180			431	
Inlets	EA		457	225	36		718	
Manholes	EA		165	84	5		254	
Storm drainage pipe	LF		63,372	32,026	9,098		104,496	
End treatments	EA		11	4	34		49	
Paved ditch	LF		3,141				3,141	
<b>Barriers</b>								
W-beam guardrail	LF		6,270	-	-		6,270	
Non-flared end anchors	EA		28	-	-		28	
3h guardrail transitions	EA		28				28	
Thrie-Beam guardrail	LF		-	-	-		0	
Thrie-Beam approach rail transition	EA		-	-	-		0	
Thrie-Beam exit connection	EA		-	-	-		0	
Thrie-Beam cable end treatments	EA		-	-	-		0	
Guardrail End Sections (Departure end)	EA		-	-	-		0	
Guardrail end treatment (approach end)	EA		-	-	-		0	
Crash attenuators	EA		8	-	-		8	
Wall railing	LF		-	-	-		0	
Bridge structure railing	LF		6,234	3,020	2,399		11,653	
Cable barrier	LF		-	-	-		0	

Section	Unit	Pecos to Brighton Blvd.	Seg. A	Seg. B	Seg. C	Chambers to Tower	TOTAL	System Provider * Cover only
Cable barrier anchors	EA			-	-			
<b>UTILITIES</b>								
High mast lighting poles	EA		20	27	20		<b>67</b>	
LED Light Fixtures for High Mast Poles	EA		40	54	40		<b>134</b>	
Street lighting poles	EA		126	99	24		<b>249</b>	
LED Light Fixtures for Street Lighting Poles	EA		137	99	24		<b>260</b>	
Under bridge lights	EA		102	0	0		<b>102</b>	
LED decorative fence lighting	LF		3,267	0	0		<b>3,267</b>	
Sign Lights (if applicable)	EA		N/A	N/A	N/A		<b>0</b>	
Bridge structure signs—overhead	EA		11	10	10		<b>31</b>	
Bridge structure signs—cantilever	EA		10	5	6		<b>21</b>	
Ground mount Breakaway Signs	EA		14	2	3		<b>19</b>	
Bridge structure signs—overhead	SF		6,991	6,991	6,991		<b>20,973</b>	
Bridge structure signs—cantilever	SF		1,433	1,433	1,433		<b>4,299</b>	
Ground mount Breakaway Signs	SF		453	453	453		<b>1,359</b>	
Signs panels	EA		100	24	24		<b>148</b>	
Signs posts	EA		100	24	24		<b>148</b>	
Dynamic message signs	EA		81	45	119		<b>245</b>	
Delineators	EA		-	-	-		<b>0</b>	
Solid double yellow	LF		42,158	10,539	10,539		<b>63,236</b>	



Section	Unit	Pecos to Brighton Blvd.	Seg. A	Seg. B	Seg. C	Chambers to Tower	TOTAL	System Provider * Cover only
4" solid yellow	LF	176,804	44,201	44,201			<b>265,206</b>	
8" solid yellow	LF	49,994	12,498	12,498			<b>74,991</b>	
4" solid white	LF	577,650	144,413	144,413			<b>866,475</b>	
4" dotted white	LF	86,990	21,748	21,748			<b>130,485</b>	
4" broken white	LF	854,638	213,659	213,659			<b>1,281,956</b>	
Arrows	EA	7	1	1			<b>9</b>	
Stopsigns	EA	24	6	6			<b>36</b>	
Misc. markings	EA	403	86	86			<b>575</b>	
Raised pavement markings	EA	-	-	-				
Signalized intersections	EA	30	6	2			<b>38</b>	
Ramp meters	EA	7	4	5			<b>16</b>	
Pavement loop detectors	EA	20	12	15			<b>47</b>	
Pavement Wireless Sensor Pucks for Ramp Metering	EA	58	34	40			<b>132</b>	
Signal Heads for Ramp Metering	EA	50	29	40			<b>119</b>	
Ramp metering poles	EA	33	19	25			<b>77</b>	
Ramp metering cabinet	EA	7	4	5			<b>16</b>	
Signal light poles	EA	119	24	8			<b>151</b>	
Signal light fixtures	EA	119	24	8			<b>151</b>	
Overhead signal detectors	EA	405	90	29			<b>524</b>	
Signal cabinet boxes	EA	30	6	2			<b>38</b>	
Emergency response activator	EA	96	18	6			<b>120</b>	

Section	Unit	Pecos to Brighton Blvd.	Seg. A	Seg. B	Seg. C	Chambers to Tower	TOTAL	System Provider * Cover only
<b>COVER</b>								
100a emergency house panel	EA		1				1	
100a house panel	EA		1				1	
225a Cover lighting panel	EA		1				1	
3000kva Backup Generator	EA		1				1	
4000a outdoor switchgear normal pwr.	EA		1				1	
4000a outdoor switchgear emergency pwr.	EA		1				1	
Public address speakers	EA		80				80	
Emergency telephones	EA		16				16	
Fire alarm boxes	EA		29				29	
Overhead signs	EA		12				12	
Ventilation system	EA		18				18	18
Fire extinguishers	EA		35				35	35
Water storage tank	EA		0				0	
Closed circuit TV	EA		30				30	
Generator	EA		1				1	
Traffic signals	EA		0				0	
Cover lights	EA		1,974				1,974	
Fire/water valves	EA		40				40	
Fire pump	EA		2				2	
Suppression system nozzles	EA		2,000				2,000	
Batteries/UPS	EA		3				3	
Compressor	EA		2				2	



# CENTRAL

Section	Unit	Pecos to Brighton Blvd.	Seg. A	Seg. B	Seg. C	Chambers to Tower	TOTAL	System Provider * Cover only
Vaults	EA		0				0	
Cover drainage	LF		3,928				3,928	
Cover pump drainage	LF						0	
Cover Fixed Firefighting System	LF		30,000				30,000	
Heat trace	LF		2,000				2,000	
Retaining walls	SF						0	
Cover area	SF		207,486				207,486	
Fireproofing area	SF		193,926				193,926	
<b>ITS</b>								
Variable toll message sign (VTMS)	EA		3	1	3		7	
ITS sign structures	EA		18	9	23		50	
CCTV camera	EA						26	
CCTV Pole w/ Lowering Device	EA						21	
Comm. Cabinet type 332	EA						60	
Comm. Cabinet type 332d	EA						7	
UPS cabinet	EA						4	
Pavement loops	EA							
Manholes	EA						179	
Pull boxes	EA						0	
Conduit	LF						112,686	
<b>Cover Park Lighting</b>								
LED linear fixture	LF		928				928	
Light Pole with Fixture	EA		72				72	
In ground fixture	EA		60				60	

## 2. Scope and Methodology of Baseline Inspections

The goal of the BACR is to obtain an accurate, unbiased, and fair assessment of the condition of the assets within network, through a systematic inspection process, and produce a quantifiable measure of the condition of the network as well as individual types of assets.

KMP conducts specific inspections, condition assessments, evaluation, and testing to determine the baseline asset condition. We perform a roadway characteristic inspection comparing condition to the performance criteria stated in the Project Agreement. We plan a near 100% system assessment prior to commencement of Operations. Prior to the Operating Period, we integrate initial information into JAMMS.

The following information provides a general outline of the scope and methodology associated with baseline inspections.

### 2.1 PROJECT LIMITS OVERVIEW

The Ultimate configuration of the corridor includes two managed lanes, six General Purpose Lanes, and a number of interchanges with connecting roadways. The centerline mileages of each main roadway system within the Project are:

- **Managed Lanes:** Approximately 10 miles
- **General Purpose Lanes:** Approximately 10 miles

These limits will be critical later when determining the assessment locations. We use the defined beginning and ending of the corridor as references for assessment locations to be described later.

### 2.2 DETERMINING APPROPRIATE SAMPLE SIZE FOR CONDITION SURVEY

This section describes the method used to identify a statistically accurate sample size for the assessment locations to be rated, and includes a discussion of the randomly generated assessment location selection process.

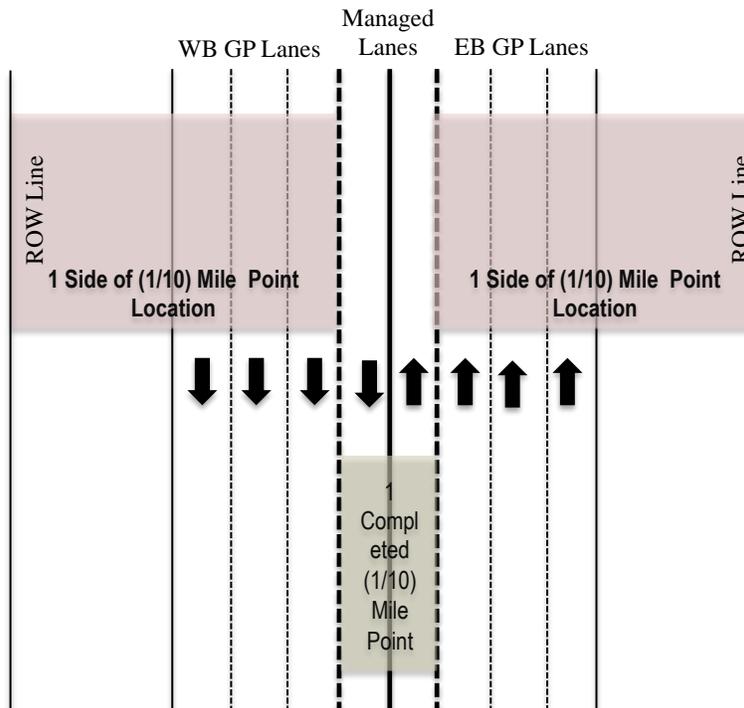
#### Determine Sample Size for Survey

To identify the sample size, the first step is determining the total sample population for each network type on this corridor. There are two types:

- General Purpose Lanes defined as urban limited access
- Managed Lanes defined as urban limited access

Each assessment location required by the process is 1/10th of a mile and encompasses both directions of one roadway type. The following illustration is an example:

## Survey Sample Size Configuration



Using this configuration and considering the 1/10 length of each sample point and the total length of each roadway type, the following is the total population size for each roadway:

- **Managed Lane Population:** Approximately 119 potential (1/10 mile) assessment locations
- **General Purpose Lane Population:** Approximately 119 potential (1/10 mile) assessment locations

### Generating Sample Sizes—Statistical Equation

After determining the population size, the next step is using an equation to statistically determine a valid sample size based on the asset population and allowed margin of error. Cochran's formula for sampling proportions is an industry-standard estimating technique if the items sampled are classified into two groups, such as Pass and Fail (a reference for the equation is Sampling Techniques, Third Edition, by William G. Cochran, Professor of Statistics, Emeritus, Harvard University, John Wiley & Sons, 1977, page 75, Equation 4.1.)

### Cochran's Formula

$$n = \frac{z^2 p(1-p)}{e^2 + \frac{z^2 p(1-p)}{N}}$$

Where:

- **Sample size**, n, is the number of sampling units to be tested
- **Standard deviation**, z, is the **level of confidence**—the probability that further sampling conducted in the same manner leads to the same result
- **Error**, e, is the difference between the average proportion passing, p, in the sample and the average proportion passing in the population
- **Proportion passing**, p, is the number of sampling units passing the criteria divided by the total number of sampling units (% passing expressed as a decimal)
- **Population size**, N, is the number of sampling units (instances of work) in the population to be sampled

The following are the values used for key components of the equation:

- z = 1.96
- e = 3%
- p = 95%
- n = population size for each roadway type

The commonly accepted value for the level of confidence is 95% (z = 1.96). This is the initial value used for quality control sampling. 3% (e) error is recommended for these population sizes and this continuous-type data.

The resulting calculated sample size (n) for each roadway type is the total sample size for the baseline condition assessment:

### Roadway Calculations

	Bi-Directional Lane	GP Lanes
<b>z =</b>	1.96	1.96
<b>N =</b>	88	110
<b>e =</b>	0.03	0.03
<b>p =</b>	0.95	0.95
<b>n =</b>	<b>61</b>	<b>71</b>



### 2.3 SELECTING SAMPLING POINTS

The goal of selecting sampling points for evaluation is to produce an unbiased method of generating point locations. Prior to choosing a method, the population of each roadway sample point option is given a numeric designation. The table below identifies these numeric designations given to each potential assessment location.

Numeric Designations for Potential Locations

Managed Lanes		General Purpose Lanes	
Mile Point (x)	Numeric Representation (Y+1)	Mile Point (x)	Numeric Representation (Y+1)
0.0	111	0.0	199
0.1	112	0.1	200
0.2	113	0.2	201
0.3	114	0.3	202
x+ 0.1	114+1	x+ 0.1	4+1
8.7	198	8.7	308

There are two methods to accomplish this task—a random number generator table and a generator application. A random number generator table is a series of numbers in a table with an undefined pattern. The individual selecting the numbers from the table establishes a process of selecting potential sample points. For example, every third number from the table, or every other diagonally aligned number starting on the top right of the table. The individual selects the total number of sample points required based on the selection method.

The second option is the use of a generator application, which simplifies this process. In the Microsoft Excel program there is a function titled “RANDBETWEEN”. This function returns a number between the numbers specified. For example if a random number is to be selected for the frontage road (1 to 110), the formula entered would be =RANDBETWEEN(1,110).

Both options allow the random selection of required sample point for each of the roadway types—we recommend the generator method for its simplicity.

### 2.4 PERFORMING THE ASSESSMENT

This section provides the general process and practices KMP uses when performing inspections, and the minimum qualification requirements of the inspectors. The assessment uses the most current manuals unless otherwise stated.

We designed this systematic assessment to determine the condition and functionality of individual assets within the Project. Characteristic/assets are inspected against a series of pre-established condition criteria. We developed this list based on the Schedule 11, Appendix A-2.

The characteristics are divided into five element groups as follows:

- Roadway
- Roadside
- Traffic services

- Drainage
- Vegetation and aesthetics

The table below shows the element groups and their associated characteristics:

### Assets and Associated Characteristics

Roadway	Roadside	Traffic Services	Drainage	Vegetation/ Aesthetic
Flex pothole	Unpaved shoulder	RPMs	Side cross drain & culverts	Roadway mowing
Flex cracks	Embankments/ Slope	Striping	Ditches/channels	Litter/graffiti
Flex ruts	Curb & gutter	PVMT symbol	Inlets/catch basins	Turf condition
Flex raveling	Fence	Signs	Rip-rap/slope	Tree trimming
Flex edge breaking	Sidewalk	Overhead signs	Misc. drainage	Landscaping
Rigid spalls/pothole	Soundwall/retaining Wall	Object mark delineators	Roadway sweep	
Rigid cracks		Lighting (Cover)		
Rigid dep/bump		Guardrail		
Rigid joint faulting		Attenuator/end treatment		
Rigid joint seal		Barrier wall		

The field assessment requires a minimum of a two-person team, which includes a certified MRP Team Leader equipped with the proper measuring instruments. This may include, but is not limited to, a carpenter’s rule, a handheld level, multiple length measuring tapes, a measuring wheel, a handheld optical level, a probing device, and a Distance Measuring Instrument (DMI). As part of the process, a minimum of one qualified Team Leader attends the inspection.



The first step in the fieldwork is to locate each 1/10 mile sample point to be assessed (the length of the location is always a 1/10 mile section.) To identify the point locations, the inspection team uses a set of Straight-Line Diagrams (SLDs) provided by the Department at <http://dtdapps.coloradodot.info/sld/>. SLDs are linear representations of roadway segments annotated with graphics or text applicable to roadway segments such as intersecting roads, bridges, and other structures. Each set of diagrams is specific to the system’s beginning and ending maintenance limits and relative to the roadside directional coordinate (north, south, east, west).



## Rating

The inspectors locate each sample point, inspect it, and complete a coding sheet summarizing the field findings within the point. Each of the 38 rated items on the coding sheet receives a score of pass (Y), fail (N), or absent (-). If the asset meets or exceeds the condition criteria, it receives a passing score of a Y. If the asset does not meet the minimum condition criteria, the characteristic receives a failing score of N. If the asset is not present, it receives an N/A or dash.

## Coding Sheets

We record the information on coding sheets with the certified score of each assessment point. At a minimum, the coding sheets include the assessment point number, the roadway name, the location (either GPS or mile point), the date of the assessment, and the rating of each of the 38 characteristics.

## 3. Performance and Measurement Table

KMP submits an updated Performance and Measurement Table as set out in Schedule 11, Appendix A-1. The table lists the target minimum baseline asset condition of the elements that are maintained by KMP during the O&M During Construction. The updated Performance and Measurement Table is attached to the Baseline Asset Condition Report.



## **32. MMP Performance Requirements**

### **32.1 PERFORMANCE REQUIREMENTS AND PROCEDURES FOR UPDATES TO MEASUREMENT TABLES**

The most recent Performance Requirements Accepted by the Department are located in Attachment 7 of this Appendix. KMP provides any recommended revisions to the performance requirements based on the procedure in Section 4.2.6 of Schedule 11, at least 90 Calendar Days before the Substantial Completion Date.

### **32.2 USEFUL LIFE FOR EACH RENEWAL ELEMENT**

The actual Useful Life will be consistent with the Baseline Requirements Table. Updates to the Useful Life Baseline Requirements Table are submitted for Acceptance no later than 60 Calendar Days before the end of each Contract Year and 90 Calendar Days before the anticipated Substantial Completion Date. The actual Useful Life will be consistent with the Baseline Requirements Table. Updates will reflect Good Industry Practice and specific attributes of the final plan set.

**– END OF SECTION –**





# Draft Renewal Work Plan



**SUBMITTED TO:**

Colorado Bridge Enterprise  
High Performance Transportation Enterprise  
c/o Colorado Department of Transportation



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## RECORD OF REVISIONS

Revision number	Date issued	Pages affected	Comments
0	5/18/2017	All	Proposal Draft Submittal



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## EVALUATION CRITERIA: RENEWAL WORK PLAN, APPENDIX I, ATTACHMENT 2

KMP has provided a full Evaluation Criteria Matrix to align the requirements of the Project Agreement with the sections of this Plan.

Sch. 11 Section	Item	Renewal Work Plan Section	Section Name	Check
6.1.3.a	KMP's overall approach to meeting Renewal Work requirements, and expected Renewal Work expenditure throughout the remainder of the Term	1.0	KMP's Approach to Renewal Work	<input type="checkbox"/>
6.1.3.b	KMP's procedure for optimizing the Useful Life of each element, describing how the replacement cycle is determined based upon initial cost, maintenance cost; reliability, obsolescence, and other relevant factors	2.0	Optimizing the Useful Life of Each Element	<input type="checkbox"/>
6.1.3.c	KMP's annual update to the Useful Life Baseline Requirements Table. For each renewal element, KMP shall submit evidence based upon actual performance and condition in service, together with appropriate O&M records, that the Useful Life as set forth in the Useful Life Baseline Requirements Table will be met or exceeded	2.0	Annual Updates to the Useful Life Baseline Requirements Table	<input type="checkbox"/>
6.1.3.d	KMP's procedure for assessing the condition of all elements, including the critical structural elements, against intended performance and predicting time to maintenance and residual life, including the inspection, testing and monitoring requirements	4.0	Assessing Element Condition	<input type="checkbox"/>
6.1.3.e	Show KMP's approach to Renewal Work follows good Industry Practice. KMP will use current techniques and research in life cycle maintenance and show all such innovation and research is adopted as warranted in its annual updates of the Renewal Work Plan	5.0	Good Industry Practice	<input type="checkbox"/>
6.1.3.f	KMP's procedure for the selection of suppliers and subcontractors needed for Renewal Work, including supply chain management procedures and procedures in place to ensure quality of work for any Renewal Work is assured	6.0	Selecting Suppliers and Subcontractors	<input type="checkbox"/>
6.1.3.g	Staffing, organization and specific responsibilities for implementing the requirements for residual life methodology and testing as required by Schedule 12 (Handback Requirements)	7.0	Staffing, Organization and Responsibilities for Residual Life Methodology	<input type="checkbox"/>
6.1.3.h	KMP's plan to achieve Handback requirements for all elements	8.0	Achieving Handback Requirements for All Elements	<input type="checkbox"/>
6.1.3.i	The methods and procedures to be used by KMP to estimate the expected cost of Renewal Work for each asset and component, demonstrating the estimates are reasonable and appropriate	9.0	Estimates for the Expected Cost of Renewal Work for Individual Assets	<input type="checkbox"/>

## EVALUATION CRITERIA: O&M SAFETY PLAN, APPENDIX I, VOLUME 2

Sch. 11 Section	Item	Renewal Work Plan Section	Section Name	Check
6.1.3.j	Planned Closures for Renewal Work, to be updated more frequently as required	10.0	Planned Closures for Renewal Work	<input type="checkbox"/>

## 1. KMP’s Approach to Renewal Work

Renewal Work is based on Kiewit-Meridiam Partners’ (KMP’s) life cycle asset management strategy. We use the following tools to monitor and measure assets to ensure they meet the Operating Period of the Project’s performance criteria:

- The Quality Management System (QMS) used during all periods of the projects—our approach includes a robust QMS that ensures that assets are constructed according to Design, and maintained to optimize the asset’s life cycle
- Commissioning of the elements
- Monitoring of elements during the warranty period to ensure they are functioning as designed
- Field inspections and detailed inspections
- Maintenance activities to support asset functionality and performance including cleaning, sweeping, and repairing
- A renewal schedule that provides the roadmap for Renewal Work
- Handback criteria that serves as a reference point and primary focus for current activities and is a prominent requirement in the future

KMP will manage the following physical assets:

### Project Physical Assets

Routine/Periodic Maintenance	Rehabilitation	Renewal
<ul style="list-style-type: none"> <li>• Noise walls</li> <li>• Major retaining structures</li> <li>• Signs and sign structures</li> <li>• Lighting</li> <li>• Culverts and drainage control facilities</li> <li>• Guardrail/barriers</li> </ul>	<ul style="list-style-type: none"> <li>• Pavement surfaces</li> <li>• Bridge structures</li> <li>• Cover</li> </ul>	<ul style="list-style-type: none"> <li>• Pavement surfaces</li> <li>• Structures</li> <li>• Drainage</li> <li>• Earthwork</li> <li>• Ancillaries</li> <li>• Mechanical and electrical systems</li> <li>• Cover plumbing systems</li> <li>• ITS/Tolling civil infrastructure</li> </ul>

The following table shows our approach to Renewal Work. It indicates the approximate timing of Renewal Work activities throughout the Term. This approach is based on:

- Estimated Useful Life and residual life
- Handback requirements
- Level of Routine Maintenance
- Optimization of costs for Renewal Work



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### Approach to Renewal Work

YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
<b>Pavement</b>																														
Diamond Grind					X					X					X					X					X					X
Mill 2", OL 2" SMA																			X											
Mill 2", OL 4" (HMA+SMA)																														X
3" Partial Patching		X				X						X				X							X				X			
Full Depth Patching				X				X					X					X							X					X
Crack Seal					X					X					X					X					X					X
<b>Bridges</b>																														
Replace Bridge Joints															X															X
Replace Bridge Bearings																														X <sup>(1)</sup>
Replace Waterproof Membrane																														X <sup>(2)</sup>
<b>Cover</b>																														
Replace Cover Lighting															X															X
Replace Jet Fans <sup>(3)</sup>																														



# CENTRAL

YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Replace CCTV Cameras										X										X										X
Replace UPS System										X										X										X
<b>Overhead &amp; Cantilevered Signs</b>																														
Replace Panels															X															X
<b>Culverts</b>																														
Reseal Joints	-	-	-												X															X
Localized Repairs																														X
<b>Retaining Walls</b>																														
Joint Repairs										X										X									X	

- (1) 5% of Total Bridge Bearings
- (2) Replace Waterproofing with Second Pavement Intervention
- (3) Assumed Replaced 1 Fan throughout term

## 2. Optimizing the Useful Life of Each Element

KMP's procedures for element Useful Life optimization begin by using operations and maintenance (O&M) factors to formulate strategic decisions throughout the Design process. This ongoing interface between the Design Team and the O&M Team results in optimized O&M processes and minimized long-term costs. Our O&M Team reviews Design drawings, analyzes life cycle costs for specific Design elements, and helps make the best decisions for material durability, efficient traffic flow, better safety, better incident response, and successful Handback.

Factors addressed in the collaboration between our O&M and Design Teams include:

- Durability of materials
- Maintainability of Project elements
- Project life cycle cost
- Integration of O&M best practices
- Renewal and rehabilitation Work priorities
- Innovative designs to optimize asset Useful Life and constructability

After Final Design, our O&M Team collaborates closely with the Construction Team to implement the O&M features of the Design. Factors addressed in the collaboration between our O&M and Construction Teams include:

- Cost optimization between Construction and O&M
- Durability of Project elements
- Optimization of Useful Life

To ensure KMP's metrics for the installation are met, we implement a robust Quality Management System. KMP oversees implementation of the Project's Quality Plans to ensure that delivery meets the Department's requirements and assets are designed, constructed, operated, and maintained to maximize Useful Life. We monitor, inspect, and test to confirm that assets function as designed.

To estimate the Useful Life of each element, KMP determined the replacement cycle based on factors including initial cost, projected maintenance cost, reliability, and obsolescence. We analyzed the Design and predicted performance for each element. We populated the replacement model with Design inputs and assumptions and compared using baseline, aggressive, and conservative alternatives where applicable. We also included the Design and performance requirements from the Schedule, traffic predictions and pavement Design inputs, and multiple replacement strategies in the analysis. The result was an estimate for replacement life for the life cycle cost analysis.

As an example for pavements:

- We analyzed pavement functional and structural performance using Pavement—ME software
- We used the results to predict pavement replacement requirements for each combination of initial construction alternative and intervention strategies
- We emphasized ride quality (IRI), because we anticipate it to be a key Renewal Work during the Operating Period



During the Operating Period, we use the predicted Useful Life as a guide for scheduling inspections to determine actual replacement needs based on performance requirements. KMP uses experienced staff to look at each element of the asset and create renewal schedules to prevent performance reductions. We monitor elements and conditions reports to confirm better performance or highlight reduced performance. With this condition assessment information, KMP adjusts the life cycle (renewal) schedule. The same process occurs each year to ensure the Handback process meets the Department's requirements.

### **3. Annual Updates to the Useful Life Baseline Requirements Table**

For each renewal element, KMP uses actual performance and condition-in-service data with appropriate O&M records to compare the elements realized Useful Life with baseline requirements.

We use the prior year's Useful Life Baseline Requirements Table if revisions or Renewal Work are not required (as determined by inspections) to maintain Performance or Residual and Useful Life. KMP revises the table for changes in technology and planned means and methods, and for lessons learned from applicable previous maintenance activities. We submit updates no later than 60 Calendar Days before the end of each Contract Year.

The final Renewal Plan is updated on an annual basis, and includes the Useful Life Baseline Requirements Table.

### **4. Assessing Element Condition**

KMP evaluates the condition of Project elements subject to rehabilitation and performance requirements. KMP conducts specific inspections, condition assessments, and testing to anticipate Renewal Work needs, and incorporates the resulting data in JAMMS. The organizations and personnel performing the inspections and testing meet the requirements set in Schedule 12.

We use inspection, assessment, and monitoring to determine if the residual life of each element of the Project meets Handback Requirements. The five-year Renewal Work Schedule identifies necessary Routine Maintenance according to an optimized replacement and renewal cycle to meet the requirements of Schedules 11 and 12.

KMP assesses the condition of all elements, including critical structural elements using an inspection and testing program to evaluate asset condition in comparison with performance requirements. The inspection program identifies the detailed condition level of individual assets and their associated deterioration rates. The inspections and testing determine the asset's current condition level, and guide maintenance schedules and residual life expectations. We use the current condition information to update and revise the Work program to accommodate the asset Work recommended by inspection findings.

The figure below illustrates this process:

### Inspection Process



Additional inspection procedure information is included in the Appendix I, Maintenance Management Plan (MMP).

## 5. Good Industry Practice

KMP follows good industry practices for Renewal Work to:

- Design and construct infrastructure to meet life cycle requirements
- Maintain infrastructure to meet the Design life of each asset
- Renew infrastructure at appropriate times
- Maintain asset functionality at all times

Renewal activities occur in conjunction with the O&M Plan detailed in Appendices H and I. The Renewal Plan addresses procedures for monitoring, measuring, and predicting asset deterioration during the Operating Period along with the appropriate strategies for rehabilitation. As new information, techniques, and innovations occur, KMP incorporates that information, as applicable, into the Renewal Plan updates. KMP Team members are active in O&M services nationally and internationally, so our life cycle maintenance techniques incorporate the most current best practices.

During the Construction Period, KMP's quality staff closely monitors the quality control of Work items that could affect life cycle predictions. Our quality staff also validates life cycle expectations through a quality control/quality assurance (QC/QA) program that includes verification inspections coupled with internal and external quality audits.

During the Operating Period, KMP follows the O&M Plan described in Appendix H to support the Renewal Plan. By properly executing Routine Maintenance activities, KMP minimizes the deterioration of the Infrastructure assets and maintains or increases their Useful Life.

Asset management software allows KMP to efficiently track assets, including asset type, age, replacement date, condition, and other information to ensure requirements are fulfilled. KMP uses base asset repair and rehabilitation decisions, and scheduling, on this information to maximize asset life and meet Technical and Handback Requirements.

KMP brings to the Operating Period of the Project lessons learned, best management practices, and innovations from similar projects nationwide.



## 6. Selecting Suppliers and Subcontractors

All Project procurement is consistent with the Small and Disadvantaged Business Participation Plan. Suppliers and subcontractors are responsible for supplying materials or performing Work according to the OMQMP (Attachment 4), federal, state, and local requirements.

The Procurement Team collaborates with the Renewal Work Team to develop the work scope based on projected Renewal Work and to identify the materials needed. The Request for Proposal (RFP) provided to the suppliers and subcontractors includes this work scope with contractual, quality, federal, state, and local requirements.

During RFP development, the Procurement Team uses KMP’s internal network of engineers and project managers, and external sources such as small business outreach groups, to develop a list of potential suppliers and subcontractors. After RFP release, the Procurement Team evaluates proposals for compliance and overall value, following up with respondents for details when necessary. The award process includes a KMP/Awardee Meeting to confirm contract expectations.

Procurement staff holds preliminary discussions with key suppliers to determine their level of interest, capability, and capacity. New suppliers undergo an extensive qualification evaluation including technical and commercial factors, customer references analysis, onsite facility inspections, and onsite Project inspection.

To manage the supply chain, our Materials Management Coordinator will:

- Coordinate receipt, inspection, inventory control, storage, preventative maintenance and accountability of Project materials, equipment, and tools
- Manage the daily operation, maintenance, and integrity of inventory control data
- Inspect materials and equipment arriving for obvious shipping damage prior to off-loading
- Develop and implement a storage locator scheme and methodology to ensure ease in location and retrieval of material and equipment in laydown yard

### Procedure for Procuring Supply and Subcontractors



## 7. Staffing, Organization, and Responsibilities for Residual Life Methodology Implementation

KMP submits a Residual Life Methodology Report, including staffing, organization, and specific responsibilities for residual life methodology and testing, as required by Schedule 12. We submit the report no later than 70 months prior to the Expiry Date. The report includes the means and methods for evaluating and calculating the residual life at Handback as required in Schedule 12, Appendix A. The report complies with best management practices and is consistent with the Department’s methods for similar assets.

The report includes the inspections and testing scopes, and the organizations proposed to complete them. The requirements for inspection and testing personnel, including required certifications and experience, are included in the Report.

## 8. Achieving Handback Requirements for All Elements

KMP carefully prepares, submits, and implements a Handback Plan to achieve the Handback Requirements specified in Schedule 12, Appendix A. The Plan includes Useful Life and residual life methodologies detailing inspection procedures, scopes, and resources. It uses independent inspection and testing organizations, and specialized inspections when necessary.

Pavement Renewal Work includes seal coats, overlays, level up, and reconditioning/ stabilizing of subbase and subgrade sections if required. Structures Renewal Work includes:

- Deck expansion joint system repairs
- Deck surface repairs
- Deterioration and spall repairs to maintain or strengthen substructure and superstructure members
- Bridge rail and approach slab repairs
- Metal fabrication measures to restore integrity to or replace structural elements
- Structural crack injection repairs

Renewal Work for other elements is determined as appropriate.

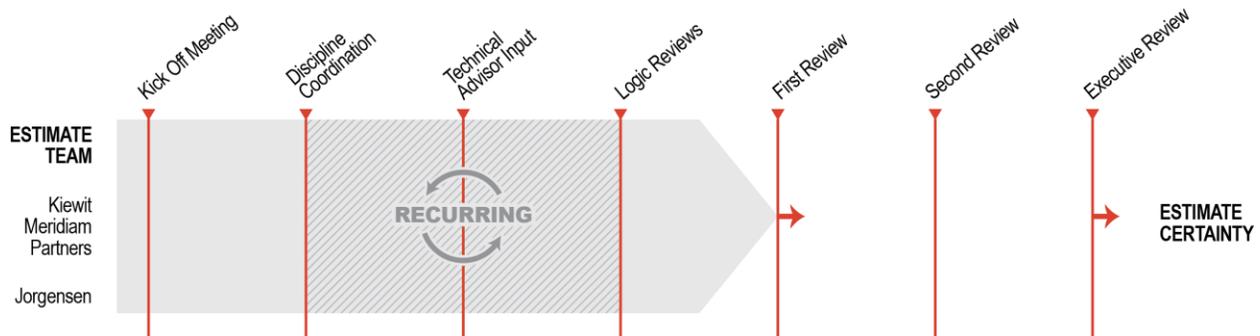
## 9. Estimates for the Expected Cost of Renewal Work for Individual Assets

KMP developed the bottom-up estimate using in-house resources with the assistance of consultants who specialize in developing OMR strategies and assigning life cycle costs. KMP used the Hard Dollar estimating and cost control platform to estimate the cost of Renewal Work for each asset and component. Hard Dollar integrates estimating, scheduling, and reporting into a single system, and helps track actual costs for total Project confidence in cost estimating, productivity management, and earned value. We populated Hard Dollar with cost data from a wide variety of Kiewit, Meridium, and Jorgensen projects, and used program functions to search, sort, and filter pertinent information to inform the estimate and decrease estimate risk.

The Estimating Team included experienced estimators from Kiewit and Meridium, and technical advisors from The Transtec Group, Inc. and BuroHappold. To develop the estimate, the O&M Estimating Team followed the procedures shown in the figure below. The O&M Estimate Team collaborated with other disciplines on Design and Construction (D&C) decisions. Using the information from these meetings, coupled with historical information for costs, the Estimate Team populated Hard Dollar with first level information. We fine-tuned the estimate through ongoing independent logic reviews by KMP management and technical advisors. Reviews and adjustments continued until final review and Approval.

At Year 10, we review the Renewal Work estimate. We obtain current subcontractor quotes, and develop an appropriate proposal structure. KMP has the expertise and knowledge of historical costs to develop estimates with a high level of certainty.

## Process for Developing Estimates for the Expected Cost of Renewal Work



## 10. Planned Closures for Renewal Work

KMP notifies the Department in writing a minimum of two weeks in advance of proposed renewal actions. The notification outlines proposed Work, schedules, work hours, and lane closures or impacts to the public. KMP proposes to use a web-based lane, ramp, and roadway closure request, Approval, and setup process. We use SharePoint and Aconex web-based systems to apply for Approval by the Department of these temporary closures. KMP follows the Project's Transportation Management Plan (TMP) that includes a Temporary Traffic Control Plan for necessary closures. The Plans describe the procedures and process for notification and implementation of planned closures for Renewal Work.

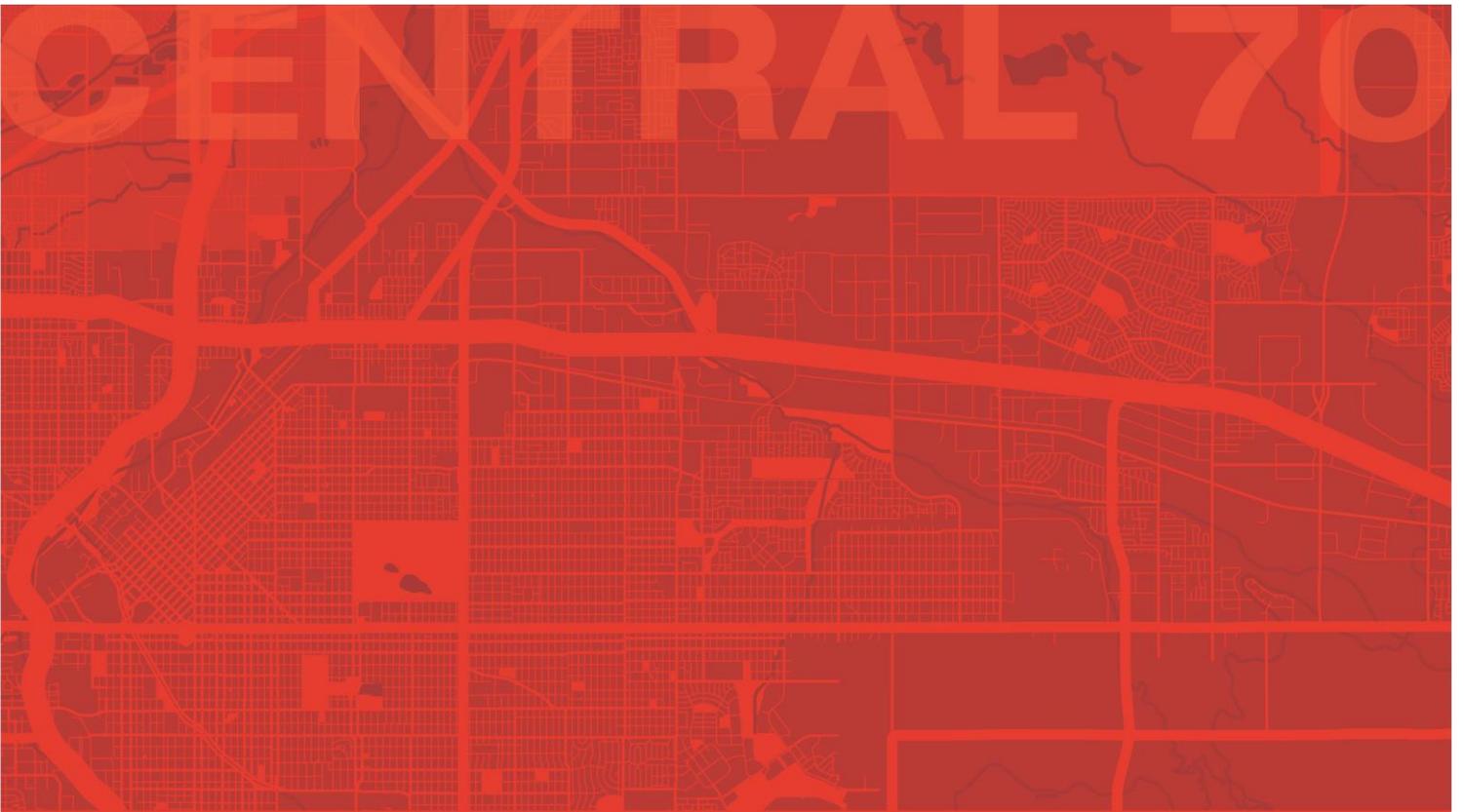
The TMP includes a Public Information Plan (PIP) developed for the Project by KMP. The PIP provides the measures on 'what' and 'how' to communicate traffic information to the traveling public in a timely manner. The PIP includes how KMP provides:

- Notification Plan for major traffic switches, ramp closures, lane reductions, lane closures, and detours
- Communication Plan for addressing congestion and delays
- Communication Plan for traffic incidents and alternate routes

We develop the final Renewal Plan after Construction, update it as necessary based on element condition, and provide detail on the full extent and schedule for Renewal Work and associated closures. Closure information includes:

- Location, time, and duration
- Description of traffic shift
- Description of detour (if needed)
- Access to the Work Area

– END OF SECTION –



ATTACHMENT 3

*Relates to Appendix I*



# Draft O&M Safety Plan



**SUBMITTED TO:**

Colorado Bridge Enterprise  
High Performance Transportation Enterprise  
c/o Colorado Department of Transportation



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## RECORD OF REVISIONS

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## EVALUATION CRITERIA: O&M SAFETY PLAN, APPENDIX I, ATTACHMENT 3

KMP has provided a full Evaluation Criteria Matrix to align the requirements of the Project Agreement with the sections of this Plan.

Sch. 11 Section	Item	QMP Section	Section Name	□
<b>5.3</b>	<b>O&amp;M Safety Plan</b>			□
<b>5.3.a</b>	As part of the MMP, KMP shall provide an O&M Safety Plan that demonstrates compliance with all State, Federal and local Law, codes and regulations for the protection of personnel and Users during the performance of O&M Work. KMP shall develop a Safety Plan that includes staff training, safety procedures and protocols to address hazardous conditions associated with the O&M Work.	<b>2.0</b>	State, Federal, and Local Laws, Codes, and Regulation Compliance	□
<b>5.3.b</b>	KMP is responsible for ensuring that all equipment used shall be maintained in a safe and efficient manner in accordance with all State, local and Federal Law, safety organizations, regulations and guidelines pertaining to providing the required services.	<b>3.0</b>	Safe, Efficient, and Compliant Equipment Maintenance	□
<b>5.3.c</b>	KMP shall follow all safety requirements outlined in the National Electric Safety Code (NESC), the Occupational Safety and Health Administration (OSHA) rules, and any applicable standards or practices for safe installation or maintenance of required equipment.	<b>4.0</b>	Implementing National Electric Safety Code (NESC) and OSHA Safety Requirements	□

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## 1. Introduction

During the Construction Period, KMP performs operations and maintenance (O&M) activities according to the Safety Management Plan in Appendix B. During the Operating Period, we perform O&M activities according to Appendix B, supplemented by this O&M Safety Plan in Attachment 3. We based the O&M Safety Plan on the corporate health and safety program of the Lead Operator, Jorgensen.

KMP is dedicated to the pursuit of safety excellence through continuously improving its safety and health program, the enforcement of safety compliance, and the elimination or minimization of exposure to hazards in the workplace. The safety program presents the most commonly accepted regulatory work practices and explains them clearly, emphasizing their importance.

### 1.1 ROLES AND RESPONSIBILITIES

For the safety program to be effective, all staff, from field personnel to top management, are accountable and fully supported. All levels of management have primary responsibility for the safety and well-being of our employees, and are responsible for promoting safe working practices, and operating conditions and procedures.

#### Roles and Responsibilities

Role	Responsibility
<b>Corporate Safety Manager</b>	Authority and responsibility for implementing, overseeing, and auditing company safety policies and procedures
<b>Divisional Vice Presidents</b>	Ultimate responsibility for the implementation of the safety program in their areas
<b>Divisional Safety Managers</b>	Divisional Vice President's responsibilities and ensuring the implementation of safety policies and procedures
<b>O&amp;M Safety Managers</b>	Responsible for safety on the Project Ensure supervisors understand, practice, and enforce safety policies and procedures
<b>Supervisors Crew Leaders</b>	Directly responsible for the implementation of the safety policies and procedures, and any corrective action plans
<b>All Employees</b>	Safety for themselves, their fellow workers, the job site, and equipment

### 1.2 GENERAL SAFETY RULES

It is KMP's policy to comply with all OSHA, state, and other federal standards, rules, and regulations. Safety on the job and in the workplace requires each individual to act responsibly, and follow established safety procedures. The following safety rules receive special attention:

- Never work in an unsafe manner, perform unsafe acts, or perform work that may result in harm to the environment.
- Always wear proper Personal Protective Equipment (PPE) for every job.



- Work Areas, offices, shops, and storage areas must be well lit—notify the responsible party and supervisor if lighting is inadequate.
- Never drop tools or equipment from higher levels—objects must be lowered safely using ropes.
- Observe and obey all safety signs and warnings.
- Use manufacturer’s recommendations for operating tools and equipment. Never modify a tool or equipment without the manufacturer’s written consent.
- Use a “**Zero Tolerance Policy**” toward compliance with fall protection, electrical safety, personal protective equipment, harassment, violence, smoking in company vehicles, and seatbelt use in company vehicles.
- Make safety a formal topic at all weekly job meetings which must be held no later than Wednesday of each week. Attendees must sign in, and sign-in sheets must be forwarded to the Corporate Safety Director each week.
- Maintain a safety data sheet binder for every project.
- Give new employees a safety training on their first day.
- Use only tools in good repair, with guards and safety devices in place. Alert the supervisor if tool is damaged and tag it as “Out of Service.”

### 1.2.1 REQUIRED SAFETY ACTIVITIES

Project workers complete these safety activities regularly:

#### **Daily Activities**

- Inspect the Work Area and tools for safety prior to start of work.
- Report all injuries to the supervisor and the Corporate Safety Director within eight hours of the incident.
- Notify supervisor or responsible party of any unsafe conditions or employee behaviors.
- Notify all employees of any safety hazards found Onsite and take appropriate actions to avoid these hazards.
- Inspect the equipment to ensure it meets the requirements of the manufacturer, OSHA, or other requirements prior to use. Remove deficient Items from service and tag "Danger—Do Not Use".
- Inspect company vehicles and contents pre- and post-use for unsafe equipment, and remove, repair, or replace as needed.

#### **Weekly Activities**

- Weekly Safety Meetings.
- Inspect all containers for proper labels, container type, and material storage. At a minimum, labels must include the product name and warnings.

### **Monthly Activities**

- Check all fire extinguishers to verify proper pressure. Ensure all components are in working order. For all extinguishers permanently mounted and exposed to vibration, remove from brackets and gently tap to keep powders from caking.
- Inventory all first aid kits, and restock as items are used or become out of date.
- Inspect all Work Areas in offices and warehouses for potential electrical hazards.

### **Quarterly Activities**

- Conduct safety training to educate all employees on current safety protocols
- Review safety procedures with employees to reemphasize the importance of these safety procedures
- Ensure visual confirmation of proper PPE for employees, and the removal and replacement of damaged PPE
- Perform motor vehicle safety inspections
- Perform inspection of all maintenance of traffic (MOT) devices for deficiencies

### **Annual Activities**

- Ensure inspection, safety certification, and documentation of all hoisting and rigging equipment (including slings and chains) by a qualified person
- Ensure inspection and documentation of all fire extinguishers by a qualified person
- Ensure emergency contact information is current
- Conduct safety inspections as required by Department specifications
- Conduct annual safety training as required
- Conduct audit of Hazards Communications Program (Corporate Safety Director)
- Conduct audit of Lockout/Tagout Procedures (Corporate Safety Director)



## 2. State, Federal, and Local Laws, Codes, and Regulation Compliance

O&M Work exposes staff to high-speed and high-volume traffic risks. To mitigate these risks and ensure compliance with all laws, codes, and regulations, safety management and accident reduction policies use a top-down approach.

To help ensure the safety of our team, the Executive Leadership Group has developed 'safety units.' These units, led by safety-qualified leaders, are dedicated to implementing programs, practices, and methodologies to improve safety. In collaboration with the Project-level O&M Safety Managers, and with final Approval by Executive Management, the Safety Program maximizes safety efforts and minimizes accidents. The Corporate Safety Manager helps create these policies and procedures, and works with the O&M Safety Manager to implement them.

The Corporate Safety Manager communicates with the O&M Safety Manager, who is the link between Project Operations, and the independent corporate safety structure to advocate safety policies and practices to Project staff. A monthly Safety Report is submitted to KMP Executive Management by the 10th of each month. On the third Thursday of each month, the O&M Safety Manager meets with KMP Executive Management and the Project Safety Manager to review four measured areas: worker's compensation, auto accidents, general liability, and property damage claims. The safety staff analyzes monthly safety reports to identify causes, possible safety violations, pertinent disciplinary actions, and corrective actions.

Following the inspection, the Corporate Safety Manager delivers an Inspection Report detailing all safety items and compliance results to the Project Manager. The O&M Manager develops a mitigation plan for any reported violations, and implements the plan prior to the next safety inspection.

To ensure compliance with all state, federal, and local laws, codes, and regulations related to the safety of workers and the public, KMP uses the following processes and activities:

- **Training:** KMP has daily 15-minute Toolbox Meetings at the beginning of each shift. These include all Project staff, and communicate the day's Work plan, specific safety input, potentially adverse working conditions (such as weather), and the correct PPE for all staff. Once a week, we extend these meetings to include a safety topic for specific tasks (such as lifting heavy objects).
- **Safety Inspections:** The Corporate Safety Manager thoroughly inspects O&M safety at least once a month. The inspection focuses on all safety aspects of the Project, including:
  - MOT set-ups
  - PPE and safety protections and practices at job sites
  - Vehicles and equipment warning lighting and markings
  - Project Office safety requirement compliance (e.g., fire extinguishers, safety posters)

Following the inspection, the Corporate Safety Manager delivers an Inspection Report detailing all safety items and compliance results to the O&M Manager. The O&M Manager develops a mitigation plan for any reported violations, and implements the plan prior to the next safety inspection. The O&M Safety Manager inspects for safety compliance weekly.

All O&M Team members, including subcontractors, follow and enforce Project policies, procedures, and safety practices. We verify Safety Meetings, safety inspections, Safety Plan compliance, and the use of continuous safety practices occur as required.

- **Safety Program Implementation:** The “Road to ZERO” is an innovative six-point safety program. It includes publications of expectations and policies, targeted and comprehensive training, safety culture awareness, ongoing work habit analysis, and rewards for outstanding staff safety records:
  - The **safety manual** is a comprehensive collection of our procedures, policies, and programs addressing the hazardous conditions associated with O&M Work. Copies are available in each Project Office and on the web. KMP has two sub-manuals: the *Corporate Safety Manual* and the *Employee Safety Manual*. The *Corporate Safety Manual* includes relevant material for OSHA, various departments of transportation, applicable federal and state law, and specific publications and forms, such as safety data sheets. The *Employee Safety Manual* includes required practices and policies for O&M Work.
  - KMP has developed **training programs** for all projects, with specifics for all positions and O&M staff levels, including managers, supervisors, crew leaders, and technicians. We track safety training in the Maintenance Management Information System (JAMMS), which compiles training status instantaneously.
  - KMP promotes **safety awareness** with visual reminders, such as posters and decals, explaining the importance of safe work.
  - Our **safety inspection and documentation** program involves regular safety compliance inspections to identify current and potential safety violations, in order to prevent incidents before they happen. We share the information and analysis from the inspections with all staff, and carefully record and track results in JAMMS.
  - We **enforce** safety policies and procedures with appropriate disciplinary action for violations.
  - We **recognize and reward** exemplary performance with benefits, such as gift cards, to promote a safety culture.

“Road to ZERO” Safety Program





**Addressing Hazardous Conditions:** Our O&M projects encompass a variety of conditions and environments, including high-speed and high-volume traffic, and interstate, urban corridor, and arterial roadway networks. Our staff works on such projects at all hours of the day, every day of the year. For most projects, vehicular traffic is a consistent consideration because this is the most-frequent cause of worksite accidents.

The O&M Safety Plan addresses the hazardous conditions our staff encounters. We exercise every precaution to protect our Team, including increasing visibility through reflective safety clothing, retrofitting our trucks with warning lights and markings, using safety devices for correct lane closure and traffic control, and using law enforcement and traffic control equipment such as truck-mounted attenuators. For our highest risk corridors, such as I-70, KMP uses enhanced lane closure equipment to protect staff from potential vehicle impacts.

### 3. Safe, Efficient, and Compliant Equipment Maintenance

O&M activities require a wide range of vehicles and equipment. Below is KMP’s initial equipment list of O&M equipment. The table presents a sample list of the types of trucks anticipated for use on the Project, and is not intended to be all-inclusive. The Maintenance Yard Manager updates and maintains an equipment list annually, or as additional equipment is procured.

#### Project Equipment List

Vehicle Description	Role
<b>Trucks (Leased)</b>	
F150 Single Cab	Management/Supervisor
F150 Single Cab	Management/Supervisor
F250 Crew extended cab	Operations- Patrol
F250 Crew extended cab	Operations- Patrol
F250 Crew extended cab	Operations- Patrol
F250 Crew extended cab	Operations- Patrol
F250 Crew extended cab	Operations- Patrol
F250 Crew extended cab	Operations- Patrol
F250 Crew Cab	Maintenance
F250 Crew Cab	Maintenance
F450 Crew Cab	Maintenance
F550 Crew Cab	Operations- Tow
F550 Crew Cab	Operations- Tow
F650 Crew Cab	Operations- Tow
<b>SUBTOTAL</b>	<b>14</b>

Heavy Equipment (Purchased)	
64,000 GVW Tandem Axial Dump Truck	Snow and Ice
64,000 GVW Tandem Axial Dump Truck	Snow and Ice
64,000 GVW Tandem Axial Dump Truck	Snow and Ice
64,000 GVW Tandem Axial Dump Truck	Snow and Ice
64,000 GVW Tandem Axial Dump Truck	Snow and Ice
64,000 GVW Tandem Axial Dump Truck	Snow and Ice
64,000 GVW Tandem Axial Dump Truck	Snow and Ice
64,000 GVW Tandem Axial Dump Truck	Snow and Ice
Bucket Truck	Covered Lowered Section
Kubota Tractor	Vegetation Control
Attenuator Truck Flatbed/Scorpion	MOT
Attenuator Truck Flatbed/Scorpion	MOT
<b>SUBTOTAL</b>	<b>12</b>
Utility Equipment (Purchased)	
Trailer—Goose Neck	General
Trailer—Utility	General
Kubota Utility Vehicle	Vegetation Control
Kubota Utility Vehicle	Vegetation Control
8 Cyd V-BOX Spreader/Wet System	Snow and Ice
8 Cyd V-BOX Spreader/Wet System	Snow and Ice
8 Cyd V-BOX Spreader/Wet System	Snow and Ice
8 Cyd V-BOX Spreader/Wet System	Snow and Ice
2 Cyd V-BOX Spreader/Wet System	Snow and Ice
2 Cyd V-BOX Spreader/Wet System	Snow and Ice
Skid Steer	Drainage
Snow Plow	Snow and Ice



Snow Plow	Snow and Ice
Snow Plow	Snow and Ice
<b>SUBTOTAL</b>	<b>19</b>
<b>Rental Equipment</b>	
Ditch Bucket Excavator	Erosion control
Lite Crane	Misc.
Dump Truck (Snow Mitigation)	Snow and Ice
John Deere Front End Loader	Snow and Ice
Lighting Tower Portable	Misc.
Scissor Lift	Misc.
12" Chipper	Misc.
Motor Grader	Misc.
500 Gal Water Tank Trailer	Vegetation Control
Variable Message Board	MOT.
Snooper Truck	Inspections

### 3.1 EQUIPMENT SERVICING REQUIREMENTS

With effective equipment preventative maintenance schedules, the Maintenance Yard Manager can maximize daily production efficiency throughout the network. These programs optimize the Useful Life of equipment, and extend their in-service capabilities. They are general guidelines, incorporating the manufacturer’s recommendations for preventative maintenance, customized for specific pieces of equipment. The Maintenance Yard Manager follows the recommendations provided by the original equipment manufacturer (OEM) when specific diagnostics and detailed service actions are required.

### 3.2 DAILY EQUIPMENT CHECKLISTS

Effectively completing the daily equipment checklist (DEC) is the first step in proactive equipment maintenance—it allows equipment operators to communicate usage and conditions to the Maintenance Yard Manager. The DEC is designed for standard duty trucks, sedans, SUVs, hybrids, and other passenger vehicles. It is not for use on specialty equipment, trailers, heavy-duty trucks, and miscellaneous construction equipment. The figure below identifies the classes of equipment that should use the DEC.

**Prescribed Equipment for DEC**

Trucks/Vehicles: Standard Duty	General Capabilities	Current Experienced Manufacturers
<b>Lite Duty Pick-up Truck (Ford Ranger or S10 Equivalent)</b>	Personnel transport, limited off-road access, lite utility trailering capacity	Ford Ranger, Nissan Frontier, Toyota Tacoma
<b>½-Ton Pick-Up Truck</b>	Personnel/crew transport, off-road access with 4X4 drive train, equipment/towing transport	Ford F-150, Chevrolet Silverado 1500, Dodge Ram 1500, GMC Sierra 1500, Nissan Titan, Toyota Tundra
<b>¾-Ton Pick-Up Truck</b>	Personnel/crew transport, off-road access with 4X4 drive train, equipment/towing transport	Ford F-250, Chevrolet 2500, Dodge Ram 2500, GMC Sierra 2500
<b>1-Ton Pick-Up Truck</b>	Personnel/crew transport, off-road access with 4X4 drive train, equipment/towing transport	Ford F-350, Chevrolet 3500, Dodge Ram 3500, GMC Sierra 3500
<b>Standard Passenger Sedan</b>	Personnel transport, roadway/plaza/facility inspections	Any Type
<b>Standard Passenger Crossover/Hybrid/Sport Utility Vehicle</b>	Personnel transport, roadway/plaza/facility inspections, off-road access with 4x4 drive train	Any Type
<b>Service Utility/Passenger Van</b>	Personnel transport, materials transport, mobile work operations	Ford, GM, Nissan, Mercedes



Specialty Trucks: Heavy Duty	General Capabilities	Current Experienced Manufacturers
<b>1 1/2 Ton Pick-Up Truck</b>	Equipment/materials transport, off-road access with 4X4 drive train, heavy towing, and cargo	Ford F-450
<b>2 Ton Pick-Up Truck</b>	Equipment/materials transport, off-road access with 4X4 drive train, heavy towing, and cargo	Ford F550
<b>2 1/2 Ton Pick-Up Truck</b>	Equipment/materials transport	Ford F650/F750+

The DEC provides four significant checkpoint components for the Maintenance Yard Manager:

- Vehicle exterior
- Vehicle interior
- Mechanical/drive-train system
- Documents/licensing

The vehicle exterior and interior inspections verify the professional appearance of equipment exteriors, and verify that exterior lighting and interior safety features are operational. The mechanical/drive-train inspection helps identify critical mechanical symptoms that may produce premature equipment failure. The last component of the DEC ensures that each operator verifies the physical presence of appropriate licensing and registration documents.

**Sample Daily Equipment Checklist**

**VEHICLE INSPECTION CHECKLIST**

Vehicle Number: _____  Odometer Reading: _____	Suspension of Operation	Month Of: _____	1. Place a <input checked="" type="checkbox"/> if item is acceptable for each inspection point 2. If inspection point is not acceptable or needs attention, leave item blank. Note discrepancy found at bottom of form																																				
		<b>DAY</b>																																					
		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31																																					
<b>VEHICLE EXTERIOR</b>																																							
Is vehicle free of excessive dirt and debris	NO																																						
Tires have good tread, inflated to manufacturer's specifications. Visually inspect rims for damage	NO																																						
All exterior lights are working properly (head, tail, brake, turn signals, emergency, license plate)	YES																																						
Windshield wipers are in good condition	YES																																						
Windshield is free of chips and cracks	NO																																						
Is arrowboard working properly and all lights working (if applicable)	NO																																						
All strobes and other work lights properly working	YES																																						
<b>VEHICLE INTERIOR</b>																																							
All seatbelts work properly, and are in good condition	YES																																						
All interior lights work properly	NO																																						
Door locks function properly	NO																																						
Is the vehicle accident folder in vehicle (Items include: current insurance card, current registration card, vehicle accident report and disposable camera)	YES																																						
Verify all safety equipment is present (1st Aid Kit, Fire Extinguisher)	YES																																						
Side mirrors are present, clean and properly adjusted	YES																																						
Interior of vehicle is free of trash and debris	NO																																						
<b>MECHANICAL SYSTEM</b>																																							
The brake fluid, power steering fluid, radiator fluid and oil levels at proper levels	YES																																						
Verify no fluid leaks under vehicle	NO																																						
Windshield washer reservoir is full	NO																																						
Battery is in good condition and terminals free of corrosion	NO																																						
Steering is not loose or erratic	YES																																						
Warning lights do not stay on after the vehicle is started	YES																																						
<b>DOCUMENTS AND LICENSING</b>																																							
Verify the current vehicle registration is present in the vehicle	YES																																						
Verify the vehicle license plate is active and not expirex	YES																																						
Verify the vehile fuel card is present (if applicable)	NO																																						
Verify the vehicle maintenance service card is present (if applicable)	NO																																						
Verify the vehicle insurance card is present, active, and current	YES																																						
Verify the operator's accident kit is present	YES																																						
(Print Name)																																							
Date Repairs Completed: _____																																							



The following are the procedural and regulatory requirements for the DEC:

- All operators, upon first accessing the vehicle, must complete the DEC.
- In general, the operator should complete the inspection in less than 10 minutes.
- The DEC is completed before any operation of the vehicle.
- If multiple operators use the same vehicle within the same day, the DEC must be completed by each operator.
- It is the operator's responsibility to report negligence, deficiencies, damages, immediate service requests, and missing documentation to their direct supervisor. Failure to report these items can result in disciplinary action to the operator.
- The DEC log should be internally accessible in the operator's cab of each vehicle, and safely stowed. It should always remain in the vehicle.
- The monthly logbook of DEC's is given to the Maintenance Yard Manager at the end of each month, and replenished with a new log of DEC's.
- The DEC identifies deficiencies that, if found, result in the immediate operation suspension of the indicated vehicle. Should the operator fail to report deficiencies and operate the vehicle, disciplinary action could result. Subcontractors, suppliers, or consultants must have procedures that meet the minimum requirements of the DEC.
- Subcontractors, suppliers, or consultants may have their own internal processes that exceed the minimum requirements specified within this Plan. In these cases, the parties must submit their DEC procedure directly to the Maintenance Yard Manager for Approval. The Maintenance Yard Manager has Final Approval authority for modifications, alterations, or substitutions to the DEC, and for the procedures on any vehicles and equipment used on the Project.

If a subcontractor or consultant wants to use a more rigorous or beneficial maintenance program for their equipment in the classes indicated above, the Maintenance Yard Manager must first approve the request. The subcontractor or consultant is required to justify the usage of an alternative vehicle preventative maintenance schedule through production improvements, cost, and efficiency benefits to the Project.

As these vehicles begin to age, more extensive preventative maintenance is required to maximize vehicle life, bolster performance, and prevent premature failure. The DEC helps identify the maintenance services that should occur at various equipment ages, mileage, and type. We perform these services in conjunction with the more frequent standard maintenance service described previously.

### 3.2.1 PROCEDURES TO ENSURE PERFORMANCE AND AVAILABILITY OF EQUIPMENT

The combination of detailed equipment history tracking and the preventative maintenance program allows KMP to understand the current condition of each piece of equipment. This enables proactive vehicle procurement to ensure equipment is available to service the needs of the O&M Work.

Refurbishment of vehicles may be required occasionally. Refurbishment can include new engine installations, rebuilt transmissions, cosmetic body replacements, radiator/cooling repairs, and system replacements. The Maintenance Yard Manager is responsible for assessing specific requirements for equipment refurbishment that occurs when the cost of the refurbishment does not exceed the lease or annual depreciation value of a new equivalent vehicle. It is expected through the proactive use of the preventative maintenance plans identified above that vehicle refurbishment will be rare.

We replace standard vehicles over defined lifetimes. The Maintenance Yard Manager has the authority to determine the most beneficial time to replace a standard piece of equipment.

An essential component of the vehicle maintenance program is record keeping and analysis. The Maintenance Yard Manager is responsible for coordinating all equipment records, storage, and organization.

#### **4. Implementing National Electric Safety Code (NESC) and OSHA Safety Requirements**

The National Electrical Safety Code is a referenced standard to OSHA 29 CFR 1910.269. The Code is a voluntary consensus standard that OSHA recognizes to help employers meet OSHA requirements. The objectives are to ensure the continued practical safeguarding of persons during the installation, operation, and maintenance of electric supply and communication facilities. The O&M Safety Plan has been developed and implemented according to the safety requirements of NESC and OSHA. We follow these standards and practices for the safe installation or maintenance of required equipment.

The Code covers basic provisions for safeguarding of persons from hazards arising from the installation, operation, or maintenance of: 1) conductors and equipment in electric supply stations, and 2) overhead and underground electric supply and communication lines. It also includes work rules for the construction, maintenance, and operation of electric supply and communication lines and equipment.

We inspect all electrical equipment to ensure that it is free from recognized hazards that could cause death or serious physical harm to employees. The safety of equipment is determined by:

- Suitability of equipment for an identified purpose. This may be evidenced by a listing, labeling, or certification for that purpose.
- Mechanical strength and durability. For parts designed to enclose and protect other equipment, this includes the adequacy of that protection.
- Electrical insulation.
- Heating effects under conditions of use.
- Arcing effects.
- Classification by type, size, voltage, current capacity, and specific use.
- Other factors contributing to the practical safeguarding of employees who use or are likely to contact the equipment.



KMP employees do not work near any part of an energized circuit without the appropriate license or training for such work. When working on or near these circuits, the employee shall be protected against shock by de-energizing the circuit and grounding it, or by guarding it effectively with insulation or other means.

Except where electrical distribution and transmission lines have been de-energized and visibly grounded at the point of work, or where insulating barriers (separate from the equipment or machinery), have been erected to prevent physical contact with the lines, equipment shall be operated proximate to power lines only in accordance with the following:

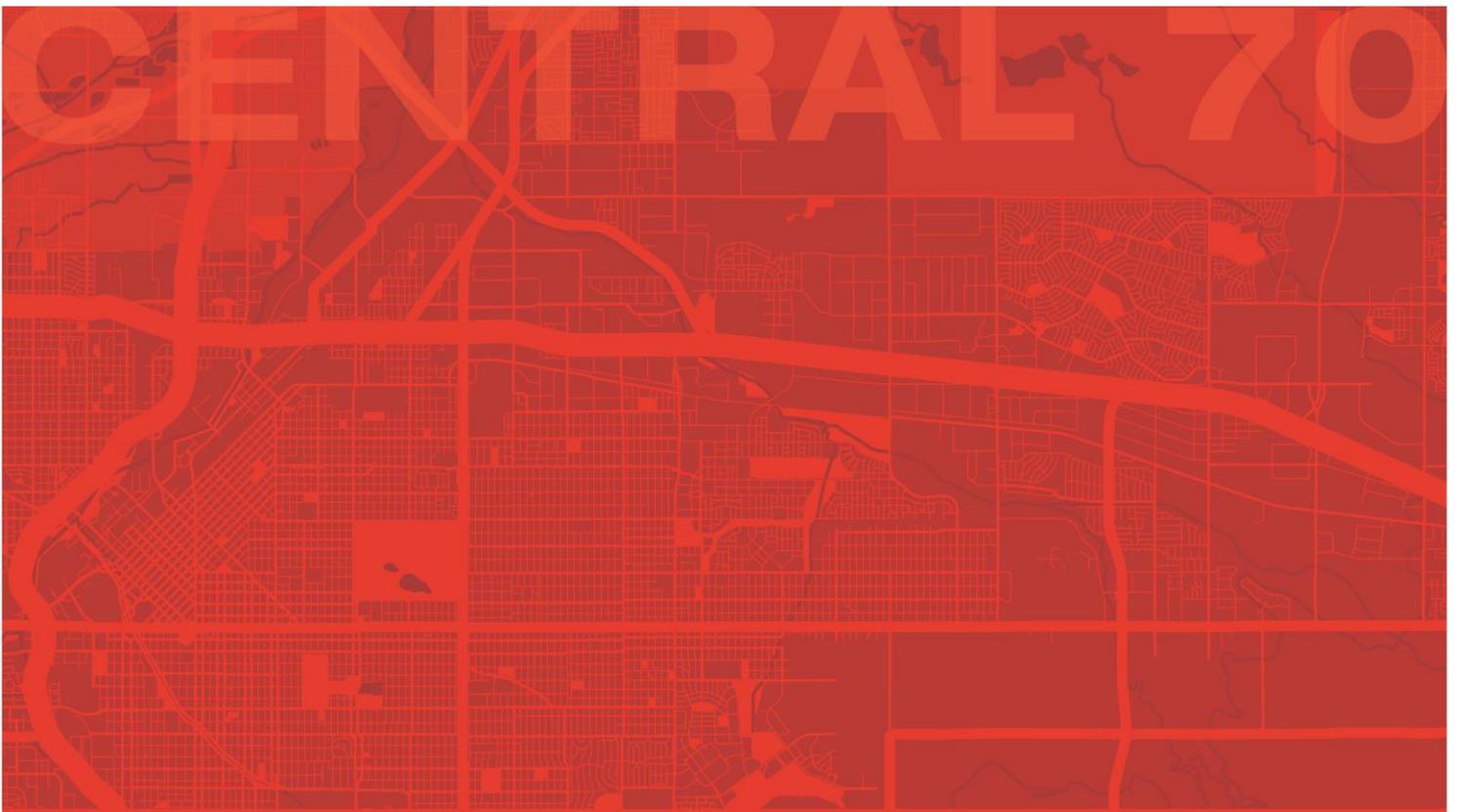
- For lines rated 50 kV or below, minimum clearance between the lines and any part of a crane or load shall be 10 ft.
- For lines rated over 50 kV, minimum clearance between the lines and any part of the crane or load shall be 10 ft. plus 0.4 in. for each 1 kV over 50 kV, or twice the length of the line insulator, but never less than 10 ft. A person shall be designated to observe clearance of the equipment, and give timely warning for all operations where it is difficult for the operator to maintain the desired clearance visually. Any overhead wire is considered to be an energized line, unless and until the person owning such line, or the electrical utility authorities, indicate that it is not an energized line, and it has been visibly grounded.

All below ground electrical, gas, or fiber optic lines shall be located and marked prior to digging. O&M employees should manually dig at least 12 in. prior to mechanical digging to ensure that all lines are clear.

Specific KMP policies for implementing NESC and OSHA Safety Regulations for electrical work are included by reference with the O&M Safety Plan. These policies include:

- Policy No. SPP-P007 “Fall Protection Program”
- Policy No. SPP-P014 “Personal Protective Equipment Program”
- Policy No. SPP-S002 “Bucket Truck Safety Policy”
- Policy No. SPP-S012 “Lockout and Tagout”
- Policy No. SPP-S020 “Temporary Traffic Control”

**– END OF SECTION –**



ATTACHMENT 4

*Relates to Appendix I*



# Draft O&M Quality Management Plan (OMQMP)



**SUBMITTED TO:**

Colorado Bridge Enterprise  
High Performance Transportation Enterprise  
c/o Colorado Department of Transportation



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## RECORD OF REVISIONS

Revision number	Date issued	Pages affected	Comments
0	5/18/2017	All	Proposal Draft Submittal



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## EVALUATION CRITERIA: O&M QUALITY MANAGEMENT PLAN, APPENDIX I, ATTACHMENT 4

KMP has provided a full Evaluation Criteria Matrix to align the requirements of the Project Agreement with the sections of this Plan.

Sch. 11 Section	Item	QMP Section	Section Name	CHECK
5.4	<b>The OMQMP shall address each of the following:</b>	<b>1.0</b>	Introduction	<input type="checkbox"/>
5.4.a	Approach to quality management including a description of quality assurance and quality control functions for validating the information, accuracy, and results of the OMQMP	<b>2.0</b>	Approach to Quality Management, Assurance and Control	<input type="checkbox"/>
5.4.b	A quality improvement process used to analyze nonconforming work and determine methods or processes to minimize or eliminate nonconforming work and noncompliance events associated with O&M work	<b>3.0</b>	Quality Improvement Process Used to Analyze Nonconforming Work	<input type="checkbox"/>
5.4.c	Approach to reporting relationships and responsibilities including Department oversight	<b>4.0</b>	Approach to Reporting Relationships and Responsibilities including Department Oversight	<input type="checkbox"/>
5.4.d	Approach to Developer self-monitoring/self-reporting requirements for inspection, data validation procedures and tracking of nonconforming work and noncompliance events	<b>5.0</b>	Approach to KMP Self-Monitoring/Self-Reporting Requirements	<input type="checkbox"/>
5.4.e	Approach to preparing and reviewing Incident reports, nonconformance reports, traffic reports and maintenance work reports	<b>6.0</b>	Approach to Incident Reports, Nonconformance Reports, Traffic Reports and Maintenance Work Reports	<input type="checkbox"/>
5.4.f	Approach to training of Developer's O&M work personnel on quality assurance and quality control functions	<b>7.0</b>	Approach to Training of Personnel on Quality Assurance and Quality Control	<input type="checkbox"/>
5.4.g	A comprehensive records and document management system to provide access to records and to govern protocols for records retention. Developer shall prepare reports that provide summary of observations and identify the results from the OMQMP processes	<b>8.0</b>	Records and Documentation Management System	<input type="checkbox"/>

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## 1. Introduction

KMP is dedicated to quality throughout the Project. All Operations and Maintenance (O&M) Work complies with this O&M Quality Management Plan (OMQMP) and the overarching Quality Management Plan (QMP). The OMQMP, which addresses the quality process during the Operating Period, supports the QMP quality improvement objectives.

It is KMP's policy to meet the requirements of the Project Agreement and to adhere to its quality objectives. Our principal quality objectives are to meet the requirements of the Project Agreement, meet or exceed the Department's expectations, and eliminate rework by doing it *Right First Time*. We monitor our performance against these objectives and require continual improvement.

Quality is a critical element for all O&M Work. KMP strives to achieve the highest levels of service and to continually improve our service to the Department. This section presents specific quality management and control practices for the O&M program for the Project.

## 2. Approach to Quality Management, Assurance, and Control

To ensure that our O&M Work meets the performance requirements of the contract (specifically Appendices A-1 and A-2 of Schedule 11) KMP uses a comprehensive QMP. The QMP has four components: self-monitoring, quality control (QC), quality assurance (QA), and management review. Designated O&M staff responsible for meeting quality requirements perform QA, QC, and management functions. QC is an internal function of the O&M activities, and all QC reports are internal. The O&M Quality Manager is responsible for reviewing all audits and inspections, and certifies maintenance quality compliance.

Position descriptions and responsibilities include:

- **Quality control:** QC inspectors and key supervisors are responsible for QC checks on daily O&M activities. Their training includes using the correct specifications and standards applicable to their areas of responsibility, which we inspect for quality and compliance. We also train key supervisors for Work activity QC. Neither supervisors, nor others involved in the O&M Work serve as inspectors for their own projects. Although QC personnel report to the O&M Manager, they also work closely with the O&M Quality Manager on quality practices and policies.
- **Quality assurance:** The O&M Quality Manager is responsible for implementation of the entire quality process and reports directly to the Project Quality Manager. The O&M Quality Manager works directly on QC activities and ensures O&M implementation incorporates effective inspector training, quality process and procedure updates, and O&M QA audits. The O&M Quality Manager reports to the KMP Executive Management. Based on the periodic quality management review, the O&M Quality Manager assists in implementing operational changes for performance improvements.



- **Management review:** KMP Executive Management is ultimately responsible for the effectiveness of the quality program. The KMP Board reviews quality findings and directs the O&M Management Team in the necessary operational changes discovered in the QA audit and management review.

There are three key stages for implementing the Quality Management Plan—review, analysis, and mitigation:

- **Review:** Understanding the functional parts of the O&M program and inspecting current operational practices
- **Analysis:** Compiling data and findings into useful, understandable formats to evaluate the overall operations and maintenance program
- **Mitigation:** Isolating problems, determining cause and effect, and developing plans to improve areas not meeting maintenance or operational performance requirements

The KMP OMQMP successfully incorporates these three stages into a systematic, comprehensive approach to ensure quality and compliance with the O&M program performance requirements.

The QMP has four key components responsible for quality and compliance, which combined result in operational improvements:

- **Self-monitoring:** Places responsibility for the quality of all Work tasks and self-assessment of operational program effectiveness on the O&M Project Team.
- **Quality control:** Verifies accuracy of self-assessments and ensures consistent quality compliance in the performance of daily operational activities. Trained personnel review QC at the operational level of the O&M activities.
- **Quality assurance:** Reviews and analyzes O&M program effectiveness. QA improves these programs to optimize the level of service. QA is independent of the daily O&M Team.
- **Management review:** Verifies the effectiveness of the QMP, and implements O&M program changes to ensure quality and continuous program improvements. A designated manager reviews the QMP each year.

### 3. A Quality Improvement Process Used to Analyze Nonconforming Work

This section details how each QMP component works independently, and how the QMP elements interact to ensure quality and continuous improvement.

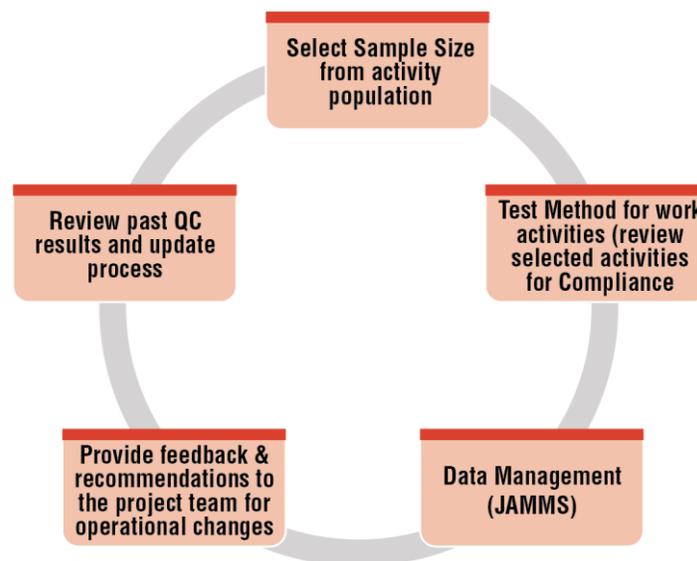
### 3.1 SELF MONITORING

Every employee, at every level, must understand the responsibilities and standards of their work and the procedures required to meet or exceed the standards. Employees must also be able to identify noncompliant results and know how to correct them. The O&M Team is responsible for ensuring all employees and subcontractors understand and follow these practices. Self-monitoring involves three primary elements:

- Identifying compliance requirements
- Using proper work methods to ensure compliance
- Verifying compliance for continuous improvement

The figure below illustrates our self-monitoring process:

#### Quality Control Process for Self-Monitoring and Reporting



#### 3.1.1 IDENTIFYING COMPLIANCE REQUIREMENTS

Knowing activity compliances and the compliance measures is the first step in the self-monitoring process. The sources for determining compliance criteria are:

- Contract documents (Appendices A-1 and A-2)
- Federal and Department standards, specifications, policies, procedures, manuals, and guidelines
- Internal KMP procedures/policies
- Industry best practices



The O&M Team, with the aid of the O&M Quality Manager, is responsible for collecting and compiling all requirements and presenting this information to the O&M staff in a comprehensive and concise manner.

KMP uses this process for all assets and activities identified in the Project Agreement or associated documents. During this process, the O&M Management Team works with the QA Management Team to ensure an understanding of KMP requirements and the sources of necessary information. This occurs throughout the Construction and Operating Periods to ensure a fully populated Maintenance Management Information System (JAMMS).

### 3.1.2 IDENTIFYING WORK METHODS THAT ENSURE COMPLIANCE

Work methods vary for each maintenance or operational activity performed—however, some methods benefit all activities. The following formats and resources have proven successful in self-monitoring:

- **Routine customer and internal progress meetings:** Used to cooperatively identify completed, current, and future Work actions, and discuss achievements and improvement areas of Routine Maintenance Work.
- **Generation of Routine Maintenance service requests (RMSRS):** Periodic inspections to identify maintenance needs and identify required work.
- **Detailed activity checklist:** A series of conformance indicators for successfully completing maintenance activities.
- **Maintenance Management Information System (JAMMS):** A software application for planning, monitoring, and tracking maintenance activities and operations. JAMMS accounts for all resources used for O&M Work and shows planned vs. actual costs for each activity.

KMP holds progress meetings with field staff to discuss recent and planned O&M Work, using results from previous Work to inform the strategy for planned Work.

KMP meets monthly to coordinate and verify Project progress and performance and to ensure completion of monthly reporting responsibilities to the Department.

Detailed activity checklists are activity-specific forms for work crews with key standards and guidance for correctly completing asset repair and maintenance work. Our extensive lists include the most common maintenance and repair activities associated with asset maintenance, and KMP uses these tools in Work activities to reduce or eliminate noncompliance for performance measures.

Below is the guardrail repair checklist as an example:

#### Guardrail Maintenance/Repair Checklist

#	Guardrail Maintenance/ Repair	Comments
1	Is the guardrail height for single panel, double rail or standard thrie-beam installed between 20-24 in. high at center of rail?	

#	Guardrail Maintenance/ Repair	Comments
2	Is the guardrail height for rail with rubrail, and modified thrie-beam installed between 23-27 in. high at center of rail?	
3	Is the rubrail installed 12 in. from center of panel?	
4	Is the post spacing to 6 ft. 3in.?	
5	Are all posts in good condition, functioning as intended, and aligned? (e.g., not twisted, damaged, split)	
6	Are all panels lapped according to traffic flow, and in good condition? (e.g., no perforations, severe pancake)	
7	Are the offset blocks intact and functioning as intended? (e.g., not split, cracked)	
8	Are offset blocks secured with 16D galvanized nails?	
9	Are the object markers spaced properly and correct type used? (Be sure the set of the first object marker is allowing visibility for driving lane)	
10	Is all connecting hardware used correctly and in accordance with Department specifications per design index?	
11	Is Work Area clear of all debris and excess material?	
12	Is groundwork completed in working zone?	

### 3.1.3 COMPLIANCE VERIFICATION FOR CONTINUOUS IMPROVEMENT

This step includes conformance verification with O&M procedures through which O&M staff identifies Nonconforming Work and takes Corrective Actions. To verify conformance, we compare Work actions with compliance indicators. If noncompliant, the following actions result: 1) Notification to customers, managers, and supervisors, and 2) Onsite remediation (or development of a remediation plan) to ensure future conformance. When needed, KMP holds discussion meetings. JAMMS is one tool for self-monitoring, which KMP uses daily for reporting, scheduling, and performance measure tracking and variances identification.

## 4. Approach to Reporting Relationships and Responsibilities Including Department Oversight

We discuss reporting relationships and responsibilities Section 2. Department oversight is per the Project Agreement.



## 5. Approach to KMP Self-Monitoring/Self-Reporting Requirements

The goals of the QC process are to:

- Determine if maintenance work activities and operational procedures are meeting Project Agreement requirements
- Identify areas of success
- Identify areas needing improvement
- Identify mitigation techniques to achieve continuous improvement

Review results are vital for understanding which specific operational activities, processes, and procedures need strengthening to improve performance, quality, and compliance assurance.

### 5.1 QUALITY CONTROL SAMPLE SIZE

A common element of all QC programs is selecting the correct sample size from the total of relevant activities. A typical sampling program uses a predetermined number of randomly selected samples from the overall population of activities. The QC process is ongoing; therefore, activity population sizes are variable. The best sampling method identifies a maximum percentage for review based on the type of activity and its functional significance to the network. Work activities occur throughout the year, so dependable sampling requirements are important. The example below shows the percentage of work orders undergoing quality control checks:

**Example Percentage of Work Orders for QC Checks**

Asset	Suggested QC % of Completed Work Orders
<b>ROADSIDE ASSET GROUP</b>	
Vegetation	25
Brush and trees	25
Debris and road kill	10
Litter	10
Landscaping, wildflower beds, bulb beds, ornamental shrub beds	25
Illegal signs/structures	10
Concrete barriers	100
Sound walls & barriers	100
Slopes	15
Fences	20
Crossovers/police parking locations	20
Retaining walls	100

Asset	Suggested QC % of Completed Work Orders
<b>DRAINAGE ASSET GROUP</b>	
Pipes & Box Culverts (less than 36 sq. ft.)	10
Pipes & Box Culverts (greater than 36 sq. ft.)	10
Ditches—paved	10
Ditches—unpaved	10
Under drains & edge drains	10
Storm drains & drop inlets	10
Curb & gutter, curbing raised, concrete median	10
Storm water management ponds	25
<b>Traffic asset group</b>	
Signs (static) —post mounted	25
Cable locating—electric, fiber, communications, ITS, etc.	10
Junction boxes	10
Signs (static)—overhead and bridge mounted	50
Pavement markings	50
Pavement markers (raised & recessed)	25
Pavement messages	25
Lighting—roadway	10
Lighting—sign	10
Lighting—under deck or Cover	10
Lights—warning, bridge mounted navigation, anti-collision	10
Guardrail	50
Impact attenuators	100
Object markers & delineators	5
Glare foils	5
<b>Roadway &amp; shoulder asset group</b>	
Asphalt surface	50
Unpaved shoulders	10
Concrete surface	25



Asset	Suggested QC % of Completed Work Orders
<b>Bridge asset group</b>	
Deck	25
Superstructure (includes parapet walls)	25
Substructure	25
Slope protection	25
Weep holes	10
<b>Services group</b>	
Incident/emergency response	10
Customer response	10
Roadway sweeping	15
Graffiti removal	5
Object markers/delineators device	5

## 5.2 TEST METHODS FOR WORK ACTIVITIES

The O&M activities specified in the Project Agreement require continuous monitoring and review to verify compliance with standards, specifications, and other requirements. The review associated with each activity is a two-part process involving assessment of the work method and verification of performance indicators linked to an activity.

To verify the review of all critical components, KMP uses detailed checklists for individual maintenance/repair activities. See section above for an example checklist. We have designed the checklists to organize the maintenance and repair of an asset into a manageable work method by including details of the asset and references to specific standards and specifications.

Each checklist's goal is to verify the accuracy of all information provided by O&M staff. The QC Reviewer uses the completed work documents and detailed checklists to verify correct completion of fieldwork. This process is effective in ensuring work compliance with Department standards and specifications.

## 5.3 DATA MANAGEMENT

KMP uses JAMMS for data management. Following each QC review, the inspector enters all information into JAMMS. JAMMS quantifies the results from the QC reviews and provides a summary report of the results.

## 5.4 FEEDBACK AND RECOMMENDATIONS

QC auditors compile the results and present them to the O&M Manager. To be effective for the O&M Team, the QC program must detail the deficiencies of noncompliant activities. QC Reviewers must identify reasons for variance and offer potential solutions for avoiding similar problems in the future.

The O&M Manager prepares an updated monthly plan incorporating the findings from the QC reviews. The plan addresses strategies for maintaining current operational procedures or for improving problem areas. The plan includes brief descriptions of the problematic activities and potential mitigation measures such as additional oversight, additional training, and contract document review.

## 5.5 REVIEW HISTORICAL QC RESULTS

Prior to new QC reviews, previous QC analyses help identify activities on which to focus. This also informs reviewers of operational adjustments implemented after the previous QC.

## 5.6 QUALITY ASSURANCE

Two goals of QA are verifying compliance with all requirements (the Department’s and KMP’s), and identifying better operational efficiencies. KMP completes QA independently from O&M Team to avoid bias. QA reviews occur at least once annually.

A focus of QC is verifying the compliance of daily activities. QA focuses on the management and output of the O&M program units. The following steps are typical for a QA audit:

- **Step 1:** Review key O&M functions
- **Step 2:** Analyze findings and quantify results
- **Step 3:** Identify areas for operational improvement
- **Step 4:** Report findings to O&M Team and executive leadership



## 5.7 QUALITY ASSURANCE ACTIVITIES

Several key O&M functions control the output of the overall O&M program. These functional units drive the success or failure of the effort and greatly affect both the short term and long term results of the O&M program. QA’s role is to define the function of these units, evaluate their status, and determine how to manage functions to achieve the highest potential. Audits are continually refined to meet new requirements and to improve the entire process. The basic template for QA’s seven most common O&M program units is:

### 5.7.1 O&M PROGRAM

QA audit for multi-year and annual O&M plans for performance compliance includes:



- Review of proposed O&M Work programs and comparison to O&M obligations of the Project Agreement
- Comparison of proposed Work plan to actual completed Work
- Review of Work production rates in JAMMS in comparison to original estimates
- Review of customer service logs to verify response time compliance, call back timeframes, and other applicable maintenance and repair time criteria
- Review condition assessments to identify improvement areas for the O&M program and Work activities

### 5.7.2 PROJECT BUDGET

The QA audit involves:

- Reviewing planned versus actual expenditures to identify areas of budget variance
- Confirming documentation and justification for deviations from original budget

### 5.7.3 JAMMS

JAMMS is the maintenance management information system (MMIS) to plan, schedule, and track all O&M Work. The QA audit involves:

- Confirmation of correct project set up, including correct rates, O&M limits and designation, and O&M activity codes with designations and units of measure matching Department codes
- A JAMMS review to confirm correct management organization, including service request backlog category, equipment resources entered with correct hourly rates, and asset inventory entered correctly
- Confirmation that JAMMS reports match Department's requested report data and formats

### 5.7.4 QUALITY CONTROL PROGRAM

The QC program includes:

- Review JAMMS QC Summary Report to verify that QC completion follows the correct frequency compared to the percentage of completed Work activities, and that QC deficiencies are tracked and understood
- Field-verify QC accuracy for O&M Work activities
- Compare QC Summary Report to the O&M Team's QC plan
- Review proposed mitigation plan resulting from the QC deficiency assessment and determine if the O&M Team implemented the most effective operational change

### 5.7.5 CONTRACT COMPLIANCE

Confirm overall compliance with KMP responsibilities, including reporting and administrative requirements such as vendor and subcontractor management, bonding, and insurance:

- Review subcontractor and vendor files to ensure subcontract agreements are honored, agreements are current, W-9s are correct, and subcontractor and individual certifications and all required insurance is on file and current
- Review contract reporting criteria and verify timely submission of all required reports
- Review plans and confirm compliance with stated promises and directives
- Verify insurance and bonding certifications are available and current

### 5.7.6 SAFETY

Ensure that all safety policies and procedures are enforced and followed by all O&M Team members, including subcontractors:

- Verify Safety Meetings occur as planned
- Verify safety inspections occur as planned
- Verify safety practices comply with O&M Safety Plans
- Verify O&M Team is implementing continuous safety practices

### 5.7.7 TRAINING PROGRAMS

KMP training programs and certifications are current and produce highly qualified and competent staff. We monitor training results to ensure the achievement of critical outcomes.

The QA Reviewer reviews and inspects the program units in detail to determine the current level of compliance. Analyses occur in conjunction with the review—the reviewer can begin to formulate how well each program function is operating as the review proceeds and identify mitigation options. The QA Reviewer also identifies areas that can benefit from additional operational efficiency. Continual improvement is always a goal, even when already in compliance with the performance requirements. QA Reviewers help KMP achieve the highest level of service.

After the review is complete, we present a comprehensive and concise report to the O&M Project Management Team and Executive Management. This report describes the QA review process, items reviewed, the resulting findings, and mitigation suggestions. The O&M QA Manager then presents the draft report at a Debriefing Meeting and leads a discussion on the findings so the QA results are clear and understood.

## 5.8 MANAGEMENT REVIEW

The final component of the O&M QMP is the O&M management review, which meets two key objectives:

- Verify the overall quality program is achieving its objectives
- Implement critical operational changes resulting from the QA review

O&M Executive Management leads the management review, which typically occurs in conjunction with the QA debriefing. The O&M QA Manager presents the findings and recommendations, while the O&M Manager identifies opportunities for improvement and implementation timelines.

## 6. Approach to Incident Reports, Nonconformance Reports, Traffic Reports and Maintenance Work Reports

The reporting function is managed through JAMMS. We have established protocols for the variety of incidents that can occur, and they typically include maintaining traffic flow via detours, restricting traffic in hazardous areas, managing traffic accidents, and responding to emergency asset repairs. KMP has defined a systematic, procedural approach to achieve a timely management of traffic incidents and to maintain asset health as shown in the figure below. Also, see the Incident Response Plan in Attachment 2 of Appendix H.



## 7. Approach to Training of Personnel on Quality Assurance and Quality Control Functions

### 7.1 GENERAL

Training addresses the overview of the QMP, its rationale, and associated responsibilities:

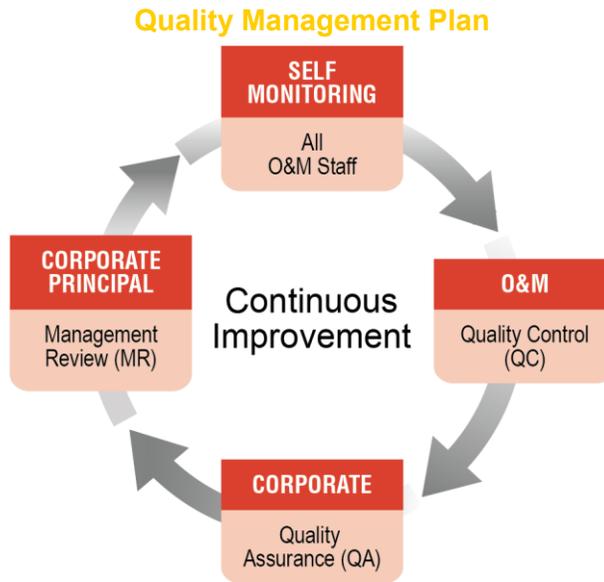
- **Reasons for Quality:** Topics include ensuring a lasting quality product, identifying problems before failures, continual improvement as individuals and as a company, and cost efficiency
- **Quality Program Responsibilities:** The figure below illustrates the distribution of responsibility during a training session



## 7.2 QUALITY MANAGEMENT SYSTEM TRAINING

Training includes an overview of the QMP, details of the four key components and their tasks and goals.

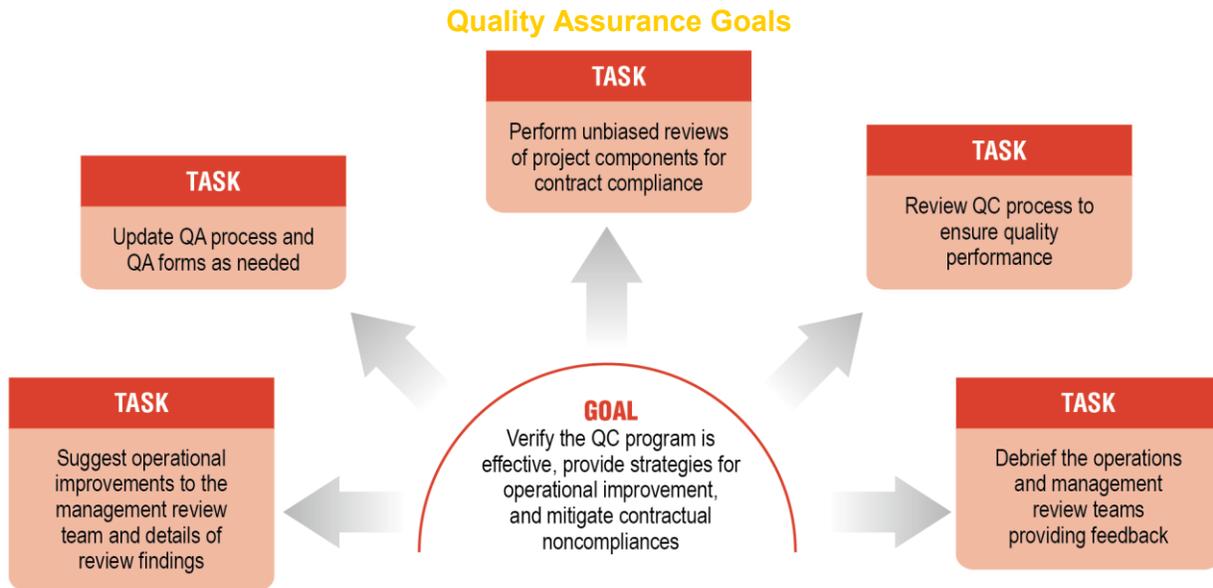
- **Overview:** Explains how the QMP process works



- **Quality Control:** Describes the goal of QC and the tasks included in the process



**Quality Assurance:** Describes the goal of QA and the tasks included in the process



**Management Review:** Describes the goal of QA and the tasks included in the process





### 7.3 DETAILED QUALITY TRAINING

Detailed quality training is for those directly responsible for implementing the Quality Management Plan. It has three main modules: Introduction to Quality, QC, and QA. Individuals responsible for QC need only take the first two modules; those responsible for QA must take all three modules:

- **Introduction to Quality:** Supplements quality training and includes additional topics for five functional areas, key documents used during quality reviews, and the reporting structure
- **Quality Control:** Includes three parts: QC program development, achieving QC, and example QC reviews
- **Quality Assurance:** Includes three parts: QA program development, achieving QA, and example QA reviews

The training for those directly responsible for quality occurs at least once a year and more frequently as needed. The QMP evolves, so supplemental training exercises are important.

## 8. Records and Documentation Management System

JAMMS is a key tool for managing quality audits, verifying performance compliance, and identifying areas for improvement. JAMMS is a proprietary computer software program developed specifically for asset management contracts. The system assists in managing maintenance operations and in monitoring and verifying compliance. The system has extensive capabilities for monitoring, tracking, and recording information associated with O&M Work. Three key functions are asset management, alert manager, and compliance verification.

KMP enters the Department maintenance codes for Work activities into the system. Performance criteria (such as that listed in Appendices A-1 and A-2 of Schedule 11) is specified in one of the many data fields.

JAMMS can allow the designation of specific Work activities for QC, so when a Work need is entered into the system, it is identified as a potential QC review activity. The QC inspector can select from a master list of specific work orders for quality and compliance reviews.

For monitoring performance, JAMMS has an alert system to send emails related to compliance, response time, and performance input to designated KMP contacts.

When a Work activity is entered into the system, JAMMS immediately time stamps and produces a work order. Time stamps also occur on completion.

JAMMS has several reporting functions. Two primary reports are the Compliance Report and the QC Program Summary Report. The following figure is an example of the information provided in the Compliance Report:

## Example Compliance Summary Report

### Compliance Report

Project is in (31200 ,34250 ,38280 ,31060 ) AND Received Date >= 2/1/2011 AND Received Date <= 4/29/2011



SR#	WO#	ASR Number	Activity No.	Description	Maint Area / Facility Name	DATE AND TIME		Location Description	In Compliance
						Request Received	Work Completed		
100986	301222		540	Graffiti Removal	I-95 Central Du	02/01/2011 10:45:00 A		95 NB at Louisa St	N
100990	301286	020111TAF01	520	Small Sign Repair < or Eq 30 SqFt	I-95 Central Du	02/01/2011 03:00:00 P	02/01/2011 05:30:00 PM	I95 SB off ramp to A1A/Zoo	Y
100990	301286	020111TAF01	520-1	Small Sign Maintenance--Regulatory Sign (White/Red)	I-95 Central Du	02/01/2011 03:00:00 P	02/01/2011 05:30:00 PM	I95 SB off ramp to A1A/Zoo	Y
100991	301285		540	Graffiti Removal	DBI-East	02/02/2011 08:12:00 A	02/03/2011 11:00:00 AM	Beach WB at Pottsburg Creek Bridge	Y
100992	301287		540	Graffiti Removal	DBI-East	02/02/2011 08:14:00 A	02/03/2011 09:30:00 AM	University WB east of the 95 sign	Y
100995	301271		540	Graffiti Removal	DBI-East	02/02/2011 08:15:00 A	02/03/2011 01:00:00 PM	Under JTB just east of Gate Parkway	Y
100996	301272		540	Graffiti Removal	DBI-East	02/02/2011 08:16:00 A	02/03/2011 03:00:00 PM	Atlantic Blvd. EB at Bell Tel Way	Y
100997	301273		540	Graffiti Removal	DBI-East	02/02/2011 08:52:00 A	02/03/2011 08:45:00 AM	Emerson St. EB	N
100998	301274		520	Small Sign Repair < or Eq 30 SqFt	DBI-North	02/02/2011 09:13:00 A	02/02/2011 11:00:00 AM	13041 Lem Turner Rd.	N
100999	301275		520	Small Sign Repair < or Eq 30 SqFt	DBI-East	02/02/2011 09:12:00 A	02/04/2011 11:00:00 AM	SR 202/JTB at mileposts 0.733 and 2.733	N
101002	301277		520	Small Sign Repair < or Eq 30 SqFt	DBI-East	02/02/2011 09:12:00 A	02/16/2011 09:00:00 AM	SR 152/Baymeadows Road at mileposts 1.903 and 3.956	N
101038	301317		540	Graffiti Removal	DBI-East	02/03/2011 08:25:00 A	02/04/2011 09:30:00 AM	University at Hart overpass	Y
101046	301327		540	Graffiti Removal	DBI-West	02/03/2011 09:50:00 A	02/04/2011 11:00:00 AM	Main St at Mary	Y
101075	301356	020311TAF01	520	Small Sign Repair < or Eq 30 SqFt	DBI-East	02/03/2011 03:32:00 P	02/03/2011 05:00:00 PM	Arlington Expy before Southside Connector	Y
101090	301485	020411CPJ01	531	Attenuator Repair	DBI-East	02/04/2011 10:40:00 A	02/04/2011 04:00:00 PM	Beach Blvd WB at Parental Home	Y
101092	301482	020411TAF01	520-1	Small Sign Maintenance--Regulatory Sign (White/Red)	DBI-West	02/04/2011 02:51:00 P	02/04/2011 05:30:00 PM	103rd Street @ New World Avenue	Y

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For QC data and reporting, reviews can use the QC sub-module in JAMMS to report QC findings. The inspector can include name, date of inspection, the inspection method, the work quality findings, QC failure type, and inspection notes.

Photos, handwritten documents, and other relevant material can be uploaded with the record. The Department can access and review these records at any time.

Following the completion of the QC review and uploading of all findings to JAMMS, the system produces a QC Program Summary Report. This report summarizes the various QC reviews and calculates QC scores. The figure below is an example:



## Example QC Summary Report

### Quality Control Program Summary

Project in (DBI- Jacksonville, Jax Interstates AM) AND WO Created Date >= 1/1/2011 AND WO Created Date <= 3/1/2011



SR TYPE		TOTAL			RESULTS					
Name	Description	WO Created	# QC	% QC	# Passing	% Passing	# Pass / w Exception	% Pass / w Exception	# Failed	% Failed
ROADWAY		1,395	106	7.60 %	95	89.62 %	3	2.83 %	8	7.55 %
TOTAL		1,395	106	7.60 %	95	89.62 %	3	2.83 %	8	7.55 %

QC INSPECTORS		TOTAL			RESULTS				
Name	Description	# QC	% QC	# Passing	% Passing	# Pass / w Exception	% Pass / w Exception	# Failed	% Failed
Roger Mann		101	95.28 %	90	89.11 %	3	2.97 %	8	7.92 %
Charles, Jr. Peacock		3	2.83 %	3	100.00 %	0	0.00 %	0	0.00 %
Richard Lawson		2	1.89 %	2	100.00 %	0	0.00 %	0	0.00 %
TOTAL		106		95	89.62 %	3	2.83 %	8	7.55 %

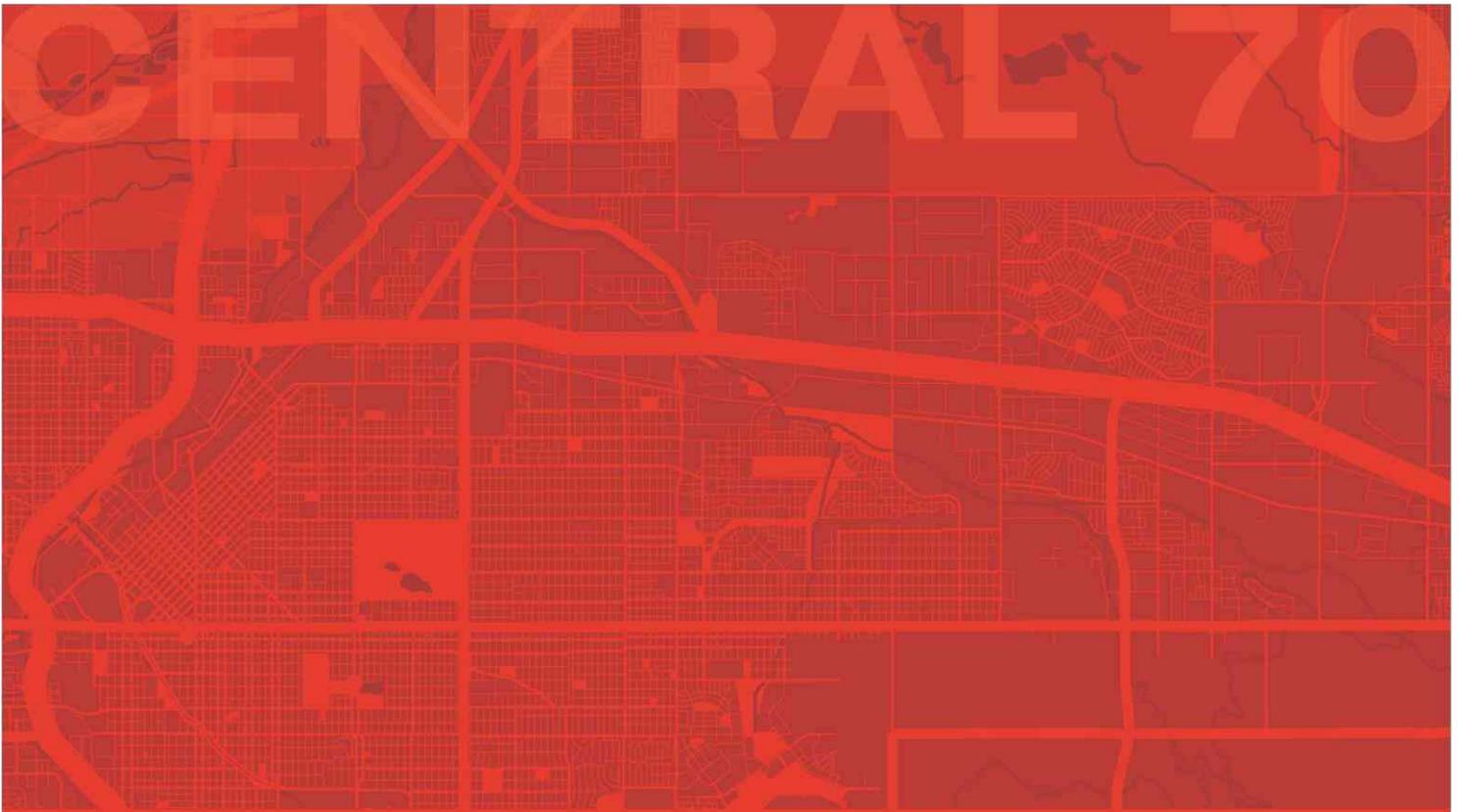
QC STATUS		TOTAL	
Name	Description	# QC	% QC
QC Completed (Passed)		98	89.91 %
QC Completed Failed		8	7.34 %
Tagged but not complete (Subcontractor)		2	1.83 %
Ready for QC		1	0.92 %
TOTAL		109	

FAILURE REASONS		TOTAL	
Name	Description	# QC	% QC
Work Not Complete		4	50.00 %
Lack of Specification Knowledge		3	37.50 %
Poor Workmanship		1	12.50 %
TOTAL		8	

ACTIVITIES		TOTAL			RESULTS					
Name	Description	WO Created	# QC	% QC	# Passing	% Passing	# Pass / w Exception	% Pass / w Exception	# Failed	% Failed
526-40	ThrieBeam bridge End	2	1	50.00 %	0	0.00 %	0	0.00 %	1	100.00 %
526-06	Guardrail end anchorage assy - flared	1	1	100.00 %	0	0.00 %	0	0.00 %	1	100.00 %
526-34	Guardrail Emergency Mobilization	5	3	60.00 %	1	33.33 %	0	0.00 %	2	66.67 %
526-42	Transition panel	3	2	66.67 %	1	50.00 %	0	0.00 %	1	50.00 %
526-41	Thrie Beam Block	4	2	50.00 %	1	50.00 %	0	0.00 %	1	50.00 %
526-39	P. Block	15	4	26.67 %	2	50.00 %	0	0.00 %	2	50.00 %
526-18	Guardrail Thrie Beam Panel	4	2	50.00 %	1	50.00 %	0	0.00 %	1	50.00 %
526-32	Wood post in soil	6	5	83.33 %	3	60.00 %	0	0.00 %	2	40.00 %
526-35	Guardrail Rub Rail	22	10	45.45 %	6	60.00 %	0	0.00 %	4	40.00 %
526-37	Alignment	25	12	48.00 %	8	66.67 %	0	0.00 %	4	33.33 %
526-36	Guardrail Reflector	38	21	55.26 %	15	71.43 %	0	0.00 %	6	28.57 %
526-02	Miscellaneous asphalt pavement	56	27	48.21 %	21	77.78 %	0	0.00 %	6	22.22 %
526-33	Guardrail Standard Panel	64	34	53.13 %	28	82.35 %	0	0.00 %	6	17.65 %
526-29	Wood block	42	23	54.76 %	19	82.61 %	0	0.00 %	4	17.39 %
526-30	Steel post in soil	48	23	47.92 %	19	82.61 %	0	0.00 %	4	17.39 %
520-1	Small Sign Maintenance—Regulatory Sign (White)	62	6	9.68 %	5	83.33 %	0	0.00 %	1	16.67 %
492	Tree Trimming and Removal	233	7	3.00 %	6	85.71 %	0	0.00 %	1	14.29 %
526	Guardrail Repair	263	73	27.76 %	63	86.30 %	0	0.00 %	10	13.70 %
520	Small Sign Repair - or Eq 30 SqFt	165	19	11.52 %	18	94.74 %	0	0.00 %	1	5.26 %
534-13	8" Solid White Paint	2	2	100.00 %	2	100.00 %	0	0.00 %	0	0.00 %
787-3	Lighted Traffic Sign Lighting Maintenance	26	0	0.00 %	0	0.00 %	0	0.00 %	0	0.00 %
459	Concrete Sidewalk Repair	2	2	100.00 %	2	100.00 %	0	0.00 %	0	0.00 %
457	Concrete Repair	10	1	10.00 %	1	100.00 %	0	0.00 %	0	0.00 %
028-1	Vehicle and Equipment Maintenance and Repair	14	14	100.00 %	14	100.00 %	0	0.00 %	0	0.00 %
532-2	6" Solid Yellow Paint	2	2	100.00 %	2	100.00 %	0	0.00 %	0	0.00 %
520-3	Small Sign Maintenance—Guide Sign (Green)	37	4	10.81 %	4	100.00 %	0	0.00 %	0	0.00 %
487	Weed Control - Manual	22	0	0.00 %	0	0.00 %	0	0.00 %	0	0.00 %
494	Chemical Weed and Grass Control	1	0	0.00 %	0	0.00 %	0	0.00 %	0	0.00 %
543	Road Sweeping (Mechanical)	41	39	95.12 %	39	100.00 %	0	0.00 %	0	0.00 %
545	Edging and Sweeping	119	0	0.00 %	0	0.00 %	0	0.00 %	0	0.00 %
787-2	Double Arm Lighting Maintenance	1	0	0.00 %	0	0.00 %	0	0.00 %	0	0.00 %
532-11	6" Black Skid	1	1	100.00 %	1	100.00 %	0	0.00 %	0	0.00 %
521	Large Sign Repair - 30 SqFt	22	0	0.00 %	0	0.00 %	0	0.00 %	0	0.00 %
028	Shop/Vehicle Maintenance	25	0	0.00 %	0	0.00 %	0	0.00 %	0	0.00 %
520-4	Small Sign Maintenance—Recreational Sign (Brow	4	1	25.00 %	1	100.00 %	0	0.00 %	0	0.00 %
526-38	Steel Block	6	4	66.67 %	4	100.00 %	0	0.00 %	0	0.00 %
531	Attenuator Repair	19	2	10.53 %	2	100.00 %	0	0.00 %	0	0.00 %
787-5	High Mast Annual PM Lighting Maintenance	14	0	0.00 %	0	0.00 %	0	0.00 %	0	0.00 %
519	Delineators	86	9	10.47 %	9	100.00 %	0	0.00 %	0	0.00 %
520-5	Small Sign Maintenance—Informational (Blue)	6	5	83.33 %	5	100.00 %	0	0.00 %	0	0.00 %

- END OF SECTION -

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ATTACHMENT 5

*Relates to Appendix I*



# JAMMS User Manual



**SUBMITTED TO:**

Colorado Bridge Enterprise  
High Performance Transportation Enterprise  
c/o Colorado Department of Transportation

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# JAMMS USER MANUAL



**JORGENSEN**



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## Purpose

JAMMS is our Jorgensen Asset Management Maintenance System, which is used to report our accomplishments to our client, it is important that this information is entered accurately and in a timely manner.

Jamms is used to track the following information:

### **Customer Service Requests:**

- Initial requests containing date/time received information as well as contact information and call back/e-mail dates/times to the client to report the completed work
- Work orders
- Daily work reports containing information of labor, materials and equipment used to close out requests

### **Human Resource Information:**

- Employee timesheets, including vacation, sick time and holiday hours
- Training information
- Environmental health & safety issues
- Employee claims information

### **Assets**

- Road and facility assets
- Equipment
- Inventory

### **Third party claims**

- Work orders associated with damaged assets
- Claims processing information

## Acronyms

ASR	Accident Service Report - A form turned in by maintenance staff to report damages caused by an accident
CSR	Customer Service Request – A request from the client or the motoring public
DWR	Daily Work Report – The reporting of activity accomplishments. Labor hours, equipment and materials used to complete an activity
HCM	Human Capital Management – Employee listings, timesheets, certification and course documentation and disciplinary issues
JAMMS	Jorgensen Asset Maintenance Management System
PO	<p>Purchase Order - Work order given to Subcontractor as direction to complete a given task.</p> <p>The PO will contain the activity that will be reported to the client as well as the pay items that determine how much the subcontractor will be paid for the work performed.</p>
QC	Quality Control
SR	Service Request - A request entered into JAMMS that is a result of someone identifying a maintenance need. This request can come from in-house personnel, the Client, which would be a Customer Service Request or as the result of damages found because of an accident. Entering the Service Request into JAMMS will be almost always be followed by creating a Work Order.
TPC	Third Party Claims - Processed for obtaining reimbursement from the insurance companies for damages to roadway assets
WO	Work Order - Once we have determined the need for work to be performed, we must assign this work to someone; we do this by creating a work order. A work order can be assigned to either in-house staff or to a subcontractor.
WR	Web Request – A request received from the motoring public through our web request site

## How Accomplishments are Reported

Each activity we perform in the field is reported to our client. Different activities are reported by different units of measure. The following are some of the units of measure used for different activities:

Activity	Unit of Measure
Asphalt Repair	Tons
Delineators	Each
Fence	Linear Feet
Graffiti Removal	Square Feet
Guardrail	Linear Feet
Lighting Repair	Man Hours
Litter Removal – in house	Man Hours
Litter Removal – subcontractor	Acres
Mowing	Acres
Pothole Repair	Each
Service Patrol	Man Hours
Signs	Each
Sweeping	Curb Miles
Tree Trimming and Removal	Man Hours
Misc. shop/admin work performed by Techs	Man Hours

**Please note that if an activity is reported in man-hours, the total number of labor hours for all employees involved in the activity must match the number of accomplishments.**

## Fundamentals

### JAMMS Functionality

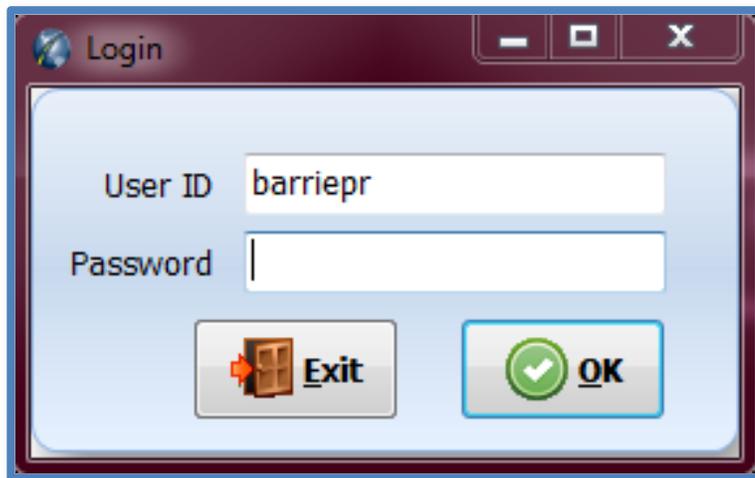


### Jamms Interface

The JAMMS program is organized into several areas. The following is a quick guide around the program to understand location and functionality in JAMMS.

#### System Log In

To login to JAMMS, click on the application icon and the login screen will appear as shown below. Your username and password must be set up by the System Administrator.



## JAMMS Functionality Contd.

### JAMMS Launcher



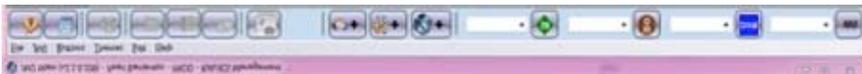
The areas of functionality and some capabilities within JAMMS are shown below. User access to each module is dependent on the user's login. For example, only a couple of users with extensive knowledge of the system have access to the Administration Module.

You can close out your launcher while navigating through the system. You can access the launcher by going to your system tray and right-clicking on the JAMMS icon to open up a quick menu or double click on the icon to open your launcher screen.

### Menu Navigation

The navigation bars are always displayed at the top of the screen. Below is an example of the toolbar in the JAMMS Main Module. Buttons that are grayed out are unusable in the current screen. You will see buttons activate when the specific functionality is available.

### Main Module Toolbar

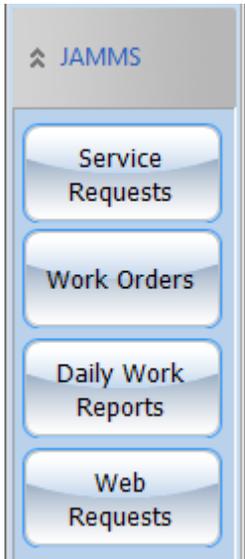


You can add a new service request by clicking either the globe icon, which indicates an in-house request, the "people" button, which indicates a public request or the handshake button, which indicates a client request.

You can search for specific SR's, WO's, DWR's and Web Requests by typing the numbers into the blank fields as shown below and clicking the SR, WO, DWR, or WR button.

<input type="text"/>		<b>SR Search</b>
<input type="text"/>		<b>WO Search</b>
<input type="text"/>		<b>DWR Search</b>
<input type="text"/>		<b>Web Request Search</b>

**Main Module Menu Bar**



The menu bar at the side of the screen are your query search screen selectors:

**Jamms:** Searches for the following are performed:

Service requests (Search only)

Work orders (Search only)

Daily work reports (Search only)

Web requests (Search only)



**Inventory:** Searches for and the initiation of entering/creating the following:

Equipment (Search for and create new record)

Materials (Search for and create new record)

Create Counts

Post counts



**HCM:** Search for employees and initiating entering/creating employee profiles.

Enter timesheets/reconcile time/adjust time

Create training classes Enter claims Creating/entering training classes

Enter Claims (Entering training classes and claims are functions performed by HR and the Division Training Managers only)

**Main Module Menu Bar**



**Vendors:** Search for and create vendors (create material PO's)

Material POs' (Search for and create new record)

Material Invoices (Search for and create new record)

Subcontractor Invoices (Search for and create new record)



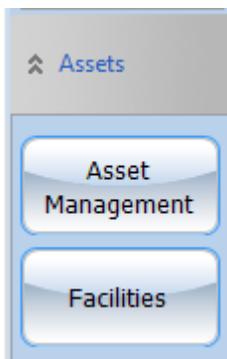
**QC Selector:** Search for work orders requiring QC.



**TPC:** Search for insurance companies and third party claims

Search for/create insurance companies

Search for/enter information for third party claims



**Assets:** Search for and the initiate entering assets

## Searching for Information

Queries can be run using a variety of parameters. The following are some of the parameters you can use to run queries:

- Date ranges
- By location
- By work description (you can even search by using only a portion of a job description, or a word from a work description).
- By source type – who did the request come from?
- By assigned Supervisor
- By Vendor name

\*\*\*\* Your options are endless in creating your searches. One important thing to remember is if you are using a date range in your search criteria, you need to enter what type of date you are looking for. This is indicated in the **Select Date** field. The select date indicates whether you are looking for something by date received, date entered, date due, etc.

You can move the query screen columns around to adjust your needs by simply left-clicking on a column and dragging it to the position in the table you would prefer. Please note that to keep your preferred layout, immediately after dragging a column to your preferred position you must left-click that column and click “Save Sort & Layout” each time you move a column.

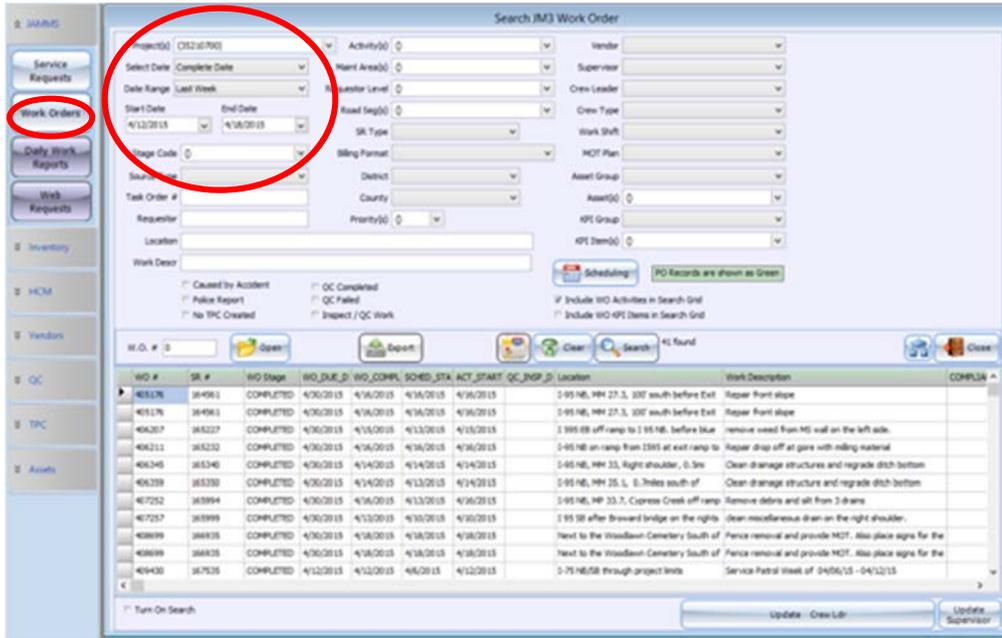
It is highly recommended that you move your columns to the positions that show the information used on a daily basis to make your searches more useful.

### SR Query by Received Date

The screenshot shows the 'Search JMS Service Request' interface. A red circle highlights the 'Select Date' dropdown menu, which is currently set to 'Received Date'. Other filters include 'Project(S)', 'Main Area(S)', 'Requester Level', 'Status(S)', 'Source Type', 'Location', and 'Work Order'. The results table below shows a list of service requests with columns for SR #, AGR\_NUMB, POLICE\_RPT\_NUM, Received, SRC\_DATE, Location, Work Description, SR Type, and SR #.

SR #	AGR_NUMB	POLICE_RPT_NUM	Received	SRC_DATE	Location	Work Description	SR Type	SR #
368078			4/18/2015	5/18/2015	2.85 North Bound on the left side beyond	ack-up mattress	ROADWAY	41
368073	041815446		4/18/2015	5/2/2015	2.95 NB Hibbons off ramp west	Car lost control and hit the guardrail. Inspected and secure guardrail	ROADWAY	41
368070	041815446		4/18/2015	5/2/2015	2.95 southbound just after commercial on	inspect wall strike caused by a car	ROADWAY	41
368023	041718464		4/17/2015	5/17/2015	2.75 SB at Base creek IWB, on the left and	inspection of the damage IWR founded on my road patrol.	ROADWAY	41
368015			4/17/2015	5/17/2015	Base Creek Road at I-75, East side	Drifts on guardrail	ROADWAY	41
368022			4/17/2015	5/17/2015	2.75 SB before the Sawgrass exp. bridge.	clean drainage along the slope to the Sawgrass express, and repair	ROADWAY	41
368005			4/17/2015	5/17/2015	2.75 SB just before the Sawgrass Runer	remove concrete debris left behind by construction, about 4 yds.	ROADWAY	41
368004			4/17/2015	5/17/2015	2.75 SB between Inda trace to I 75 exit.	remove small palm trees from the fence line.	ROADWAY	41
367999			4/17/2015	5/17/2015	2.75 NB off ramp to US 27.	repair wing delineators and replace object markers wrong side.	ROADWAY	41
368172			4/16/2015	4/30/2015	2.95 NB beyond exit 288 Sunrise Blvd W	Remove nails, metal, and bags are on left shoulder.	ROADWAY	41
367982			4/16/2015	5/16/2015	2.75 and Sawgrass (SR)	Provide Long Term MDT and Two Lane closures from I-75 SB to	ROADWAY	41
367948			4/16/2015	4/26/2015	Doctor's Office Worker's Camp.	Go to doctor per Worker's Camp.	ROADWAY	41

### WO Query by Completed Date



### Searching for Information Contd.



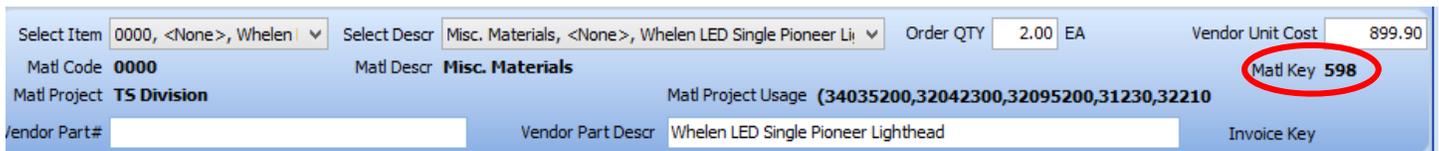
In the screens where you are able to perform both searches and initiating entering records will be indicated with the New Record button. When this button is clicked you will be able to enter the information required to create a new record for the type of item you chose from your “query” (equipment, materials, vendors, etc.). Once a record is added and saved it will show up in all future queries.

### Record Keys



Wherever a “Key” is requested you can enter the key number and click “Open” and you will be able to open the specific record you have searched.

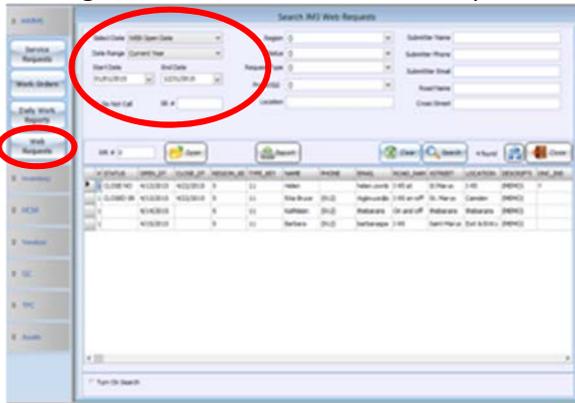
The “Key” is normally found within a record such as the subcontractor PO record or the material PO record. Within these records invoice “Keys” are indicated. You can enter these keys into the query and click open. See examples below.



The material Key is available and can be used to open the material record directly. If an invoice Key was indicated in this record then that key could also be used to directly open a record.

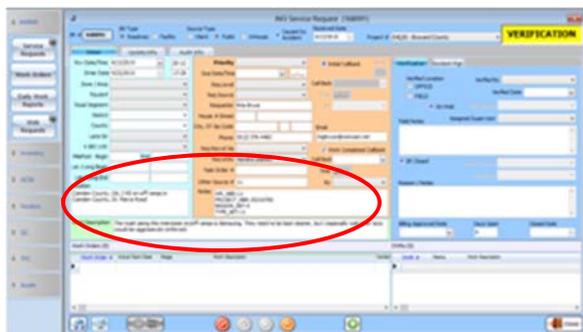
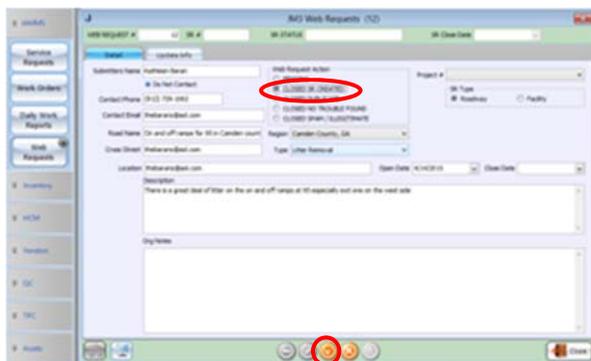
## Web Request

A web request is a request from the motoring public or area residents to perform work. These requests are found by clicking Web Requests and searching by Web Open Date. Once the request is verified by the Project Manager and action will need to be performed in Jamms.



If the Project Manager determines that work will be performed you will double-click the request from the query results. A window will open in which you will enter an action:

- Click "Edit"
- Click "Closed, SR Created"
- The SR screen will open and you will enter your SR information as you would any other SR. Entering an SR is discussed in the section "Entering SR's".



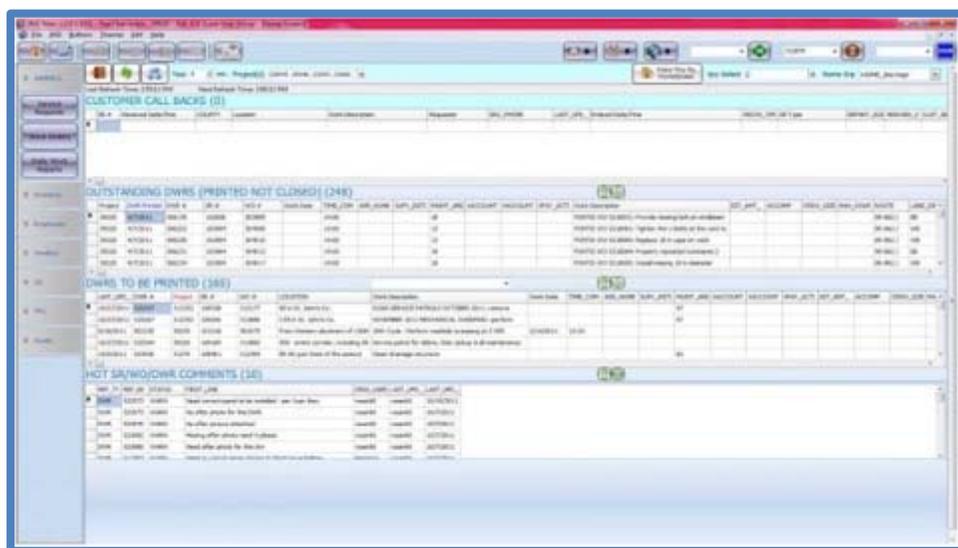
The web request number is automatically populated in the "Other Source Number" field.

The location information and work description are populated directly from the web request. The web request information is automatically populated in the Notes" field

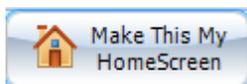
## Home Screen



Clicking on the Home Icon opens up an Action Query used to quickly glance at important data as shown below.



This screen can be customized to fit your needs by selecting the action queries you wish to view and saving your view by clicking on Make This My Home Screen.



If you are a user that is assigned to multiple projects, you are able to filter the information further by selecting specific projects on the Project drop down.

## Query Select Options:

- ❖ **Active Work Orders:** Displays all open Work Orders and can be filtered by Today, This Week, and Last Week.
- ❖ **All New Service Requests:** Displays new Service Requests and can be filtered by This Week, Today, Yesterday, This Week, and This Month
- ❖ **Critical Action:** SR's past the due dates inputted in JAMMS.
- ❖ **Customer Call Backs:** Service Requests that require call backs that have not been completed.
- ❖ **DWRs to Be Printed:** Displays DWRs that are pending and not printed.
- ❖ **Hot SR/WO/DWR Comments:** Displays all of your Hot Comments inputted on the SR, WO, and DWR screens.
- ❖ **My New Service Requests:** All SRs assigned to the users login.
- ❖ **My Scheduled WOs:** All WOs assigned to the users login.
- ❖ **On Hold Work Orders:** Work Orders that are marked on Hold.
- ❖ **Outstanding DWRs (Printed Not Closed):** DWRs that have been printed but not closed out in JAMMS.
- ❖ **To Be Scheduled:** Work Orders without a scheduled date.
- ❖ **Verification:** Service Requests that need to be verified. **VIP/High Priority Requests:** Priority 1 and Executive Level requests.

## Cascade Windows



JAMMS allows you to have multiple windows open at one time with some overlapping each other. If you click on it will cascade the open windows so you can see the titles of each window and quickly access them by clicking on the window header. When you have a window or windows open, this icon will have number in a circle. This is the number of windows you currently have opened.

## Print Report



This button will print a formatted report based on the query you have created in any of the search screens within JAMMS. This is in addition to the quick print you can use within the Search windows by right clicking on the tables heading and clicking Print This Grid.

## Attach Documents, Photos and Comments



The Document Manager is used to attach files, images, and comments at any screen. Each of these files can be set at a security level of User, Supervisor, or PM Sr. Management. This allows a user to attach sensitive information to a record without all users having access to the information.

Below is the screen used to attach documents specifically related to the job or project. This can include but not limited to Contract Work Documents, DWRs, Emails, Pay Items, PCFs, etc. All documents must be in .pdf format in order for them to be attached correctly.

### Attach Documents

The screenshot displays a web-based form titled "CONTRACT MAINTENANCE WORK DOCUMENT". The form includes the following fields and sections:

- Page:** 1 of 1
- DATE ISSUED:** 11/15/11
- WORK ACTIVITY:** Routine Maintenance
- DATE RECEIVED:**
- CONTRACT NUMBER:** 2012045
- DATE WORK BEGAN:**
- CONTRACT NUMBER (Case Number Grid Page):**
- SNY DESCRIPTION:**
- WORK ORDER NUMBER:**
- TABLE:** A table with columns: ITEM NO., LOCATION, WORK DESCRIPTION, QUANTITY, UNIT PRICE, WORK ORDER NUMBER.
 

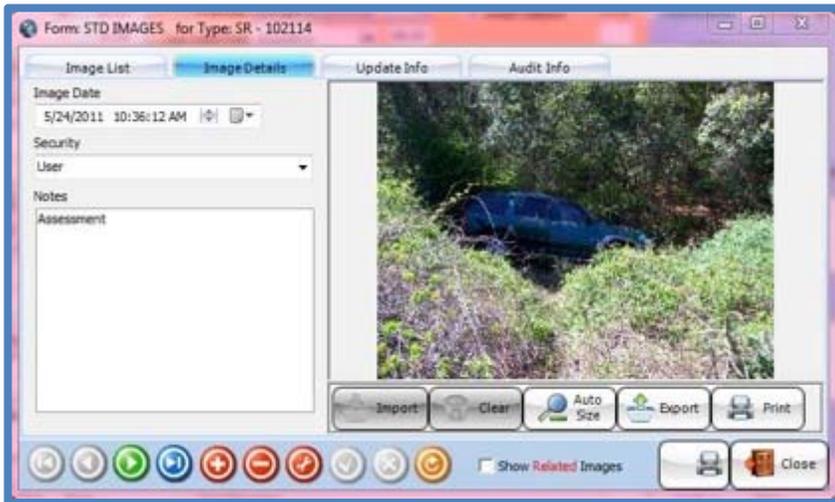
ITEM NO.	LOCATION	WORK DESCRIPTION	QUANTITY	UNIT PRICE	WORK ORDER NUMBER
0110107		Annual Lighting Pole/Post/Support Installation (10' x 4" steel) (2) (40' - 50' - 60')	2	24,400.00	

The interface also shows a sidebar with "Document Date" (11/15/2011), "Document Title" (Work Document), "Security" (User), and "Notes". At the bottom, there are buttons for "Import", "Clear", "Export", and "Print".

## Attach Documents, Photos and Comments Contd.

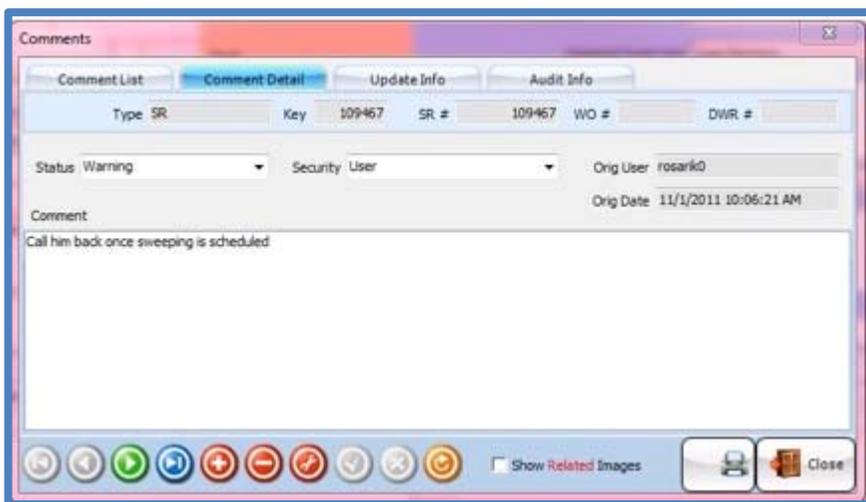
Below is the screen used to attach images. This includes employee and equipment photos as well as job specific photos for Third Party Claims. The images must be in .jpg, .png, .gif format, downsized to at least 640x480, and watermarked with the date and project. Batch Photo is an available program to downsize picture file sizes.

### Attach Images



Below is the screen used to attach comments. You can specify whether a comment is informational, warning, or hold. When a comment is marked as a warning at the SR, WO, or DWR level, you can track them through your Home Screen using the query Hot SR/WO/DWR Comments. This is a useful tool to keep track of missing information, reminders, record phone conversations with a client/public, etc.

### Attach Comments



## Bottom Bar Buttons

There are several buttons within JAMMS that are located in the bottom bar of all edit screens as shown below



From left to right we have the following functionality:

- ❖ First record
- ❖ Previous record
- ❖ Next record
- ❖ Last record
- ❖ Add new record
- ❖ Delete record
- ❖ Edit record

PLEASE NOTE: EDIT RECORD BUTTON MUST BE CLICKED BEFORE YOU CAN MAKE EDITS ON ANY SCREEN. YOU WILL NOTICE THE SCREEN CHANGE FROM BLUE TO GREEN IN EDIT MODE.

- ❖ Save record

PLEASE NOTE: SAVE RECORD BUTTON MUST BE CLICKED AFTER EDITS ARE MADE OR ELSE YOU WILL NOT SAVE ANY CHANGES YOU HAVE MADE.

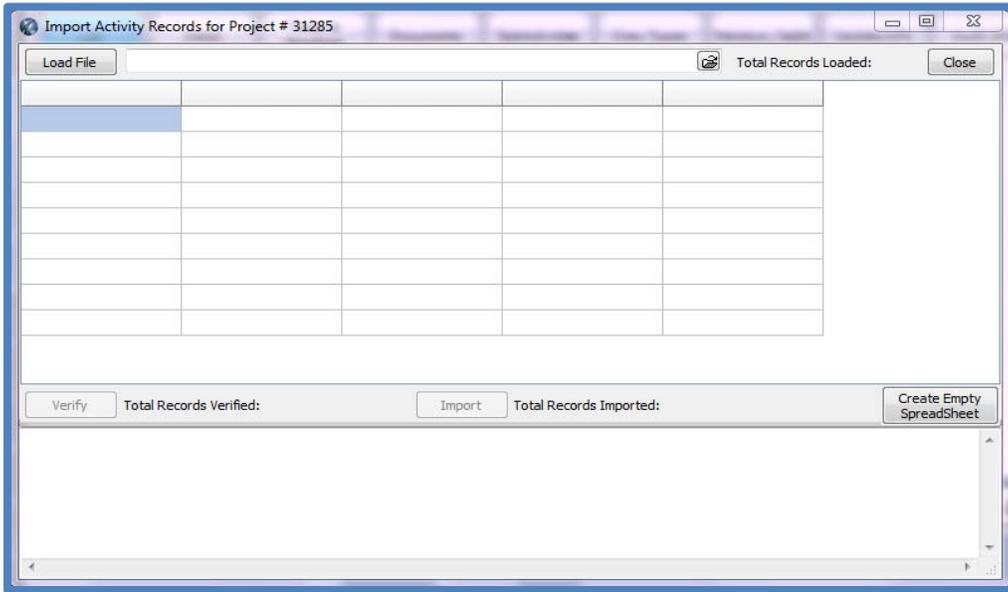
- ❖ Cancel edits
- ❖ Refresh record
- ❖ View active records only
- ❖ Copy records
- ❖ Import records
- ❖ Print
- ❖ Close record

### Import and Copy Function

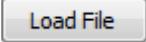
There are several places within JAMMS where you have the ability to either copy records from an existing project to another or import records into a project. This functionality is available in the following screens:

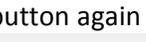
JAMMS 2 Main Module		
Equipment	Materials	Employees
Vendors	Insurance Companies	Asset Management
Facilities		
Maintenance Module		
Asset Group	Facility Type	Activity
Activity Group	Activity RJA	Crew Type
Contract Priority	Misc. Codes	Schedule Priority
Work Shift	Lane Direction	XSection Position
Maintenance Area	Road Segment	Requestor Source
Requestor Level	Received Via	RMSR Method
Material Category	Material Type	

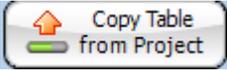
The import function gives you the ability to import multiple records using a formatted excel spreadsheet. It is important the formatted spreadsheets are used or you will be unable to begin the import. The function takes you the screen as shown below:

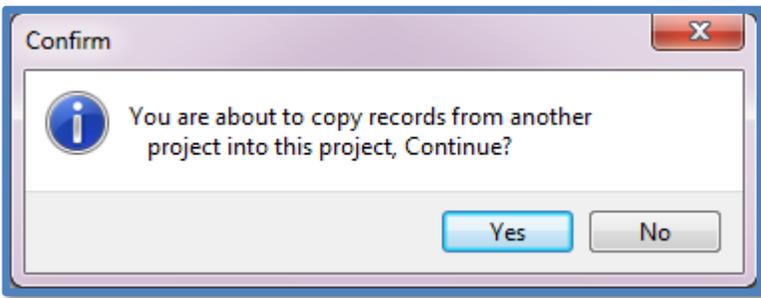


## Import and Copy Function Contd.

First click on the open file button  and locate the excel spreadsheet on your computer and click open. Now click on the Load File button  and then Verify.  

If there are any errors, the error location will display in the lower grid and the specific fields will be highlighted. You can simply click on the highlighted cells in the upper grid and choose the appropriate data from the drop down menu. Once all errors have been corrected, click on the Verify button again  and the total number of records will be displayed. Now click on the Import button   and your activities will be added into JAMMS.

The Copy function is a fairly simple process. Click on  and the message in Figure X will be displayed.



Once you click on yes you will be able to choose the project you would like to copy the records from.

## The Maintenance Table

Jamms is a database. In order to work in a database, you need to create the information that will appear in your drop-down boxes. The information for these drop-down boxes is entered in the Maintenance Table module. If you attempt to choose information that does not appear in a drop down box the most likely reason is that the information was not entered into the Maintenance Table in order for it to be available in the drop down box. The following are some examples of information created in the Maintenance Table:

- Units of Measure – (Each, linear feet, cubic yards, curb miles, etc.)
- Asset Groups (bridges, signs, lighting, etc.)
- Location directions, road segments and maintenance areas
- Employee titles
- Crew Types
- Asset Types
- Activities and activity groups
- Material categories and material types

Most of this information will be pre-loaded into your Jamms module for your project before you begin, but you should familiarize yourself with these functions so that you can quickly resolve any data entry issues that may arise.

One of the functions you will perform more often in the Maintenance Table is adding activities or pay items so that you can add these to a subcontractor PO. You must use extreme care when performing this function as these entries have an effect on your ability to create a PO quickly and accurately. The following are the steps taken to add an activity/sub-activity/pay item to the Maintenance Table:

- Click on the “Activity” Tab, then click the next “Activity” tab
  - ❖ Scroll through your list of activities to make sure the one you need does not already exist in the table

Activity Code	Activity	Units	Unit Price	Crew Descr	Cost Code	Bench
028	Fleet Vehicle Maintenance (Fleet Assets)	MHr			12090	01000
029	Job Admin & Miscellaneous Shop & Field Work	MHr			12040	01000
030	Work for another project	MHr			12040	
032	Administrative Duties (Office)	MH		Administrative	12010	
032AD	Assess Asset Damage	MH		Service Patrol	36400	
032FA	Field Administration	MH		Administrative	12040	
032FI	Field Inspection (QC)	MH			15040	
032IN	Materials Inventory	MH		Administrative	12040	
032PM	Purchasing Materials	MHr			12040	01150
033	Training	MH			12050	
035	Project Management	MH			11020	
197	Engineering Duties, including RCI	MH			15020	
411	Asphalt Repair - Manual	Tons			31100	04030
411-01	Milling and Resurfacing Asphalt Pavement	LS		Skilled Labor	31100	
411Misc	Asphalt Miscellaneous Work	Tons			31100	
411Misc-1	Miscellaneous Asphalt	LS			31100	
411T	Asphalt Pothole Patching	Each			31100	
412	Asphalt Repair - Mechanical	Tons			31100	
412-01	Milling and asphalt overlay (approx. 60' x 15')	LS			31100	100
413	Bituminous Pavement Joint Repair	LinFt			31100	04025
414	Base Repair	Tons			31100	04030

More than likely, you will be entering sub-activities or pay items, since all of the main activities will most likely have been entered at the start of the project. Sub-activities/pay items require what are called a roll-up activities, which simply, ties the sub-activity to the main activity.

- Check the “detail” portion of the main activity and note the following:
  - ❖ The “Activity Group”
  - ❖ The “Activity Benchmark”
  - ❖ The “Cost Code”

These details will be used to create your sub-activity or pay item and must match the main activity:

### Main Activity

Note: There is no roll-up activity on the detail page of the MAIN ACTIVITY; this is not needed for the main activity, only the subsequent sub-activities or pay items:

The explanation for this is simple; the main activity is the activity that is contained in the contract documents and is provided by your local DOT. These are the activities that are reported to the client. The sub-activities or pay items are dependent on the main activities. In order to create a PO using a sub-activity or pay item, you must first enter a main activity so that it can be reported to the client. The sub-activity or pay item is used for calculating how much will be paid to the subcontractor for the work performed.

### Sub-Activity or Pay Item

Note that the activity group and cost code match the above main activity. Note that there is now a rollup activity, which is the main activity, which ties the sub activity to the main activity. When creating a PO, if you were to leave off the rollup activity and tried to pull in the sub activities onto the PO, you would not be able to because the sub-activity is directly tied to the main activity.

## Creating a Vendor and Adding Activities to a Vendor

Now that you have created your activities, you can add them to in house work orders.

We will sometimes assign work to a subcontractor instead of completing the work in-house. The first step you need to take in order to create a subcontractor is to have the subcontractor/vendor set up on a corporate level:

- You must send a New Vendor Request the Vendor Coordinator in corporate to have the vendor set up (See Attachment – Vendor Request Form).
- The information for the vendor, such as what type of work they will perform for us should come from the Project Manager
  - ❖ Fill out all of the information on the form, including what type of vendor you are setting up:
    - A subcontractor performs a service for us
    - A vendor/supplier supplies materials to us



### NEW VENDOR REQUEST FORM

(To be completed by Field Operations and submitted to the Corporate Office as noted below.)

Vendor Information			
*Vendor Name:			
Mailing Name (if different from Vendor Name):			
Name of Vendor Contact:			
Address Line #1:			
Address Line #2:			
City:	State:	Postal Code:	
Business Phone:	Fax #:	Cell Phone:	
Email Address:			
Vendor Service Information			
*Specify Contract(s) (for Contract Operations) Or Location(s) (for Facility Services) Vendor will Serve:			
(Contract or Location Examples: HC-TRA, TXDOT Dallas, OCEA, I-395, OTO, Cedar Rapids CSC, Richmond DSSO, etc)			
<input type="checkbox"/> <b>SUBCONTRACTOR</b> (On client site services – subcontract agreement and insurance required) IE: Asphalt repairs, sweeping, painting, HVAC technician, general contractor	<input type="checkbox"/> <b>SERVICE PROVIDER</b> (Provides services for Jorgensen – insurance required) IE: janitorial services in Jorgensen office, mechanics, indirect project expenses (cost code 90000)	<input type="checkbox"/> <b>TRADE</b> (Specialized service providers - no requirements) IE: police officers, rental equipment co., equipment/vehicle mtce. providers, trash removal/dumpsters	<input type="checkbox"/> <b>SUPPLIER</b> (No on-site services - provides materials only) IE: materials supplier  Attach Credit Application
*Type of Service:			
(Type of Service Examples: Litter Removal, Sweeping, Landscaper, Electrical, General Contractor, Auto Parts Supplier, etc)			
Provides Services on a Recurring Basis? YES <input type="checkbox"/> NO <input type="checkbox"/>			
Diversified Business Enterprise (DBE)? YES <input type="checkbox"/> NO <input type="checkbox"/> UNKNOWN <input type="checkbox"/>			
Supplier Information			
*Credit Limit Request: \$			
(standard is \$2,000 – over \$2K requires Project Manager approval - over \$10,000 requires Project Principal approval)			
Authorized Purchasers:			
*Are Purchases Tax-Exempt? YES <input type="checkbox"/> NO <input type="checkbox"/>			
Toyota Contract ONLY			
Landscape Contractor? YES <input type="checkbox"/> NO <input type="checkbox"/> In performance of regular services, will landscaper be performing irrigation services to include installation, repair, or removal of submerged irrigation pipes (tie to main line, major repair, etc)?	Type of Service Vehicle (check applicable box): <input type="checkbox"/> Passenger Vehicles or trucks 1 Ton or Less <input type="checkbox"/> Trucks Greater than 1 Ton (Stake, Dump, Trash or Electrical Bucket Trucks) <input type="checkbox"/> Tractor Trailer Units (GC, Furniture Supplier) <input type="checkbox"/> Cranes		
Contact Vendor Coordinator if status changes for either of these Toyota account requirements			
Requestor Information			
Requester's Name:	Phone:	Date:	
Submit Completed Form to Corporate Office Attn: David Tune David.Tune@RoyJorgensen.com			

\* REQUIRED

(AB# \_\_\_\_\_)

New Vendor Request Form rev 12-12.doc

## Creating a Vendor and Adding Activities to a Vendor Contd.

Once you receive notice that the vendor is suitable for use on your project, you will need additional information from the Project Manager. The PM will provide a list of activities and the cost to perform these activities, usually in the form of a quote from the subcontractor. To add this information to Jamms:

- Click on “Vendors”
- Click “New Record”

- A window will open to add the subcontractor’s information.
- Select the “Allowed Projects” for which this vendor can be used
- Select your project as the main project
  - ❖ If this subcontractor is already set up in Jamms, you will simply have your project added as an allowed project to use this subcontractor, if the contract requirements allow (consult with the Vendor Coordinator for determination).
- Be sure to click whether this subcontractor/vendor is a service provider or supply provider.
  - If this is a service provider, you will be able to create work orders and issue to the subcontractor to perform the work.
  - If this is a supply provider, you will create a material PO to order supplies from the vendor (this will be covered under a different heading).
  - Sometimes a subcontractor/vendor is a service provider AND supply provider, in which case you would click BOTH so that you can add activities AND materials. This allows you to order a service or materials from this subcontractor/vendor.

### Select your project as “Project” and “Allowed Project”

## Creating a Vendor and Adding Activities to a Vendor Contd.

Add the detailed information for the subcontractor and REMEMBER to click whether this is a service provider or supply provider. Notice that clicking “Service Provider” allows you to see the tab “Activities”. If you click “Supply Provider” you will not see this tab; you will see the materials/rental materials tab because that means this vendor supplies materials.

Now that you have set up the subcontractor/vendor information you need to add activities to this subcontractor so that you can create a work order containing these activities and subsequently create a PO to send to the subcontractor. To add activities to the subcontractor, under “Vendor”:

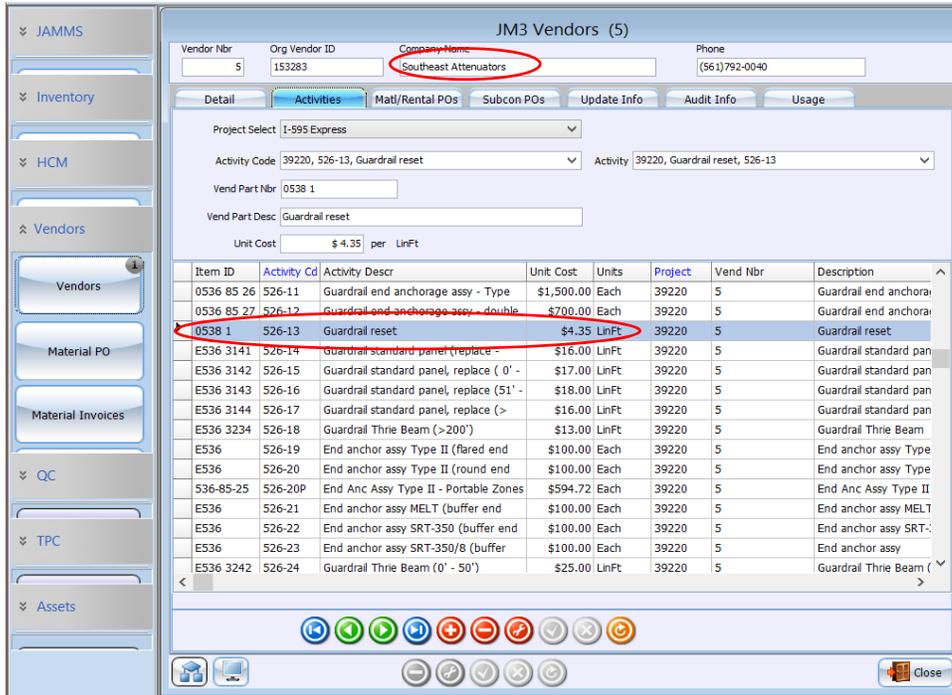
- Click the “Activities” tab
- Select YOUR project
- Click the “+” button

Item ID	Activity Cd	Activity Descr	Unit Cost	Units	Project	Vend Nbr	Description
	526	Guardrail Repair		LinFt	39220	5	Guardrail Repair
0120 2 2	526-01	Borrow excavation, truck measure	\$5.00	CuYd	39220	5	Borrow excavation, tr
0339 1	526-02	Miscellaneous asphalt pavement	\$250.00	Tons	39220	5	Miscellaneous asphalt
0536 1 1	526-03	Guardrail roadway	\$17.00	LinFt	39220	5	Guardrail roadway
0536 1 3	526-04	Guardrail roadway, double face	\$27.00	LinFt	39220	5	Guardrail roadway, doi
0536 8	526-05	Guardrail bridge anchorage assembly	\$2,500.00	Each	39220	5	Guardrail bridge ancho
0536 73	526-06	Guardrail removal	\$1.50	LinFt	39220	5	Guardrail removal
0536 76	526-07	Guardrail post special length	\$50.00	Each	39220	5	Guardrail post special
0536 85 22	526-08	Guardrail end anchorage assy - flared	\$3,000.00	Each	39220	5	Guardrail end anchora
0536 85 24	526-09	Guardrail end anchorage assy - parallel	\$3,000.00	Each	39220	5	Guardrail end anchora
0536 85 25	526-10	Guardrail end anchorage assy - Type II	\$750.00	Each	39220	5	Guardrail end anchora
0536 85 26	526-11	Guardrail end anchorage assy - Type	\$1,500.00	Each	39220	5	Guardrail end anchora
0536 85 27	526-12	Guardrail end anchorage assy - double	\$700.00	Each	39220	5	Guardrail end anchora
0538 1	526-13	Guardrail reset	\$4.35	LinFt	39220	5	Guardrail reset
E536 3141	526-14	Guardrail standard panel (replace -	\$16.00	LinFt	39220	5	Guardrail standard pan

## Creating a Vendor and Adding Activities to a Vendor Contd.

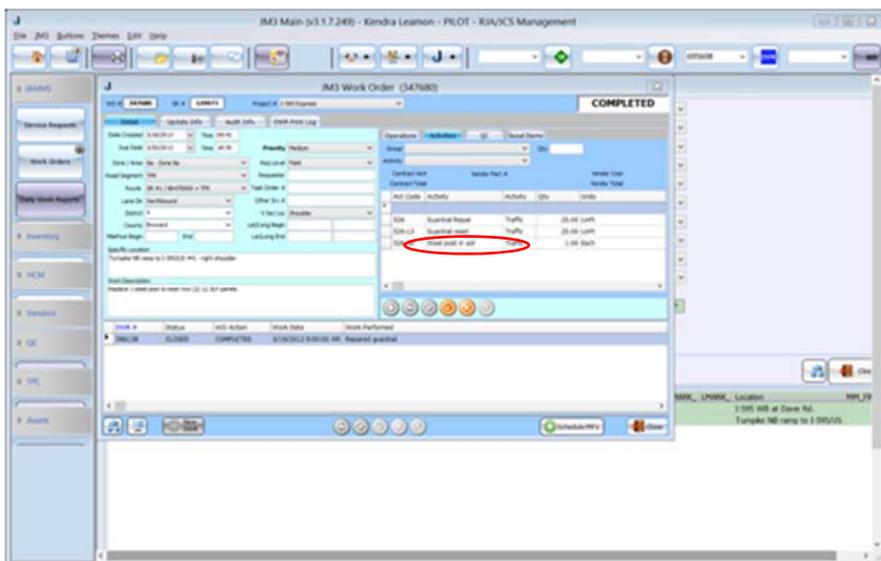
- Select the Activities you previously added to Jamms from the drop down list to add to the subcontractor.
  - ❖ Be sure that the activity you are adding is the activity for YOUR project
  - ❖ You must click the “+” button each time in order to select each activity you want to add
  - ❖ Be sure to add the \$\$ amount the subcontractor/vendor is charging to perform this activity. **If you leave this blank no cost will show up on your PO.**

Activity 526-13 has been added to this vendor with a cost of \$4.35/LF



Once you select all of the activities you want to add to the subcontractor/vendor, the activities will show up in your drop-down list in the work order in order to create a PO.

Activity now available in to be added to the PO for this subcontractor:



## Creating a Service Request (SR)

Once all of your information is added in the maintenance table and your vendors are set up, you are ready to move on to entering requests.

**Service Request:** A request entered into JAMMS that is a result of a Maintenance Need or request from the client or staff to perform an activity in the field. The following are the fields required correctly complete a Service Request.

- **Received Date/Time** – the date the request was received either from the client, public or Supervisor. This date may be a date previous to the current date however **it is crucial to use the correct date as this date will determine the “due date” the task is to be completed.**
- **Enter Date** – This date is automatically populated by the system to accurately show when the service request was entered into the system – **DO NOT CHANGE THIS DATE.**
- **Zone** – The work location is divided into zones. You will be given a listing of these zones for your project/s.
- **Road Segment** – This is the actual location where the work in question is to be completed.
- **District** – This is the district for the specific project for which you are entering a request.
- **County** – Enter the county for the project for which the request is being entered.
- **Lane Direction** – Refers to Eastbound, Westbound, Southbound or Northbound.
- **X Section Location** – Refers to which part of the road the work is to be completed (shoulder, intersection, etc.).
- **Mile post** – If there are mile posts on the project road, they should be entered for all requests.
- **Location** – The exact description of the work location is to be entered her.
- **Work Description** – Exact description of the work to be completed
- **Priority** – This is the due date based on the contractual requirements
- **Due Date** – To be determined by the compliance time outlined in the contract. If there is not contractual compliance time, you will enter the due date provided by the Maintenance Supervisor or Superintendent.
- **RJA Employee** – This is the person who either initiated or received the request.
- **Request Level** – Informs whether the request was initiated on an Executive, project or field level.
- **Received Via** – How the request was received (by phone, e-mail, form (maintenance need or work order), etc).
- **Inspection #** - This field is only filled out if the request is a result of an “Asset Inspection”, such as a bridge inspection done by our consultants.
- **RMSR Method** – Routine Maintenance Service Request (Service Request) – the method by which the work was found (road patrol routes, manager ride along, random inspection, etc.).
- **Verified by** – This is the person who verifies that the work needs to be done. Should be the Supervisor’s name.
- **Verified Date** – Date the work was verified (this is not necessarily the same date as the Entered Date). ALL requests must be verified immediately upon entering an SR. Do not leave this field blank.
- **Assigned Supervisor** – The name of the Supervisor assigned at the project.
- **Field Notes** – To be entered if there are additional notes to be added to the request.
- **SR Rejected box** – A request should only be “rejected” for extenuating circumstances such as the area of work is outside of the project limits. If the request is being canceled for any other reason, use “Closed” instead of “Rejected”. The reason for the rejection or closure is to be entered into the **“Reason”** box.
  - ❖ There should not be any work orders under an SR rejected or closed in this manner.
  - ❖ If any work, including verifying or assessing damages was done, the work order should be closed out by completing a DWR by the normal method.
- Click “Save”

## Service Request

JAMMS
JM3 Service Request (104909)
CLOSED

SR # 104909

SR Type Roadway Facility

Source Type Client Public

Caused by Accident

Received Date 6/12/2011

Project # I-995 Express

Detail | Update Info | Audit Info

Rcv Date/Time 6/12/2011 22:04

Enter Date 6/13/2011 11:36

Zone / Area 8b - Zone 8b

Route# SR-91 / 85470000 = TPC

Road Segment TPC

District 4

County Broward

Lane Dir Southbound

X SEC LOC Shoulder

MilePost: Begin End

Lat / Long Begin

Lat / Long End

Location Turnpike SR off ramp to I-995 - left side before T-1 Bridge

Priority Safety Hazard

Due Date/Time 6/15/2011 22:04

Employee Joshua Farrington

Req Level Field

Recvd Via Field Form

By Simon Castro

RMRS Method Road Patrol/Routers

Inspection #

Notes

Verification Incident

Verified Location OFFICE

Verified By Simon Castro

Verified Date 6/12/2011

On-Field

Assigned Supervisor -George Buena-venturan

Field Notes

SR Closed

Reason / Notes

Billing Approved Date

Days Open 0

Closed Date 6/13/2011

Work Description Reset twisted wood blocks (2) damaged by car accident

Work Orders (2)

Work Order	Actual Start Date	Stop	Work Description	Vendor
38802	6/13/2011 10:30:00 AM	COMPLETED	Reset twisted wood blocks (2) damaged by car accident	
38803	6/13/2011 10:30:00 AM	COMPLETED	Provide temporary mitigation - secure site	

DWRs (2)

DWR #	Status	Work Description
10008	CLOSED	Reset twisted wood blocks (2) damaged by car accident

Close

## Web Requests

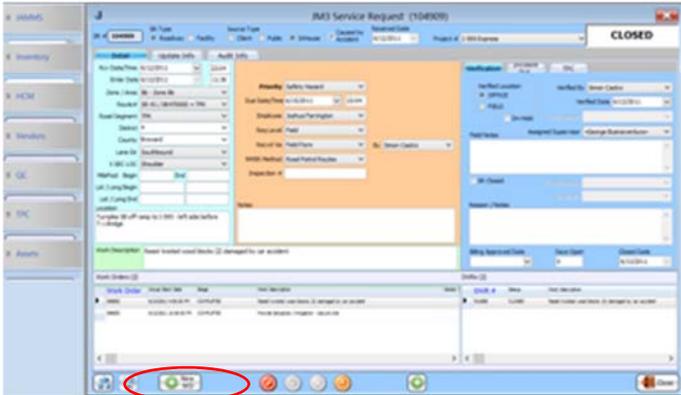
- Enter the project number from the drop down list.
- While the validity of the request is being inspected you will click “Pending” so that you have a flag of the outstanding request.
- If the request is deemed a duplicate or no trouble was found upon inspection, you will click either “Closed Duplicate” or “Closed No Trouble Found”.
- A follow up e-mail or phone call should be made to the requestor unless “Do Not Contact” was clicked by the requestor

## Creating a Service Request from a Web Request

- The SR is automatically generated when you click “Closed SR Created” in the web request window.
- You will need to enter the verification information, complete the location information with zones, etc. and enter the due date and call back information.
- You can now create a work order as you normally would.

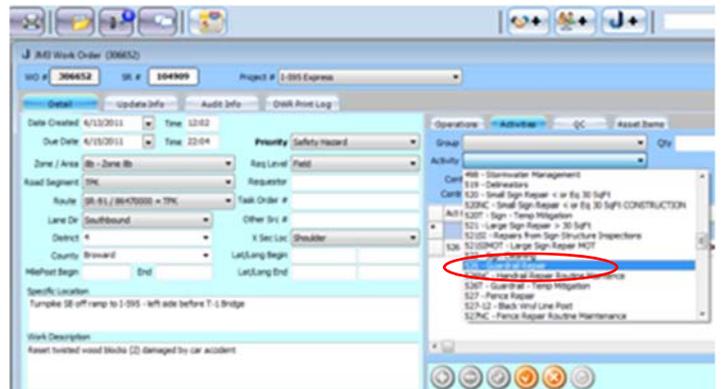
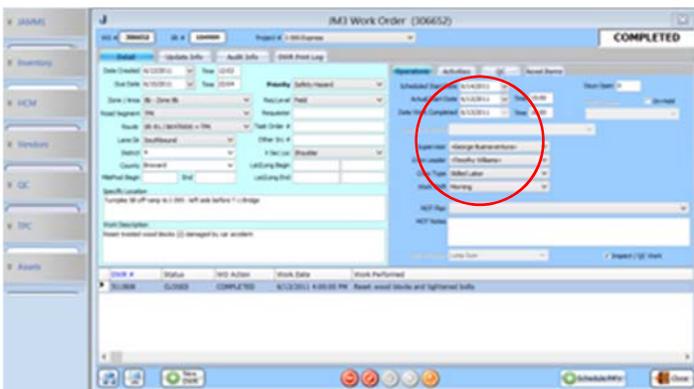
## Creating a Work Order

- ❖ Once you have created and saved an SR, click “New Work Order”



Most of the fields in the work order will automatically populate from the information entered into the Original SR. The following are the fields that will not automatically populate:

- **Scheduled Start Date** – This is the date the work is scheduled to start. If you were given a DWR by maintenance staff, the date would be the date the work was actually performed.
- **Supervisor** – Supervisor assigned to this work.
- **Crew leader** – this is the Crew Leader assigned to this area of work. On the DWR, other employees who performed the task will be added to account for their time spent completing the task.
- **Crew Type** – The type of crew that will perform the work (Service Patrol, Lighting, Sign crew, etc.).
  - ❖ Click “Save”
  - ❖ Click the “Activity” tab.
- **Activity** – on this tab the activity/activities will be assigned for this specific task. Use the pull down tab to choose the “Activity”, not the “Group”. The group will populate once the activity is chosen.
  - ❖ Enter the quantity of work to be done, such as linear feet, square feet, number of acres, etc.
  - ❖ Click “Save”
  - ❖ Click “Edit”



## Putting a Work Order On-Hold

There only a few, specific reasons to put a work order on hold: Waiting on Client Direction, Waiting on Material or Waiting on a Permit. If one of these reasons apply, a work order can be placed on hold. The preferred method is to change the due date and scheduled start date on a work order; these reasons are for an extended approved hold only. Work orders can only be placed on-hold at the direction of the Project Manager.

- In the Work Order screen click the checkbox labeled “On-Hold”
- Select a “Hold Reason”
- Click Save

**DWR’s cannot be created against a work order that is on-hold.** The hold must first be released by editing the record and un-clicking “On-Hold”

The screenshot displays the JM3 Work Order (410331) interface. At the top right, a red box highlights the **ON-HOLD** status. Below this, the 'Hold Reason' dropdown menu is open, showing three options: 'Waiting on Client Direction', 'Waiting on Materials', and 'Waiting on Permit'. The 'Waiting on Client Direction' option is circled in red. The interface also shows various fields for work order details, including Date Created (6/16/2015), Due Date (6/23/2015), Priority (Medium), and specific location information (NB 136th Ave on Right Shoulder). The 'MOT Notes' field contains the text: 'Waiting to find out if this fence is in RJA right of way or if it belongs to Town of Plantation'. At the bottom, there are navigation buttons for 'New DWR', 'Schedule PM's', and 'Close'.

## Scheduling Work Orders

There are several ways to schedule work orders in Jamms. Using your query screens will be very helpful in assessing which work orders to schedule and in which work orders you will need to change the due date and scheduled start date

### Work Order Query

Running a work order Query for “Pending” work orders will give you a result of all work orders for which no scheduled start date has been entered. Review these work orders to select those you wish to schedule or need to change the due date

Search JM3 Work Order

Project(s) (35210700) Activity Grp(s) 0 Vendor  
 Select Date Due Date Activity(s) 0 Supervisor  
 Date Range Current Year Maint Area(s) 0 Crew Leader  
 Start Date 01/01/2015 End Date 12/31/2015 Requestor Level 0 Crew Type  
 Stage Code (PENDING) SR Type Road Seg(s) 0 Work Shift  
 Source Type Billing Format MOT Plan  
 Task Order # District Asset Group  
 Requestor County Asset(s) 0  
 Location Priority(s) 0 KPI Group  
 Work Descr KPI Item(s) 0

Caused by Accident  QC Completed  Inspect / QC Work  
 Police Report  QC Failed  Inspect / QA Work  
 No TPC Created  Include WO Activities in Search Grid  
 Include WO KPI Items in Search Grid

W.O. # 0     7 found

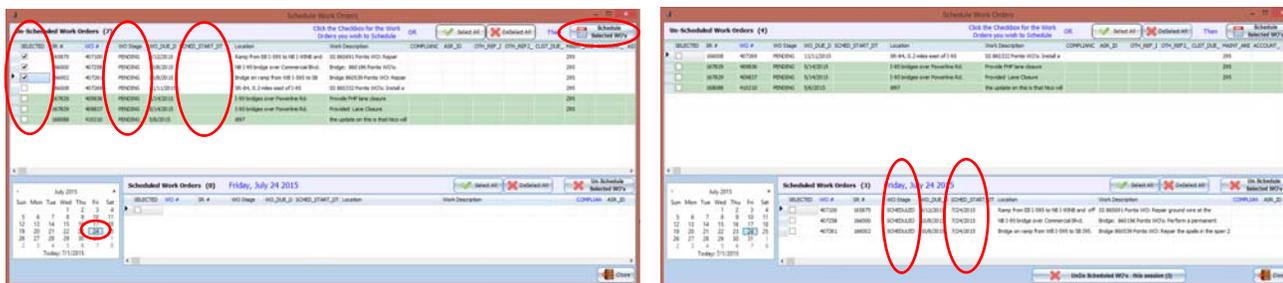
WO #	SR #	WO Stage	WO_DUE_D	WO_COMPL	SCHED_STA	SCT_START	Location	Work Description	QC_INSP_D	QA_INSP_DT	Images	Docs(#)	COMPLIAN
407100	165875	PENDING	9/12/2015				Ramp from EB I-595 to NB	SS 865691 Pontis WO: Repair ground wire at			1	0	
407258	166000	PENDING	10/8/2015				NB I-95 bridge over Commercial	Bridge: 860196 Pontis WO's: Perform a			3	1	
407261	166002	PENDING	10/8/2015				Bridge on ramp from WB I-595 to	Bridge 860539 Pontis WO: Repair the spalls in			2	2	
407269	166008	PENDING	11/11/2015				SR-84, 0.2 miles east of I-95	SS 865332 Pontis WO's: Install a Column cap			1	1	
409836	167829	PENDING	5/14/2015				I-95 bridges over Powerline Rd.	Provide FHP lane closure assistance for			0	0	
409837	167829	PENDING	5/14/2015				I-95 bridges over Powerline Rd.	Provided Lane Closure Assistance			0	0	
410210	168088	PENDING	5/6/2015				1897	the update on this is that Nico will be handling			0	0	

Turn On Search

- **!** In the above Query several work orders have a past-due due date. You will need to open each work order individually to change the due date. If the due date is greater than the due date on the SR, you must first change the due date on the SR.
- **!!** Be sure that you are not changing due dates for compliance items (activities RJA is contractually obligated to complete by a specific date)
- **!** In the above Query no scheduled start date has been entered
  - ❖ Work Orders in “Pending” status have no scheduled start date
  - ❖ Work Orders in “Scheduled” Status have been scheduled (check dates for accuracy)
  - ❖ Work Orders in “In-Progress” status have been started (at least one DWR has been entered against it)
  - ❖ Work Orders in “Completed” status have been completed

## Schedule Several Work Orders at Once

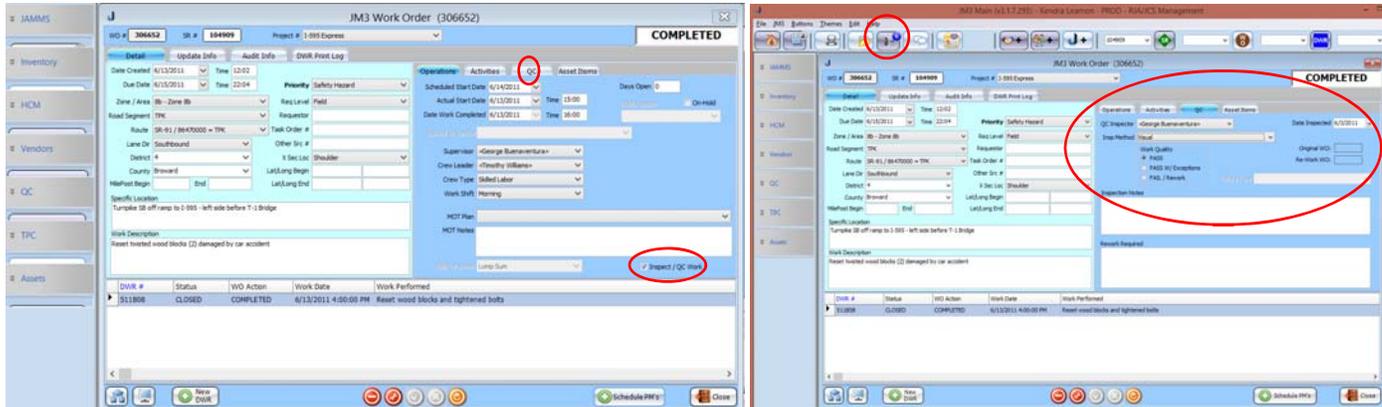
- You can select several work orders to schedule at once by clicking the “Scheduling” button from the Work Order Query screen
  - ❖ You may want to move your columns around so that you can view the date fields easily
- The “Schedule Work Orders” screen will open
  - ❖ The work orders at the top of the screen are the work orders that require scheduling
- Click each work order you wish to schedule for the same scheduled start date
- If you wish to schedule all of the work orders with the same scheduled start date click “Select All”
  - ❖ If you found that you made an error you may click “Deselect All”
- In the “Scheduled Work Orders” section at the bottom of the screen select the date to schedule the work orders
- In the top section (Schedule Selected Work Orders) click the “Schedule Selected Work Orders” button
- The work orders you have chosen will be moved down to the “Scheduled Work Orders” section;



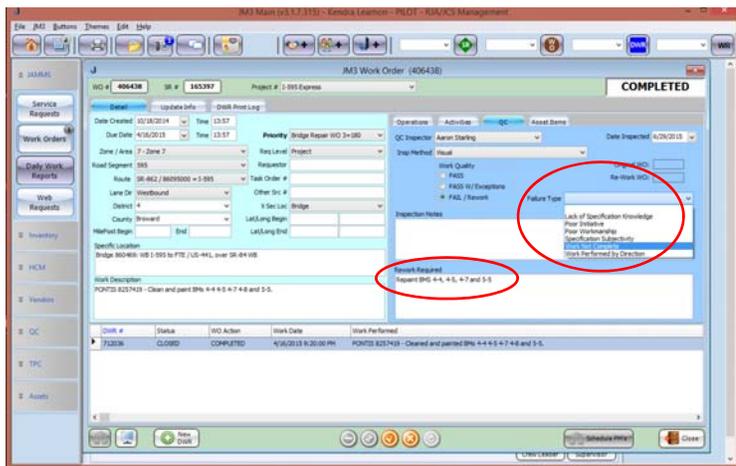
- The selected work orders have been moved from the “Unscheduled” section down to the “Scheduled” section
- Note that the work order stage has been updated from “Pending” to “Scheduled”
- Note that there is now a scheduled start date in the Scheduled Start Date field; this field was blank when the work orders were in the “Un-Scheduled Work Orders” section
- If you discover you made an error, you must click each work order in the “Scheduled” that you wish to un-schedule and click “Un-Schedule Selected WO’s” or you can select work orders in this section and click “Undo Scheduled WO’s – This Session” button

## QC Process

- **QC Checkbox** – this box should be checked for most scopes of work. A supervisor will check the completed work by either reviewing the photos or physically going out into the field to complete a QC checklist for the work performed. Be sure that the “before” and “after” photos are turned in with each completed DWR.



- To mark a work order for QC click the “Inspect/ QC Work” button located on the right side of the work order screen. This will flag the work order to be inspected by a QC Supervisor when the work is complete
- To enter the QC into Jamms click the QC tab and choose “Pass”, “Pass with Exceptions” or “Fail/Rework”.
- Choose the “Inspection Date”



- You must first enter a work description in the “Rework Required” field or the first line of the work description will show up as blank
- Once a failure type is chosen, click save
- If a work order QC is failed Jamms will automatically create a “Rework” work order.
- The system will automatically create a “Rework” work order - the original work order number will show up on the right side of the QC screen

### Rework Work Order

- Once the re-work work order has been created you must again click the “Inspect/ QC” button so that when completed, the completed re-work work order can be QC’d
- Enter a Scheduled Start Date and assign the work order to a Crew Leader
- The work order should now be completed as usual

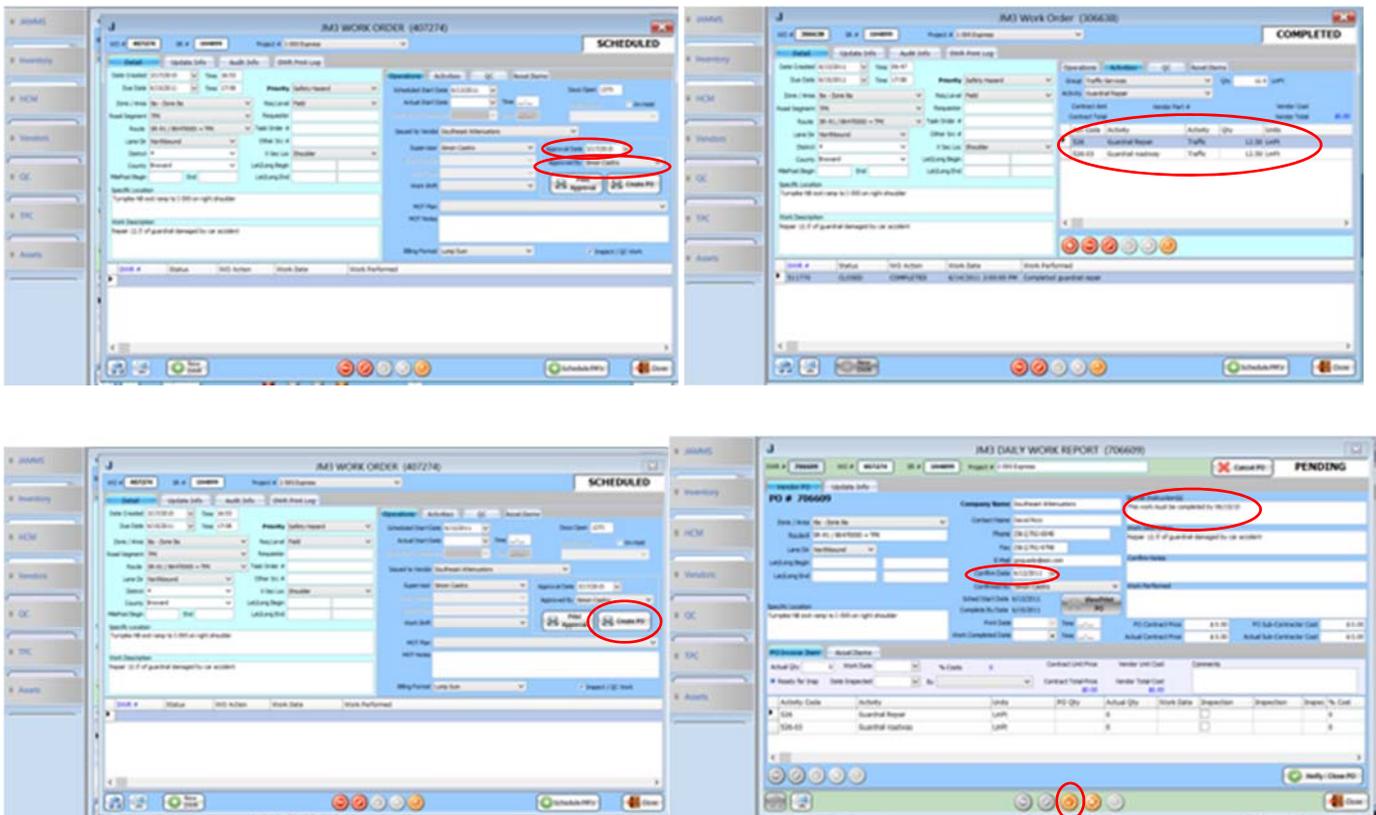
The screenshot shows the JM3 Work Order (410366) interface. At the top right, a red circle highlights the 'REWORK' button. Below it, the 'Original WO: 406438' field is also circled in red. The interface includes tabs for Detail, Update Info, Audit Info, and DWR Print Log. The 'Detail' tab is active, showing fields for Date Created, Due Date, Priority, Zone/Area, Road Segment, Route, Lane Dir, District, County, MilePost Begin, and End. The 'Operations' tab is also visible, showing 'QC Inspector', 'Insp Method', 'Work Quality' (with radio buttons for PASS, PASS W/ Exceptions, and FAIL / Rework), and 'Failure Type'. The 'Work Description' field contains: 'Repaint BMS 4-4, 4-5, 4-7 and 5-5 (Original Work Description: PONTIS 8257419 - Clean and paint BMs 4-4 4-5 4-7 4-8 and 5-5.) (Original WO #406438)'. At the bottom, there are buttons for 'New DWR', 'Schedule PM's', and 'Close'.

The screenshot shows the JM3 Work Order (410366) interface. At the top right, a red circle highlights the 'REWORK' button. Below it, the 'Scheduled Start Date' field is circled in red. The 'Inspect / QC Work' button is also circled in red. The interface includes tabs for Detail, Update Info, Audit Info, and DWR Print Log. The 'Detail' tab is active, showing fields for Date Created, Due Date, Priority, Zone/Area, Road Segment, Route, Lane Dir, District, County, MilePost Begin, and End. The 'Operations' tab is also visible, showing 'Scheduled Start Date', 'Actual Start Date', 'Time', 'Days Open', 'Issued to Vendor', 'Supervisor', 'Crew Leader', 'Crew Type', 'Work Shift', 'MOT Plan', 'MOT Notes', and 'Billing Format'. The 'Billing Format' field is set to 'Lump Sum'. The 'Inspect / QC Work' button is checked. At the bottom, there are buttons for 'New DWR', 'Schedule PM's', and 'Close'.

## Creating a Purchase Order

Often a Service Request will require that work be assigned to a subcontractor instead of in-house staff. When this is the case instead of assigning the work order to a Maintenance Tech, you will assign it to a subcontractor. The following are the fields required to create a Purchase Order:

- Under the Operations tab, instead of assigning a crew leader you will click the “Issued to Vendor” tab and choose the subcontractor appropriate for the assigned task.
- **Approved Date** - Enter the Approved date (the date the Supervisor asked for the Purchase Order).
- **Approved by** – this is the name of the Supervisor who approved the issuance of the Purchase Order.
  - ❖ Click “Save”
- Choose Activities – The actual work to be completed by the subcontractor
  - ❖ Only the activities you have previously assigned to the subcontractor will show up in your drop-down list.
- Choose Pay Items – These are the items that have prices included. These items will add up in the Purchase Order to create the Purchase Order price.
- Click “Create PO” – The Purchase Order screen will open and most of the information from the Work Order will populate to the Purchase Order. You will need to enter the following information:
- **Confirm Date** – This is the date the Supervisor requested the Purchase Order
- **Special Instructions**– Fill out any instructions such as when to start and complete the work



## Creating a Purchase Order Contd.

The completed PO is really a DWR for the subcontractor. Once the work has been completed by the subcontractor, the PM/Supervisor should return the Purchase Order to you with the completed date and time. The PM/Supervisor must confirm the "Accomplishment", which would be number of acres, miles, items installed, etc. Before and after photos should also be included with the completed Purchase Order. If these details are not included, the Purchase Order should be returned with a request for this information so that the proper information can be properly entered into JAMMS. The following information will be entered into JAMMS once a completed Purchase Order is turned in:

- Completed Date
- Completed Time
- Description of work completed
- For each line of activity complete the (acres/number of items/square or linear feet, etc.)
- Enter the date the Supervisor confirmed the completed work into the "Inspected Date" field
- Only after all of these items have been confirmed for accuracy should the "Close PO button be clicked.
- After the PO has been closed go back to the Work Order form and enter the QC information in the QC tab (enter whether the QC status is passed or failed and whether the inspection was performed visually or on a detailed form.

**Congratulations! You have successfully completed your first Purchase Order!**

**JM3 Daily Work Report (511770)**

DWR # 511770 WO # 306638 SR # 104899 Project # [ ] Cancel PO **CLOSED**

**Vendor PO # 511770**

Zone / Area: 8a - Zone 8a  
Route #: SR-91 / 86470000 - TPK  
Lane Dir: Northbound  
Lat/Long Begin: [ ] [ ]  
Lat/Long End: [ ] [ ]

Company Name: Southeast Attenuators  
Contact Name: Tom Beniamino  
Phone: (561)792-0040  
Fax: (561)792-9798  
E-Mail: DrtBeniamino@aol.com  
Confirm Date: 6/12/2011  
Confirmed By: «George Buenaventura»

Sched Start Date: 6/13/2011  
Complete By Date: 6/15/2011  
Print Date: 6/13/2011 Time: 09:49  
Work Completed Date: 6/14/2011 Time: 15:00

Special Instruction(s): This work is to be completed by 06/15/11 at 4:00 p.m.  
Work Description: Repair 12.5' of guardrail damaged by car accident  
Confirm Notes: [ ]  
Work Performed: Completed guardrail repair

PO Contract Price: \$ 0.00 PO Sub-Contractor Cost: \$ 212.50  
Actual Contract Price: \$ 0.00 Actual Sub-Contractor Cost: \$ 212.50

Specific Location: Turnpike NB exit ramp to I-595 on right shoulder

**PO Invoice Item**

Actual Qty	Work Date	% Costs	Contract Unit Price	Vendor Unit Cost	Comments																														
12.5	6/14/2011	100																																	
<table border="1"> <thead> <tr> <th>Activity Code</th> <th>Activity</th> <th>Units</th> <th>PO Qty</th> <th>Actual Qty</th> <th>Work Date</th> <th>Inspection</th> <th>Inspection</th> <th>Inspec</th> <th>% Cost</th> </tr> </thead> <tbody> <tr> <td>526</td> <td>Guardrail Repair</td> <td>LinFt</td> <td>12.5</td> <td>12.5</td> <td>6/14/2011</td> <td><input type="checkbox"/></td> <td>6/14/2011</td> <td>Georg</td> <td>100</td> </tr> <tr> <td>526-03</td> <td>Guardrail roadway</td> <td>LinFt</td> <td>12.5</td> <td>12.5</td> <td>6/14/2011</td> <td><input type="checkbox"/></td> <td>6/14/2011</td> <td>Georg</td> <td>0</td> </tr> </tbody> </table>						Activity Code	Activity	Units	PO Qty	Actual Qty	Work Date	Inspection	Inspection	Inspec	% Cost	526	Guardrail Repair	LinFt	12.5	12.5	6/14/2011	<input type="checkbox"/>	6/14/2011	Georg	100	526-03	Guardrail roadway	LinFt	12.5	12.5	6/14/2011	<input type="checkbox"/>	6/14/2011	Georg	0
Activity Code	Activity	Units	PO Qty	Actual Qty	Work Date	Inspection	Inspection	Inspec	% Cost																										
526	Guardrail Repair	LinFt	12.5	12.5	6/14/2011	<input type="checkbox"/>	6/14/2011	Georg	100																										
526-03	Guardrail roadway	LinFt	12.5	12.5	6/14/2011	<input type="checkbox"/>	6/14/2011	Georg	0																										

Ready for Insp:  Date Inspected: 6/14/2011 By: «George Buenaventura»  
Contract Total Price: [ ] Vendor Total Cost: [ ]

Verify / Close PO

## Completing a DWR

We are no longer automatically creating a DWR in Jamms. If the field staff or Maintenance Supervisor requests so you can print out a DWR. Keep in mind that once you print a DWR you have seven (7) days in which the work will need to be turned in and closed out in Jamms or an alert will automatically be sent from the system advising the DWR is more than 7 days old. To close out a DWR turned in by field staff, follow these steps:

- **Prep Start** – This is the time the crew prepped their trucks with materials to complete their work
- **Travel Start** – This is the time the crew started traveling to their work site
- **Start Time** – This is the actual time the work was started (**Remember**) dates and times are crucial – be sure to check whether the dates/times are accurate.
- **End Time** – You will use the latest time the work was completed (for instance if three employees worked on a task and they completed their portion of the work at different times, **use the latest time to complete this field.**
- **Work Performed** – This should be a detailed description of the work performed (for example – installed thirteen (13) delineators at guardrail, or trouble shot lighting outage and confirmed the outage was caused by construction activity).
  - ❖ Click “Save”.
  - ❖ Click “Edit” – your next field is the “Activity” field. Enter the accomplishment.
- **Accomplishment** – This is the number of items installed or total man hours used to complete the work. **Double check this information for accuracy against the DWR.**
  - ❖ Click “Save”
  - ❖ Click “Edit”
- **Labor** – You will account for all employees who participated in completing this task – enter the name of each employee, the time he/she began and completed this task. If more than one employee worked on this activity, use the **+** button to add additional employees.
  - ❖ Click “Save”
  - ❖ Click “Edit”
- **Equipment** – You will account for all equipment (such as trucks driven by each employee) and any other equipment (such as mowers) used to perform this task. If more than one truck or piece of equipment was used to perform this task, use the **+** button to add additional equipment.
- **Materials** – You will account for all inventoried materials used to complete this task such as lighting material or sign building materials. A complete listing of materials will be provided to you for your project. If more than one type of material was used to perform this task, use the **+** button to add additional materials.
  - ❖ If the materials used were miscellaneous materials (materials not kept in inventory) click 0000-Miscellaneous Materials, enter the vendor name and a list of available materials from this vendor will appear in the drop-down list.
- As the Administrator, you will need to be sure that all of the information required to complete a work order are turned in by the Maintenance staff.

**Congratulations! You have successfully completed a work order for an activity!**

## Completing a DWR Contd.

**JM3 Daily Work Report (705098)** - CLOSED

Work # 705098 | WO # 406426 | SR # 165393 | Project # 1-015 Express

**Detail** | Update Info | Audit Info

Zone / Area: 7 - Zone 7 | Let's Log Begin: 26.08718119 | 40.20.088526 | Supervisor: Marice English | Total Man Hrs: 1.15  
 Route: SR 462 / 86295300 = 1-015 | Let's Log End: | Crew Type: Service Patrol | Labor Cost: \$ 95.15  
 Lane Dir: Inbound | SEC LOC: Off Ramp | Task Order #: | Material Cost: \$ 5.00  
 Specific Location: 163-1-015 off-ramp to NB US-441 | Repair: "CHEVRON" sign damaged from vehicle hit on the left shoulder | Equipment Cost: \$ 20.99  
 Total Cost: \$ 121.13

Work Performed: Repair chevron sign damage complete

Work Order Status:  COMPLETED |  IN-PROGRESS |  ON-HOLD

Activity	Qty	Activity	Req'd	Actual	Units	Contract Price	Contract Total	% of DWR Cost	Work Cmpl
320 Small Sign Repair < or Eq 30 SqFt	1.00	1.00	1.00	1.00	UNITS	\$9.00	\$9.00	100%	3/10/2015 9:23:00 AM

**JM3 Daily Work Report (705098)** - CLOSED

Work # 705098 | WO # 406426 | SR # 165393 | Project # 1-015 Express

**Detail** | Update Info | Audit Info

Zone / Area: 7 - Zone 7 | Let's Log Begin: 26.08718119 | 40.20.088526 | Supervisor: Marice English | Total Man Hrs: 1.15  
 Route: SR 462 / 86295300 = 1-015 | Let's Log End: | Crew Type: Service Patrol | Labor Cost: \$ 95.15  
 Lane Dir: Inbound | SEC LOC: Off Ramp | Task Order #: | Material Cost: \$ 5.00  
 Specific Location: 163-1-015 off-ramp to NB US-441 | Repair: "CHEVRON" sign damaged from vehicle hit on the left shoulder | Equipment Cost: \$ 20.99  
 Total Cost: \$ 121.13

Work Performed: Repair chevron sign damage complete

Work Order Status:  COMPLETED |  IN-PROGRESS |  ON-HOLD

Activity: Labor | Equipment: Multi Vertical Excav. | Assets:

Activity: 320 Small Sign Repair < or Eq 30 SqFt | Accompl: 1.00 | Units | Contract Unit Price | Contract Total | % of DWR Cost | Work Cmpl

Activity Ctl: Activity | Request Qty | Accompl Hrs | Units | Contract Price | Contract Total | % of DWR Cost | Work Cmpl

Employee ID	Name	Start Date	Start Time	End Date	End Time	Break Hrs	Total Hrs
154329	Pedro Neves	3/10/2015	8:14:00 AM	3/10/2015	9:23:00 AM	0	1.15

**JM3 Daily Work Report (705098)** - CLOSED

Work # 705098 | WO # 406426 | SR # 165393 | Project # 1-015 Express

**Detail** | Update Info | Audit Info

Zone / Area: 7 - Zone 7 | Let's Log Begin: 26.08718119 | 40.20.088526 | Supervisor: Marice English | Total Man Hrs: 1.15  
 Route: SR 462 / 86295300 = 1-015 | Let's Log End: | Crew Type: Service Patrol | Labor Cost: \$ 95.15  
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 Specific Location: 163-1-015 off-ramp to NB US-441 | Repair: "CHEVRON" sign damaged from vehicle hit on the left shoulder | Equipment Cost: \$ 20.99  
 Total Cost: \$ 121.13

Work Performed: Repair chevron sign damage complete

Work Order Status:  COMPLETED |  IN-PROGRESS |  ON-HOLD

Activity: Labor | Equipment: Multi Vertical Excav. | Assets:

Equipment # 183396 | Description: Ford F-150 Long Bed | Hrs Used: 1.15 | Rental Cost: \$9.00 | Hourly Rate: \$15.75 | Total Cost: \$18.11

Equipment #	Description	Hrs Used	Hourly Rate	Rental Cost	Total Cost	Comments
183396	Ford F-150 Long Bed	1.15	\$15.75	\$9.00	\$18.11	
048732	Small Hand Truck (Blower, Pruner)	1.15	\$2.50	\$9.00	\$2.00	

## Creating Materials

- Choose your Project from the drop down list (YOU MUST DO THIS FIRST, EVEN THOUGH IT DOES NOT APPEAR ON THE SCREEN FIRST)
- Click “Create a New Record”
- Enter the name of the material at the top of the screen
- Enter the material code
- Click “Material Category and enter your selection from the drop-down list
  - ❖ If your selection does not appear in the drop down list you will need to create it in the Maintenance Table under “Material Category”, the same would apply to material type
- Click “Material Type”
- Choose the projects that will be allowed to use this material
  - ❖ It is helpful to only allow projects to your material at the time they need them in order to avoid accidental use of your materials vs. another project’s materials, causing errors in your inventory counts
- Enter the storage location, which is usually the shop for your project
- Choose the unit of measure (make sure that you keep this uniform throughout your listings, eg. Each Vs. EA)
  - ❖ Again, if your choice of unit of measure is not in the drop down list, it must be created in the Maintenance Table
- We do not sell material, so there is no cost to sell
- You will not enter a balance on hand
  - ❖ Balances are added to your inventory by entering an invoice against a PO # created for this PO for this specific material code
  - ❖ Balances are depleted from your inventory when the material code is used in a DWR as a material used to complete a task
- You can enter a reorder point, which will flag you when you are low on this specific material

The screenshot displays the 'JM3 Materials (<NEW RECORD>)' window. At the top, the 'Material' field contains 'Training Sign', 'Material Code' is '1887', 'Balance On Hand' is '0.00', and 'Unit of Measure' is 'Each - Each'. Below this are tabs for 'Detail', 'Ledger', 'Vendors', 'Material POs', 'Update Info', and 'Usage'. The 'Detail' tab is selected, showing 'Project Inventory' as 'I-595 Express', 'Material Category' as 'Signs', 'Material Type' as 'Panels - Warning', and 'Storage Location' as 'I-595 Shop'. Other fields include 'Unit Cost' and 'Unit Cost Sell' both at '0.00', 'Last Inventory Count' at '0.00', 'Adjustment' at '0.00', 'Adjustment Date' (empty), and 'Reorder Point' at '0.00'. A 'Close' button is located at the bottom right.

**Note that there is no balance on hand. This is because you have not created a PO and processed an invoice against it.** Once the invoice is processed, the number of items you receive will be added to your balance on hand.

## Adding Materials to a Vendor

Now that you have created this material, you can add the material to a vendor in order to create a material PO.

- First you must create a vendor, using the same steps you used to create a subcontractor
  - ❖ **REMEMBER** to click the vendor as a materials provider.
    - If you were to click the vendor as a service provider you would only be able to add activities for them to provide a service, not materials
- After you have created the vendor you will add the material to the vendor in order to have this available to order on a PO
- Click on the Vendor Tab
- Search for the vendor and choose one
- Double click to open the vendor's window
- Click on Material/Rental Equipment

The screenshot shows the 'JM3 Vendors (964)' window in the JAMMS system. The 'Vendors' tab is selected in the left-hand navigation pane. The main window displays the details for a vendor named 'Britco Signs'. The 'Mat/Rental Equip' tab is active, and the 'Company Name' field is circled in red. The 'Allowed Projects' dropdown is set to '(31230,39220,31270,31220,33230700)'. The 'Project #' dropdown is set to 'OOCEA'. The 'Primary Contact' is 'Allan Weissman' with phone number '(561)848-2230'. The 'Secondary Contact' is also 'Allan Weissman' with phone number '(561)848-1411'. The 'Business Type' is 'Signs'. The 'Service Prov.' checkbox is checked, and the 'Supply Prov.' checkbox is also checked. The 'Cert Expire Date' and 'Agreement Expire Date' dropdowns are visible. The 'Close' button is in the bottom right corner.

Note that since this is a supply provider, the activities tab is not visible

## Adding Materials to a Vendor Contd.

- When you click on the materials/rental equipment tab, a window will open allowing you to choose from materials available to order on a PO.
- Click Material Project and enter your project from the drop-down list
- From the drop-down list, choose the material you created, click the material, then tab down to the “Vendor Item #”
- Enter the Vendor Item #, if there is one
- Enter the Vendor’s item description
  - ❖ Note that the unit of measure is pre-populated – this is because when you created this material, you already entered the unit of measure and the system uses this as the unit of measure to order this material
- Enter the unit cost, if it is different than what was entered in the materials table
  - ❖ Once you create a material, it is available to be ordered from many different vendors in your system; you need only to change the price on the individual vendor’s as their prices may vary
- Click “Save”

**JM3 Vendors (964)**

Vendor Nbr: 964    Org Vendor ID:    Company Name: Britco Signs    Phone: (561)848-2230

Detail    **Mat/Rental Equip**    Mat/Rental POs    Subcon POs    Update Info    Audit Info    Usage

Material Project Select: I-595 Express

Material Code: 1887    Material: 1887, Training Sign    Material Owner Project: I-595 Express

Mat Key: 6220    Projects Using Material: (39220)

Vendor Item #:    Vendor Item Description: Training Sign    Unit of Measure: Each - Each    Unit Cost: \$ 12.00

Material Code	Material Description	Unit Cost	Units	Vendor Item #	Vendor Item Description
*		\$12.00	Each		Training Sign
1769	36x38 "SPEED LIMIT 55" / 3)	\$254.00	EA		1769, 36x38 "SPEED LIMIT 55" / 3) 42"
1770	36X36 "DO NOT ENTER" / 2)	\$186.00	EA		1770, 36X36 "DO NOT ENTER" / 2) 26"
1771	R1-2 48" "YIELD" /1) 8" 1) 26"	\$246.00	EA		1771, R1-2 48" "YIELD" /1) 8" 1) 26" 1)
1772	R5-1A 36x24 "WRONG	\$134.00	EA		1772, R5-1A 36x24 "WRONG WAY"/2)
1680	One Way Right Arrow	\$30.00	Each		One Way Right Arrow
1683	Speed Limit 65	\$109.00	Each	Custom	Speed Limit 65 20"Z-Bar
1774	30"x24" A1A Hip Sheeting	\$49.00	EA	FTP-17-06	1774, 30"x24" A1A Hip Sheeting .080

**You can now create a PO for this material!**

## Creating a Material PO

Once you have added the materials to the vendor you will need to do the following to create a PO:

- IMPORTANT - Select your project from the drop down list
- Scroll down the list and choose the first material you need (BE SURE YOU ARE CLICKING ON A MATERIAL FOR **YOUR PROJECT** – these vendors are shared so there may be materials on the list from another project.
- Highlight the item you need and click “Create PO”

JM3 Vendors (964)

Vendor Nbr: 964    Org Vendor ID:    Company Name: Britco Signs    Phone: (561)848-2230

Material Project Select: I-595 Express    Create PO

Material Code: 1887    Material: 1887, Training Sign    Material Owner Project: I-595 Express

Mat key: 6220    Projects Using Material: (39220)

Vendor Item #:    Vendor Item Description: Training Sign    Unit of Measure: Each - Each    Unit Cost: \$ 12.00

Material Code	Material Description	Unit Cost	Units	Vendor Item #	Vendor Item Description
1769	36x38 "SPEED LIMIT 55" / 3)	\$254.00	EA		1769, 36x38 "SPEED LIMIT 55" / 3) 42"
1770	36X36 "DO NOT ENTER" / 2)	\$186.00	EA		1770, 36X36 "DO NOT ENTER" / 2) 26"
1771	R1-2 48" "YIELD" /1) 8" 1) 26"	\$246.00	EA		1771, R1-2 48" "YIELD" /1) 8" 1) 26" 1)
1772	R5-1A 36x24 "WRONG	\$134.00	EA		1772, R5-1A 36x24 "WRONG WAY"/2)
1680	One Way Right Arrow	\$30.00	Each		One Way Right Arrow
1683	Speed Limit 65	\$109.00	Each	Custom	Speed Limit 65 20"Z-Bar
1774	30"x24" A1A Hip Sheeting	\$49.00	EA	FTP-17-06	1774, 30"x24" A1A Hip Sheeting .080
1781	W-5-2 36X36 "Narrow Bridge"	\$85.00	Each		36X36 "Narrow Bridge"
1782	US-1 Panel	\$39.00	Each		US-1 Panel
1594	Additional Lane Right	\$205.00	Each		48x48 Sheeting Prefab Z-Bar Attached
1853	Speed Limit 45 Type III	\$50.00	Each	Custom	Speed Limit 45 Type III Sheeting R2-1
1854	Do Not Block Intersection Type	\$50.00	Each	Custom	Do Not Block Intersection Type III
1855	9-Button Delneator 18x18	\$27.50	Each	Custom	9 Button Delneator OM1-1 18x18
1887	Training Sign	\$12.00	Each		Training Sign
0000	Misc. Materials	\$76.00	Each		04" x 14" Bridge Plates
0000	Misc. Materials	\$1.00	EA	Z-bar	Z-bar
0000	Misc. Materials	\$120.00	Each		D9-2 30X30/DG3 Type XI Diamond Grad
0000	Misc. Materials	\$2.50	Each		5/8" X 1 1/2" Alum Hex Head Bolts
0000	Misc. Materials	\$45.00	Each		3" X 2.69" x 2.33" Z bar for vertical

## Creating a Material PO Contd.

The PO screen will open and you will need do the following to complete it (in a material PO you are working from the bottom up):

- Click the “Edit” button on the lower left
- Enter the number of items you are ordering (the price is already there from your materials list)
- Click “Save”
- If you need to add another item, click “+” and choose from the drop down list (because you have your project selected, this list will only populate from items for YOUR project)
- Click the “Edit” button on the center left and enter the approval and confirm dates
- Click “Save”
- You can now view/print the PO and send to the vendor

The screenshot shows the JM3 Material PO (10362) interface. The PO is for Project I-595 Express, Vendor Britco Signs, and is in an APPROVED state. The screen is divided into several sections:

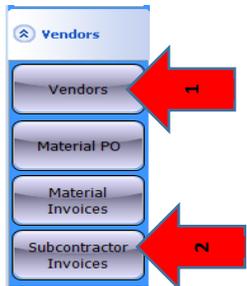
- Header:** PO # 10362, Project I-595 Express, Vendor # Britco Signs, Cancel PO button, and APPROVED status.
- Detail Section:** Includes tabs for Detail, Update Info, and Audit Info. Fields for Create Date (3/18/2015), By (Kendra Leamon), Approval Date (3/18/2015), By (Simon Castro), Confirm Date (3/18/2015), By (Simon Castro), and Deliver by Date. A red arrow labeled '5' points to the Approval and Confirm Date fields.
- Company Information:** Company Name (Britco Signs), Primary Contact (Allan Weissman), Phone (561)848-2230, Fax (561)848-1411, Email (streetsignsusa@bellsouth.net), and Special Instructions.
- Summary:** Total PO Amt \$60.00, View/Print PO button, and WO # 0.
- Item Selection:** Select Item (1887, <None>, Training), Select Descr (Training Sign, <None>, Training Sign), Order QTY (5.00), Vendor Unit Cost (12.00), Vendor Part #, Vendor Part Descr (Training Sign), Invoice Key, and Matl Key (6220).
- Table:** A table with columns: Matl Code, Material Description, Vendor Part #, Vendor Description, Qty, Vendor Cost, and Total Cost. The table contains one row: 1887, Training Sign, Training Sign, Training Sign, 5, \$12.00, \$60.00. A red arrow labeled '2' points to the Qty field.
- Bottom Navigation:** A row of buttons for navigation. A red arrow labeled '1' points to the 'Edit' button (bottom left). A red arrow labeled '3' points to the 'Save' button (bottom center). A red arrow labeled '4' points to the 'Cancel' button (bottom center). A red arrow labeled '6' points to the 'Print' button (bottom right).

Congratulations you have created your first material PO!

## Processing Subcontractor & Vendor Invoices

Once the work by a subcontractor has been completed or materials have been received, you will receive an invoice from the subcontractor or vendor.

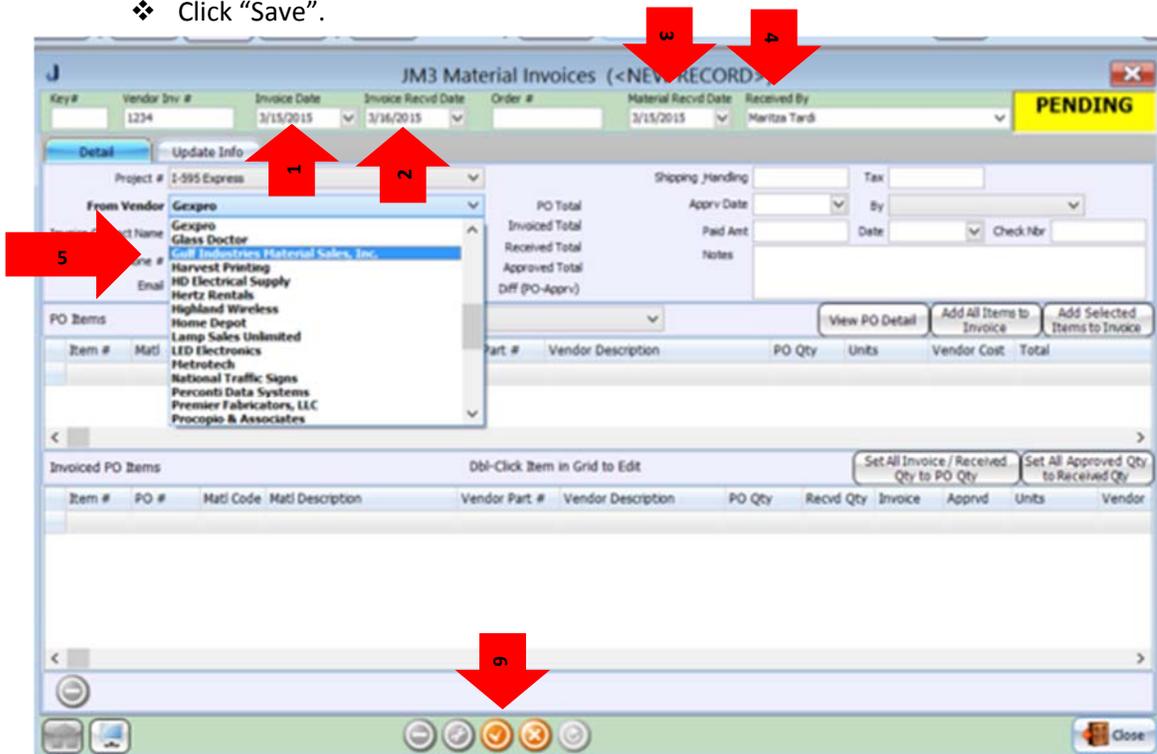
- You will code the invoice as per the business processes in the Business Process Manual and then enter the information into JAMMS.
- Go to Vendors/Subcontractor or Vendor invoices and click “Create a New Record”
  - ❖ Click the “Subcontractor Invoices” button. The screen for entering invoices will open.



- ❖ Click “New Record” and the invoice screen will open



- ❖ Enter the invoice date, invoice number, received date and “Received By” (this will be your name).
- ❖ Enter the project number if it is not already populated.
- ❖ Choose a vendor from the pull-down menu. Once you choose a vendor, all of the vendor/subcontractor information should populate.
- ❖ Click “Save”.



## Processing Subcontractor & Vendor Invoices Contd.

- On the pull down menu, choose the Purchase Order to which the invoice pertains.
- Click the Purchase Order number and the PO will drop down to the PO items section of the form.

The screenshot shows the 'JM3 Material Invoices (22677)' window. The 'PO # 10316 - Ordered Jan 5 2015 12:00AM' dropdown menu is open, and the selected item is circled in red. The window also shows a 'PENDING' status and various invoice details.

- Once the items have dropped down to the PO items section either choose the line items being charged in the invoice and click **“Add Selected Items to Invoice”** or If all of the items in the purchase order are included in the invoice, click **“Add all items to invoice”**

The screenshot shows the 'JM3 Material Invoices (22677)' window with the 'PO Items' section expanded. The 'Add All Items to Invoice' button is circled in red. The table below shows the items from the PO:

Item #	Matl	Matl Description	Vendor Part #	Vendor Description	PO Qty	Units	Vendor Cost	Total
28350	1825	Fender Panel Assembly, Quad Beam	003540040-00	Fender Panel Assembly, Quad Beam	6	Each	\$653.00	\$3,918.00
28349	1831	Diaphragm Assembly, Quad Beam 48"	006005031-00	Diaphragm Assy, Quad Beam 48"	2	Each	\$1,542.00	\$3,084.00
28348	1822	Steel Nose Assembly, Yellow	3540042-01	Steel Nose Assembly, Yell 24", 30"	4	Each	\$725.00	\$2,900.00

### OR ADD ALL ITEMS TO INVOICE

The screenshot shows the 'JM3 Material Invoices (22677)' window with the 'PO Items' section expanded. The 'Add All Items to Invoice' button is circled in red. The table below shows the items from the PO:

Item #	Matl	Matl Description	Vendor Part #	Vendor Description	PO Qty	Units	Vendor Cost	Total
28350	1825	Fender Panel Assembly, Quad Beam	003540040-00	Fender Panel Assembly, Quad Beam	6	Each	\$653.00	\$3,918.00
28349	1831	Diaphragm Assembly, Quad Beam 48"	006005031-00	Diaphragm Assy, Quad Beam 48"	2	Each	\$1,542.00	\$3,084.00
28348	1822	Steel Nose Assembly, Yellow	3540042-01	Steel Nose Assembly, Yell 24", 30"	4	Each	\$725.00	\$2,900.00

## Processing Subcontractor & Vendor Invoices Contd.

- The PO items will drop down to the “Invoiced PO Items” section of the screen and are now ready for invoice processing.

Item #	PO #	Matl Code	Matl Description	Vendor Part #	Vendor Description	PO Qty	Recvd Qty	Invoice	Apprvd	Units	Vendor
28350	10316	1825	Fender Panel Assembly, Quad	003540040-00	Fender Panel Assembly,	6	0			Each	\$653
28349	10316	1831	Diaphragm Assembly, Quad	006005031-00	Diaphragm Assy, Quad	2	0			Each	\$1,542
28348	10316	1822	Steel Nose Assembly, Yellow	3540042-01	Steel Nose Assembly, Yel	4	0			Each	\$725

- You will now double click each line item to enter the invoiced quantity, approved quantity and actual quantity in the “Edit Invoice Item” box that pops up.
- Enter the amounts from the invoice that are approved and click “Save”.
- **PLEASE NOTE THAT YOU MUST NOT CHANGE THE INVOICE UNIT COST.** If this amount is to be changed, it needs to be changed from the work order and a new PO must be created first.

Field	Value	Field	Value	Field	Value
PO Nbr	10316	Item Nbr	28350	Invoice Nbr	22677
Matl Code	1825	Description	Fender Panel Assembly, Quad Beam		
Vend Item #	003540040-00	Description	Fender Panel Assembly, Quad Beam		
PO Qty	6	Unit Cost	\$653.00	Total	\$3,918.00
Invoice Qty	6	Invoiced Cost	653.00	Total	\$3,918.00
Received Qty	6			Total	\$3,918.00
Approved Qty	6			Total	\$3,918.00
Back Ordered Qty					

- Notice that the PO number is at the top of the “Edit Invoice Item” screen as well as the material code or activity being charged. This information is transferred over directly from the PO. The amounts shown on the invoice are also taken directly from the PO.

- Any changes made to the actual quantity should be addressed directly in the PO so that the amounts that show up on the invoice screen are accurate. **If you change the actual quantity through the invoice, it will also change on the PO, which will affect your accomplishments so take care with actual quantities.**

## Processing Subcontractor & Vendor Invoices Contd.

- There is a faster way to process approvals however, in order to use this process ALL ITEMS ON THE INVOICE MUST MATCH THE PO ACTUAL QUANTITIES. If any of the quantities differ, you must enter them line item by line item: Click “Set All Actual Quantity to PO Quantity”, “Set all Invoiced Quantity to Actual Quantity” and “Set all Approved Quantity to Actual Quantity”. This will perform the same function as clicking each line item individually as shown above and change all of the your invoiced items.

- Leave the invoice in “Pending” status until the actual invoice has been signed by the Project Manager.
- Once the invoice has been approved by the Project Manager:
  - ❖ Click “Edit” and enter the approved date and supervisor name.
  - ❖ Scan the invoice to your share drive and then attach the invoice onto the invoice screen.
- Scan all of your invoices to a file.
- Attach the file to an e-mail to be sent to A/P Highways

Congratulations! You have processed your first invoices!

## Processing Inventory

A correct count of our inventory must be kept at all times. Inventory is added to JAMMS by processing a material PO and entering the invoice. Once the invoice is entered, the material is added to the inventory. When a material is used and entered into a DWR, the number of material in the inventory is reduced.

You learned how to create materials in “Creating New Materials”. If you are processing invoices and materials are being entered correctly into DWRs, your inventory counts should always be correct. There are some times when items may not have been added to a DWR or too many items may have been added to a DWR and inventory counts may be incorrect. In this circumstance you would need to adjust your inventory manually. The following is the processing for adjusting your inventory, which is called “Creating Counts”.

### Creating Inventory Counts

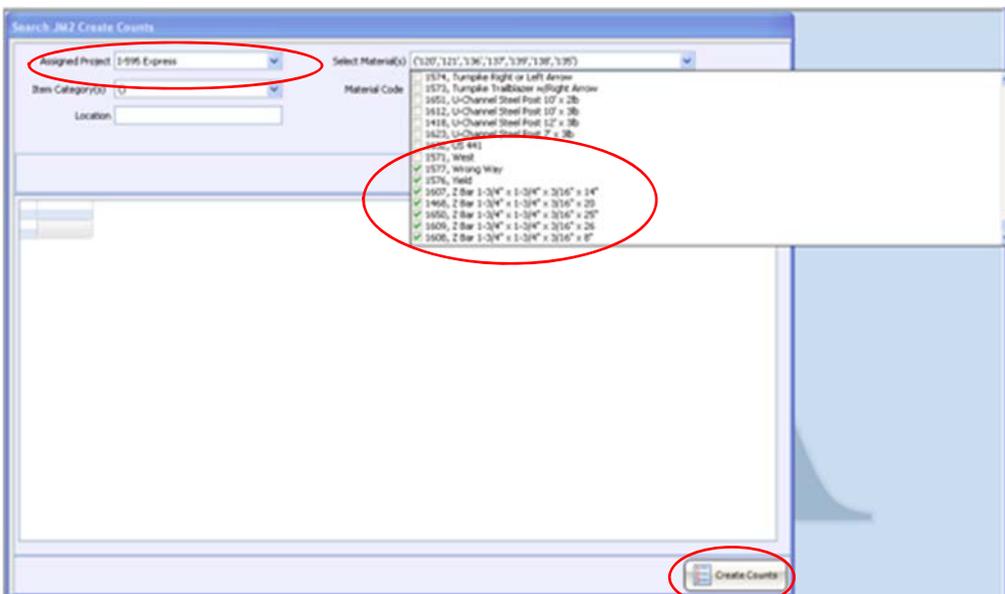
In the event that materials need to be recounted to maintain the integrity of your numbers, follow these steps:

- Go to the Inventory tab in Jamms
- Click “Create Counts



- Select your project
- Select the materials you want to count in the “Select Materials” drop-down list

### Choose materials



Once your search returns the items you need, go to the bottom of the screen and click “Create Counts”. This will bring up the counts screen.

## Processing Inventory Contd.

Project	MATER	Code	Units	UNIT_C	UNIT_C	Category	ITEM_T	ITEM_S	REORDE	Current	XACCOU	XACCOU	LOCATI	VENDOR	VENDOR	MATERI	ASSGN	CUSTO	INV_CN	INV_CN	LAST_U	LAST_U	PREV_U
139220	Z Bar	1608	Each	\$2.07	\$0.00	Signs	Wind	Z Bar		14			1-595				(352107		Y	14	Barriep	12/10/2	Leamon
139220	Z Bar	1607	Each	\$3.34	\$0.00	Signs	Wind	Z Bar		25			1-595				(352107		Y	41	Leamon	12/24/2	TardmC
139220	Z Bar	1468	Each	\$4.19	\$0.00	Signs	Wind	Z Bar		5			1-595				(352107		Y	14	Barriep	12/10/2	Leamon
139220	Z Bar	1609	Each	\$4.88	\$0.00	Signs	Wind	Z Bar		11			1-595				(352107		Y	11	Barriep	12/10/2	Leamon
139220	Z Bar	1650	Each	\$1.91	\$0.00	Signs	Wind	Z Bar		-2			1-595				(39220)		Y		Leamon	2/27/20	rosark0

- Enter the name of the employee who did the count
- Enter the actual number of items on site – Click “Save”
- Once you have entered all of the counts, click “Mark all as Apply”, click “Save”

When you are sure all of the numbers are correct, click “Post all ‘Applied’ Counts”. Your counts will now be adjusted and once again all purchases made through an invoice posted in Jamms against a PO will add materials to your count and all DWR entries made under materials will subtract inventory from your count.

Double-check that all of the records have been checked off as “Applied” and “Posted” before closing out of the screen so that you do not lose your count

Material	Material Description	Count Qty	Units	Post	Apply	Post
1468	Z Bar 1-3/4" x 1-3/4" x 3/16" x 20'	35	Each	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
1607	Z Bar 1-3/4" x 1-3/4" x 3/16" x 20'	25	Each	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
1608	Z Bar 1-3/4" x 1-3/4" x 3/16" x 20'	35	Each	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
1609	Z Bar 1-3/4" x 1-3/4" x 3/16" x 20'	75	Each	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
1650	Z Bar 1-3/4" x 1-3/4" x 3/16" x 25'	40	Each	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

## Adding Assets in Jamms

We must keep track of work that is performed to maintain the assets on the project. These assets could be, but will not be limited to:

- Bridges
- High Mast lighting
- Highway lights
- Large signs
- Attenuators

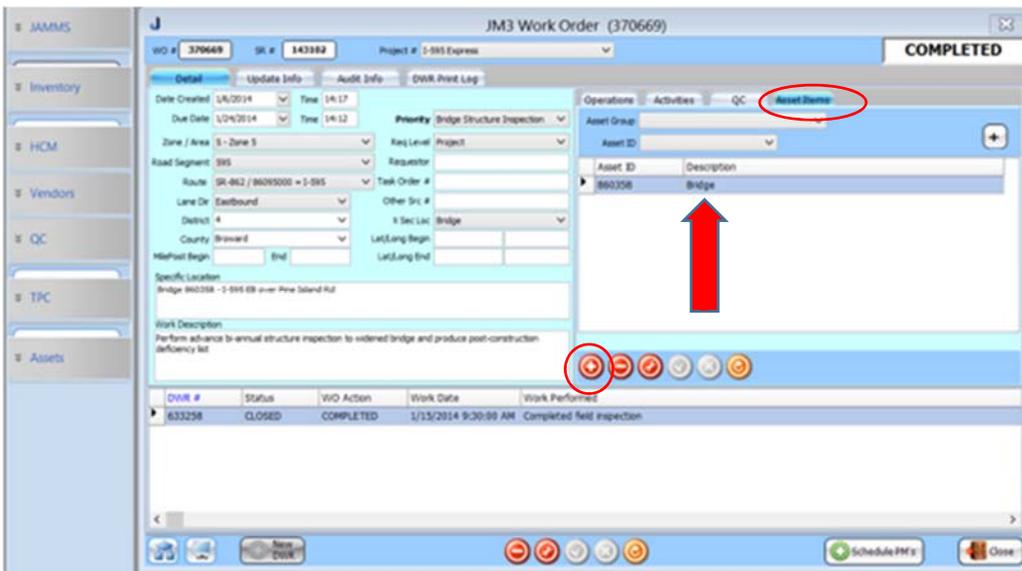
A list of assets will most likely be created for your project at project set-up, but there may be assets found at a later date that will need to be added to the database.

- Open the Asset Management tab in Jamms
- Search to be sure this asset does not already exist by entering a portion of the asset number in “Asset ID”. If this asset does not show up in your query screen, it is new and you can enter the asset into the Asset Manager.
- Pick the correct project to enter the asset
- Enter the Asset Group as “Bridge, Attenuator”, etc.
- Enter the Asset ID number (asset number)
- Enter the “Description” (what type of asset is it)
- Enter the location information
- Enter the “In Service Date” (Date asset was approved)
- Enter Mile Post information and Roadway information
- Save the record
- Scan a copy of the asset information as a document to the Asset Management screen

The screenshot displays the JM2 Asset Management (18907) application window. At the top, there are fields for Asset Key (18907), Asset Type (Roadway), Asset ID (13H4900024), Description (Utility Permit), and Project # (Indian River). Below this, there are tabs for Detail, Update Info, Audit Info, and Usage. The 'Detail' tab is active, showing the 'Asset Detail' section with fields for Asset Group (Permit), Asset ID (13H4900024), Description (Utility Permit), Manufacturer, Location (A1A south of Hammock Way Service Entrance), Lat/Long Begin/End, MilePost Begin/End (16.825), In-Service Date (3/14/2013), and Estimated Value (\$ 0.00). The 'Roadway' section is also visible, with fields for Zone / Area (A1A), Road Segment (SR A1A), Route# (SR A1A / 88070000 - A1A), Lane Dir, X Sec Loc (Roadside), MilePost Begin/End (16.825), and Location (A1A south of Hammock Way Service Entrance). The 'Service History Totals' section shows zero values for Total Man Hrs, Labor Cost, Material Cost, Equipment Cost, Sub-Contractor Cost, and Total Cost. The 'Service History' table is empty. A red arrow points from the 'Roadway' section to the 'Asset Detail' section, with the text 'Populated from Location Information added in the Detail Section'. The bottom of the window has a toolbar with buttons for New WO, Import Roadway Assets, Import Facility Assets, and Close.

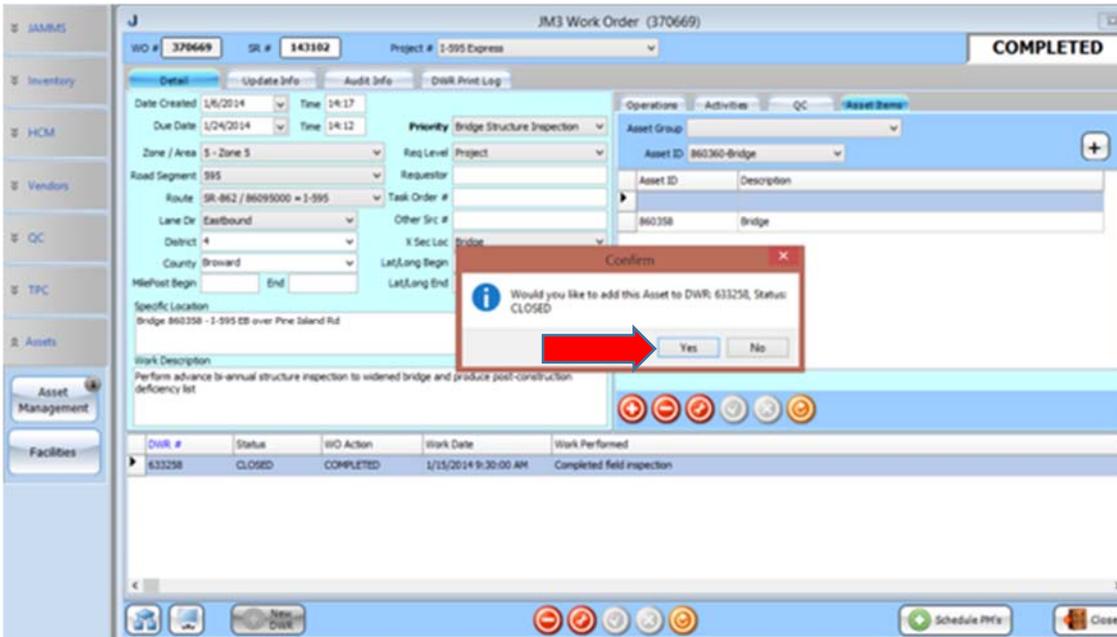
## Adding Assets to a Work Order & DWR

- Any work that will be performed on an asset should include the asset number. This is done to track the cost to maintain the asset and all work orders for work on these assets must include the asset number in order for these costs to be tracked.
- Follow these steps to add an asset to a work order:
  - ❖ Click on the “Asset” tab
  - ❖ Click the + button and scroll through the drop down list.
  - ❖ Choose the asset
  - ❖ Click “Save”.

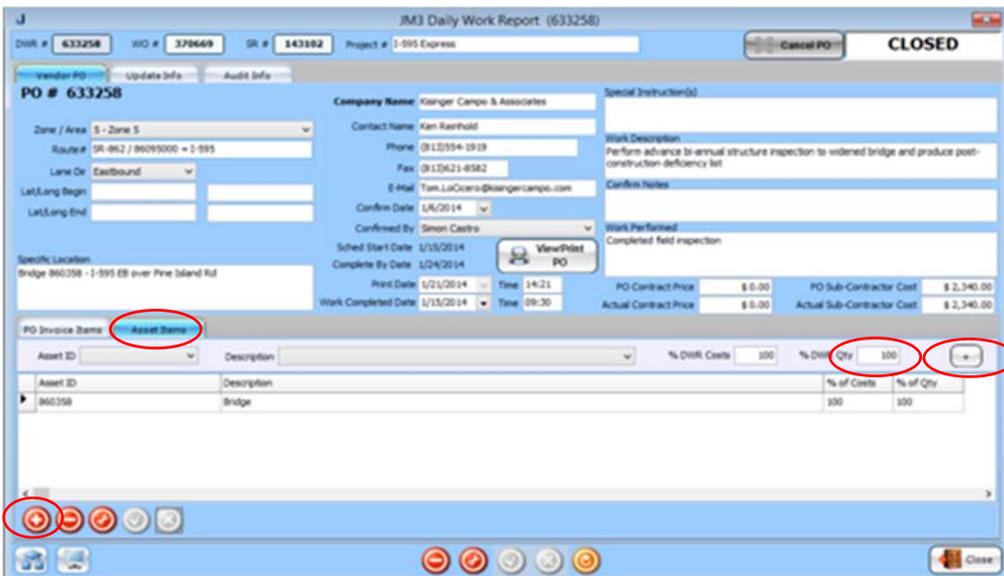


- Now that the asset has been added to the work order the asset will automatically be added to all of the DWRs under this work order and the cost to maintain the asset will be captured.
- If you forget to add the asset to the work order it can be added directly to the DWR, or you can go back to the work order to add it and the system will ask you if you want to add the asset to the DWRs that have been created already. You will click yes however, you will need to go into those DWRs and add the percentage (100%) to the percentage field so that the work will be captured in the costs.
- If no percentage is entered, the cost will not be captured.
- If you add more than one asset the costs will be divided equally unless you physically change it. Keep in mind that it is very rare that the percentages are equal so you must divide out the total number of man hours spent by the labor hours in order to determine the percentage.

## Adding Assets to a Work Order & DWR Contd.



- If the asset was not added on a work order level, it can still be added on the DWR level by following these steps:
  - ❖ Click the “Asset” tab
  - ❖ Click the + button
  - ❖ Scroll through the drop-down list and add the asset
  - ❖ Click “Save”
- If you are on the DWR level and discover that the asset you need to add does not exist in the drop-down list you can add the asset from this screen by following these steps:
  - ❖ Click the + button that appears at the bottom of the screen on the far right-hand side of the side (next to % of DWR Qty).
  - ❖ This will take you to the asset detail screen and you will follow the steps for entering a new asset).



## HCM:

All employees should be entered into JAMMS (both the Pilot and Production modules) so timesheets, training information and any safety items pertaining to an individual employee can be tracked. This information is entered through the HCM module.

### Adding Employees:

- To add a new employee into Jamms go to the main module and click “HCM”, click “Employees”, then click “New Record”.
- Enter the name, address, phone numbers and driver’s license information into the first section in green
  - ❖ If there was a stipulation upon hiring of the employee that the employee is not allowed to drive a company vehicle, the button “Cannot Drive Company Vehicle” MUST be clicked.
  - ❖ Choose the project to which the employee will be assigned.
  - ❖ Choose “Allowed Project” for any project on which the employee will perform activities, including the assigned project.
    - If you do not allow the employee to other projects, the employee’s name will not show up in the drop-down lists under “Labor” on DWRs for other projects.
  - ❖ Check with the Project Manager whether the employee is to receive JAMMS e-mail alerts; if so, click “Receive e-mail alerts (this will usually pertain to an Administrator, Supervisor, Project Manager, Regional Manager and Project Engineers).
  - ❖ In the yellow section of the form enter the employee ID number, the hire date, the Supervisor and Crew Leader.
  - ❖ Enter the “Standard Job Title”, which is the Jorgensen title under which the employee was hired and the “Project Title” such as Road Ranger, or Mechanic, which are not standard titles, but helps identify specific groups of employees when running internal reports and processing timesheets.
  - ❖ Enter the “Last Title Date”, the hourly rate and the “Increase Date”, which in the case of a new employee, would be the same as the “Hire Date”.
  - ❖ Click “Direct” for Administrators and Project Managers and “Tech” for maintenance techs and Supervisors.
  - ❖ Click “Save”.

## HCM Contd.

### Adding HCM Items to an Employee Profile:

It is important to check off whether an employee is a Supervisor or Crew Leader on the employee profile for several reasons. This information is tied to training requirements and reporting.

On a daily basis Maintenance Supervisors should be performing TTC inspections, site safety inspections and vehicle inspections. These inspections are reported under the employee profile of the Crew Leader being inspected or employee being inspected.

### TTC & Site Safety Inspections

- To add TTC and site safety inspections to an employee file, open the employee file and click the “HCM” tab
- Click the “Add /+” button
- Enter the item date
- Enter the name of the observer (the Supervisor performing the inspection)
- Choose the category “EHS “ Inspections
- Choose the Type (Site Safety Pass or Fail, TTC Pass or Fail, Vehicle Inspection Pass or Fail)
- If the inspection was passed you will enter into item details what kind of operation the Crew Leader was being inspected (MOT Operation, Routine Debris Stop, etc.)
- If the inspection was failed, you will need to choose a “Root Cause”, which the Supervisor should have entered into the inspection form (PPE, Job Conditions, Tools, Hazards, etc.)
- A “Fail” will automatically create an “Incident” on the employee’s file and the inspection form should contain notes as to what follow up action will be taken.
- Photos should always be taken of whatever operation is being inspected and should be attached to the HCM entry whether the inspection is passed or failed.
- Click “Follow-up Action” – write the notes of the follow-up action written by the Supervisor
- Click “Save”

The screenshot shows the 'HCM Entry' form with the following details:

- Security: Supervisor
- Item Date: 3/10/2015
- Observer: Simon, Antonio
- Category: EHS Inspections
- Type: Site Safety (Fail)
- Root Cause: PPE
- Item Details: Crew Leader was not wearing a hard hat while working under the bridge.
- Supervisor: Green, Ambar
- Follow-up Action Required:
- Corrective Action Plan:  Send Alert
- Follow Up Action: Written Warning
- Follow-up Action Completed Date: 3/10/2015
- Action Details: New Employee was given a written warning explaining that it is unacceptable to work on the road without a hard hat. New Employee was warned that if he is caught without a hard hat again he will be suspended for two (2) days with no pay.

Red circles highlight the 'EHS Inspections' category, 'Site Safety (Fail)' type, 'PPE' root cause, 'INCIDENT' status, 'Written Warning' follow-up action, and the 'Action Details' text. A red arrow points to the 'Type' dropdown menu.

## HCM Contd.

### Weekly Toolbox Talks:

- Weekly Toolbox Talks are sent out on a weekly basis by the Division Safety Manager. A safety meeting should be held weekly with staff and the sign-in sheet is to be signed by all attendees.
- The Weekly Toolbox Talks should be entered into the HCM module as “Safety Compliance”.
- The Weekly Toolbox Talk is to be entered under the Project Manager’s employee profile
- To enter the weekly talks:
- Click “HCM” – Click “Add/+”
- Enter the date of the safety meeting and enter the name of the Supervisor conducting the meeting under “Observer”
- Click “Safety Compliance” under “Category”
- Enter “Weekly Toolbox Talks” under “Type”
- Enter the name of the Toolbox Talk in the “Item Description” field
- Scan the Toolbox Talk AND the meeting sign-in sheet and attach it to the HCM item

The screenshot displays the 'HCM Entry' form for Simon R Castro (SRC). The form includes the following fields and values:

- Security: Supervisor
- Item Date: 3/1/2015
- Observer: Castro, Simon
- Category: Safety Compliance
- Type: Weekly Toolbox Talks
- Root Cause: (empty)
- Item Details: The Importance of Always Wearing the Correct PPE
- Supervisor: McPherson, John
- Follow-up Action Required:

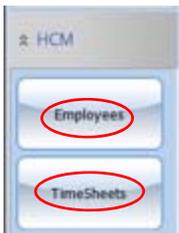
The form is titled 'Simon R Castro (SRC) - HCM Entry' and has a 'Close' button at the bottom right.

## Processing Timesheets:

Maintenance Technician’s and certain levels of Supervisor’s timesheet times are calculated directly from the labor time entered into DWRs. The time calculated from DWRs is regular time that is coded to activities performed from the MMS activities list that are added to DWRs.

Vacation, sick, holiday and training time are entered into JAMMS via “Adjustments to Timesheets”. All time must be accounted for in order for employees to be paid for all the hours they have worked. The following are the steps for entered timesheets into JAMMS.

- Go to “HCM” – Click “Employees” –Click “Timesheets”



- From the drop-down list choose the “Assigned Project”
- Choose the date range (“Last Week”, “Current Week”, etc.)
- Choose the Project Title of the group of timesheets you are processing
- Click “Search”
- A list of names will appear, which will show a status of “No Timesheet”
- In order for the timesheets to be generate you have to generate or rebuild them. This prompts Jamms to take the times from all DWRs on which the list of employees were entered and enter that labor time into the timesheet.

The screenshot shows the 'Search JM3 Emp Timesheets' window in JAMMS. The interface includes a sidebar with navigation options like Inventory, HCM, and Vendor. The main area contains search filters for 'Assigned Project' (24030 - Broward County), 'Date Range' (Current Week), 'Start Date' (3/15/2015), 'End Date' (3/21/2015), and 'Project Title' (Maintenance Technician). A table of search results is displayed below, showing employee names, titles, supervisors, and weekly hour totals. A summary table at the bottom provides a breakdown of hours by employee and activity.

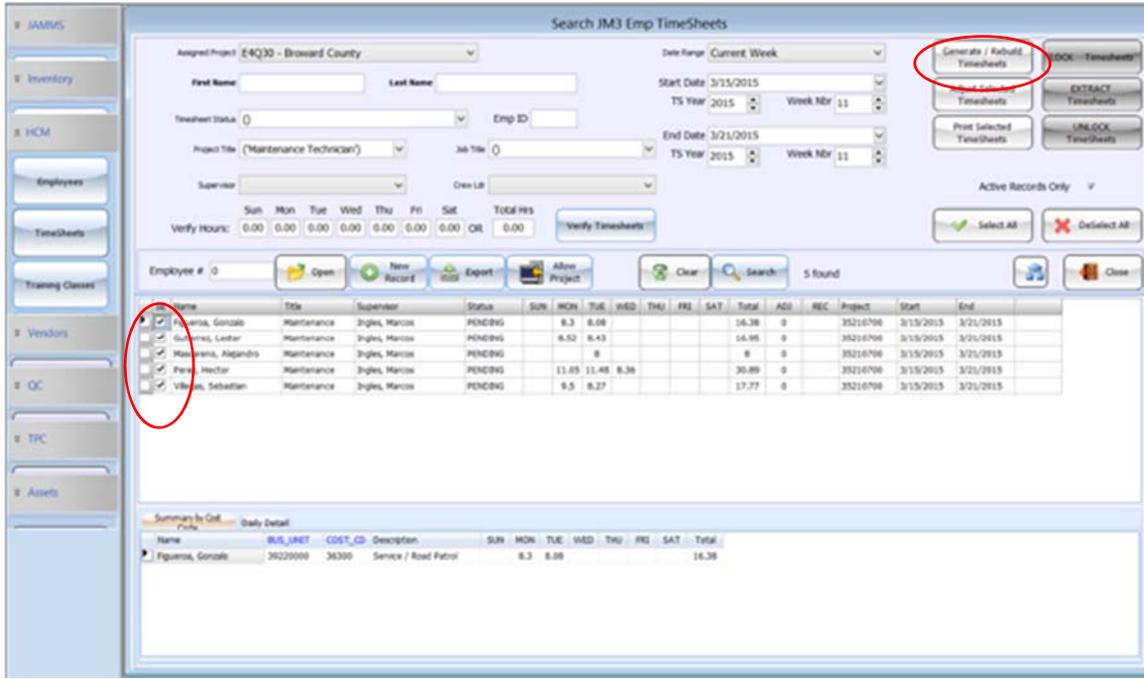
Emp #	Name	Title	Supervisor	Status	SUN	MON	TUE	WED	THU	FRI	SAT	Total	Adj	REC	Project	Start	End
✓	Figueroa, Gonzalo	Maintenance	Jugles, Maricelis	PENDING	8.3	8.08						16.38	0		35216706	3/15/2015	3/21/2015
✓	Guerra, Lester	Maintenance	Jugles, Maricelis	PENDING	8.52	8.43						16.95	0		35216706	3/15/2015	3/21/2015
✓	Masarech, Alejandro	Maintenance	Jugles, Maricelis	PENDING								0	0		35216706	3/15/2015	3/21/2015
✓	Paral, Hector	Maintenance	Jugles, Maricelis	PENDING	11.05	11.48	8.36					30.89	0		35216706	3/15/2015	3/21/2015
✓	Villegas, Sebastian	Maintenance	Jugles, Maricelis	PENDING	9.5	8.27						17.77	0		35216706	3/15/2015	3/21/2015

Name	BUS_SNET	CDST_CD	Description	SUN	MON	TUE	WED	THU	FRI	SAT	Totals
Figueroa, Gonzalo	30220000	36300	Service / Road Patrol	8.3	8.08						16.38

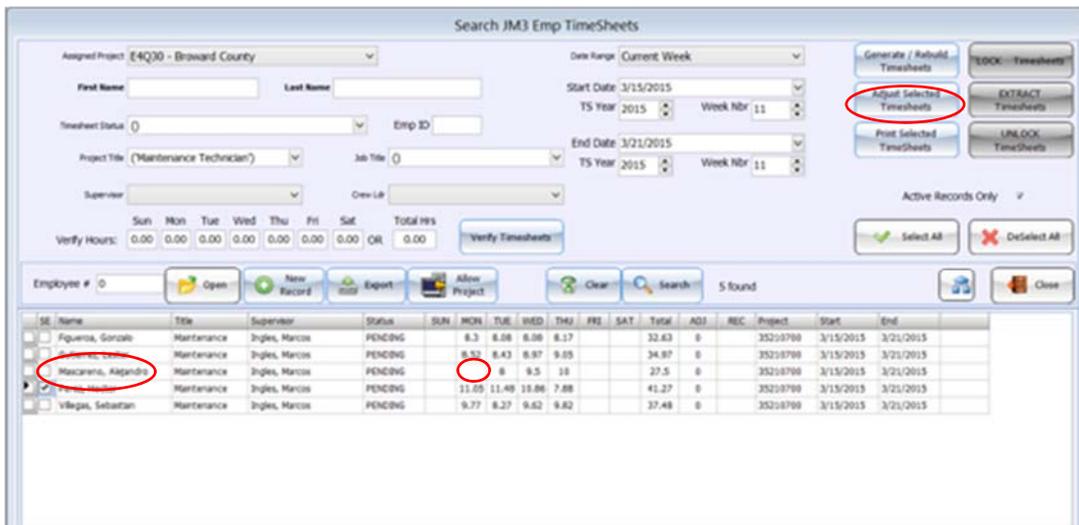
### Processing Timesheets Contd.

- Click/check the names of the employees whose timesheets you want to generate
- Click “Active Records Only” so that you do not pull in employees who no longer work for the company
- Click “Generate”/”Rebuild Timesheets”



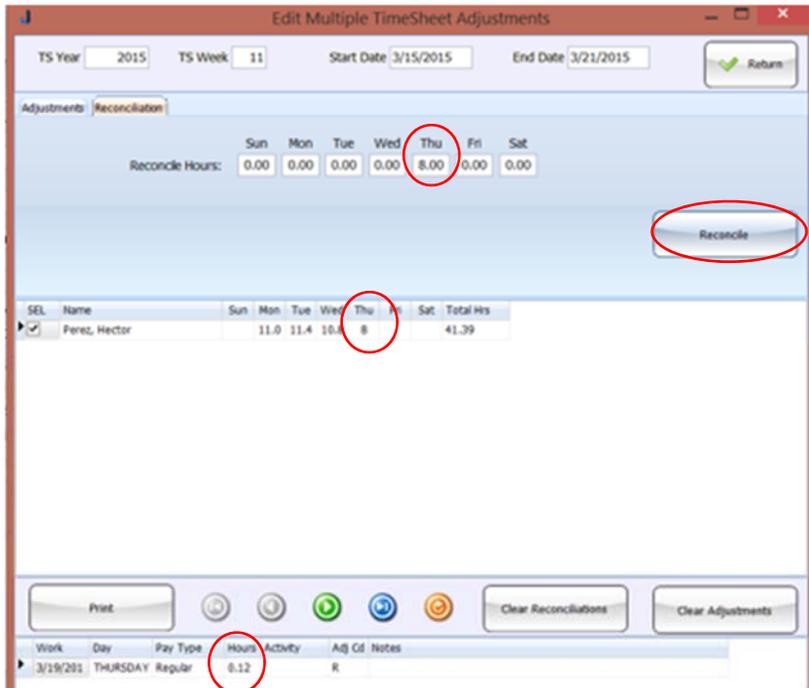
### Reconciling Hours

- Any hours which show time over .60 hours can be reconciled up to the next hour (for instance) the hours above for Hector Perez on Thursday add up to 7.88 hours; this can be reconciled up to 8 hours.
- You should not reconcile hours below .60; those hours should always be accounted for through labor hours entered into a DWR.
- To reconcile time click the name of the employee whose time is to be reconciled
  - ❖ Click “Adjust Selected Timesheet”

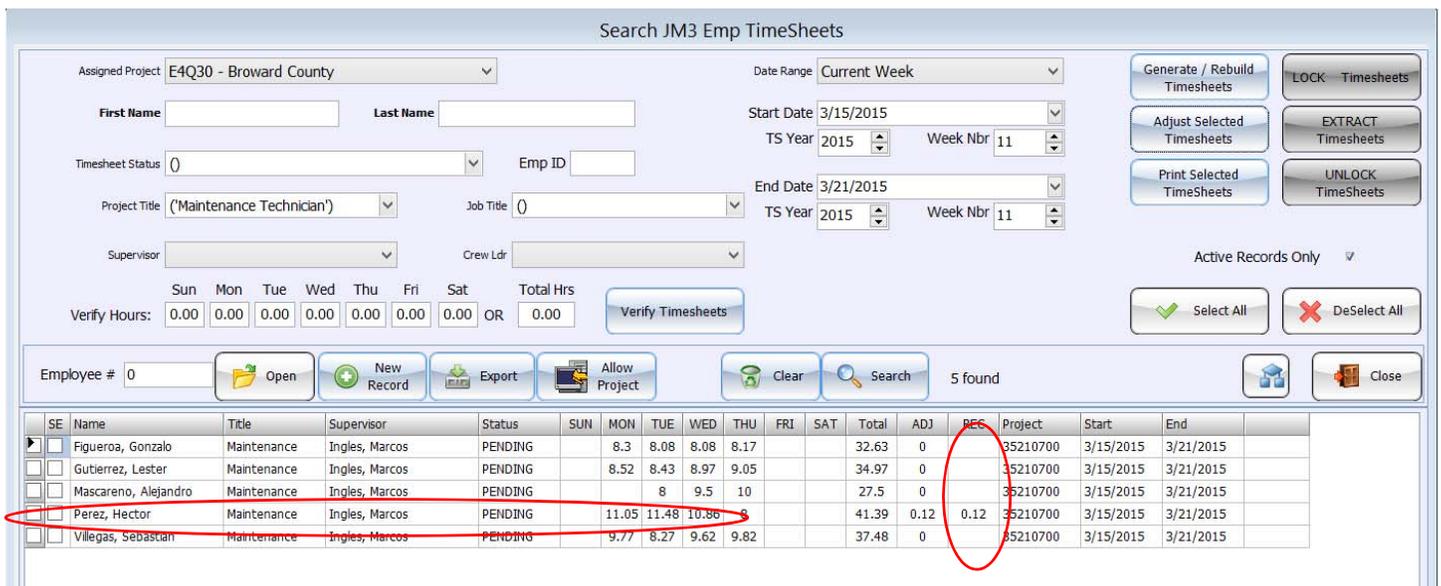


### Reconciling Hours Contd.

- In the Adjustment sheet, enter the hour up to which you are adjusting. For instance, if you are adjusting up to eight hours, enter eight; you do not enter the number of minutes, just the hour that you are reconciling up to.
- In the table below the reconciliation hours you will see the time change to the full hour you reconciled.
- In the lower table you will see the number of minutes that were reconciled for that specific day.



- To go back to the timesheet click "Return"
- The timesheet will update to show the reconciled time and the "Reconciled" column will show the number of minutes reconciled for that day.



## Timesheet Adjustments

Vacation days, sick days, holidays and time spent in training are not entered via DWR. This time is entered by making adjustments to the timesheet.

To adjust a timesheet click on the name of the employee whose timesheet is to be adjusted and click “Adjust Selected Timesheets”

Search JM3 Emp TimeSheets

Assigned Project: E4Q30 - Broward County

Date Range: Current Week

Generate / Rebuild Timesheets

LOCK Timesheets

Adjust Selected Timesheets

EXTRACT Timesheets

Print Selected Timesheets

UNLOCK Timesheets

Active Records Only

Select All

DeSelect All

Verify Timesheets

Employee # 0

Open

New Record

Export

Allow Project

Clear

Search

5 found

SE	Name	Title	Supervisor	Status	SUN	MON	TUE	WED	THU	FRI	SAT	Total	ADJ	REC	Project	Start	End
<input type="checkbox"/>	Figuroa, Gonzalo	Maintenance	Ingles, Marcos	PENDING		8.3	8.08	8.08	8.17			32.63	0		35210700	3/15/2015	3/21/2015
<input type="checkbox"/>	Gutierrez, Lester	Maintenance	Ingles, Marcos	PENDING		8.52	8.43	8.97	9.05			34.97	0		35210700	3/15/2015	3/21/2015
<input type="checkbox"/>	Mascareno, Alejandro	Maintenance	Ingles, Marcos	PENDING			8	9.5	10			27.5	0		35210700	3/15/2015	3/21/2015
<input checked="" type="checkbox"/>	Perez, Hector	Maintenance	Ingles, Marcos	PENDING		11.05	11.48	10.86	7.88			41.27	0		35210700	3/15/2015	3/21/2015
<input type="checkbox"/>	Villegas, Sebastian	Maintenance	Ingles, Marcos	PENDING		9.77	8.27	9.62	9.82			37.48	0		35210700	3/15/2015	3/21/2015

- In the Adjustment sheet you will make an adjustment for the number of hours to be allocated to the type of time used (vacation, sick, holiday, training).
- In the “Adjustments” tab enter the number of hours being allocated
- From the drop-down list choose the type of pay (sick, vacation, holiday, training, etc.)
- Enter the start and end dates (if an employee was out an entire work week for vacation you can choose Monday through Friday’s dates instead of entering the time day-by-day)
- Enter the notes
- Click “Apply”
- The time will now show up as adjusted in the lower table.

Edit Multiple TimeSheet Adjustments

TS Year 2015 TS Week 11 Start Date 3/15/2015 End Date 3/21/2015

Return

Adjustments

Hours Per Day 8.00

Pay Type Sick - Field (Technician)

Start Date 3/16/2015 Monday

End Date 3/16/2015 Monday

Notes

Apply

SE	Name	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Total Hrs
<input checked="" type="checkbox"/>	Mascareno, Alejandro		8	8	9.5	10			35.5

## Adjusting Timesheets for Training Time

When an employee spends time in training you must adjust the timesheet for the type of training course taken.

- Click the employee name and click “Adjust Selected Timesheets”
- In the Adjustment screen click the “Adjustments” tab
- Enter the number of hours spent in training
- Choose the course attended
- Enter the start and end dates
- Click “Apply”

The screenshot shows the 'Edit Multiple TimeSheet Adjustments' window. The 'Adjustments' tab is active, displaying the following fields:

- TS Year: 2015
- TS Week: 11
- Start Date: 3/15/2015
- End Date: 3/21/2015
- Hours Per Day: 4.00
- Pay Type: Training
- Course: AAA-01 - Test Course
- Start Date: 3/16/2015
- End Date: 3/16/2015

The 'Apply' button is highlighted with a red circle. Below the form is a table showing the adjusted timesheet for employee Mascareno, Alejandro:

SEL	Name	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Total Hrs
✓	Mascareno, Alejandro		4	8	9.5	10			31.5

At the bottom of the window, there is a table showing the adjusted timesheet for employee Mascareno, Alejandro:

Work Day	Pay Type	Hours	Activity	Adj-Cd	Notes
3/16/2015 MONDAY	Training	4	A		AAA-01 - Test Course

The timesheet will now show the time spent in training

Now that you have reconciled and adjusted all of the times for your employees you can finalize the timesheets.

## ASR's/TPC Processing

The comprehensive overview of processing Third Party Claims is covered in the Third Party Claims Manual.

- The Administrator is responsible to enter the ASR information into JAMMS as a service request and clicking the “Caused by an Accident”, button, which changes the request from a regular SR to an ASR. When you click the “Caused by an Accident” button, you will notice that a new tab shows up on the right hand side of your screen – this tab is called the TPC tab.

The screenshot shows the JAMMS Service Request (102390) interface. The 'Caused by Accident' button is circled in red. The 'TPC' tab is also circled in red. The interface displays various fields for incident details, verification, and work orders.

- The Administrator will enter the ASR into Jamms the same as any other SR, with the following exceptions:
  - ❖ Click the Incident Management tab
  - ❖ Enter the accident date and the ASR number
  - ❖ If this was a “response to an accident”, the dispatched, arrived and departed times must also be entered

The screenshot shows the JAMMS Service Request (102390) interface with the TPC tab selected. The 'Accident Date' and 'Report #' fields are circled in red. The interface displays various fields for incident details, verification, and work orders.

## ASR's/TPC Processing Contd.

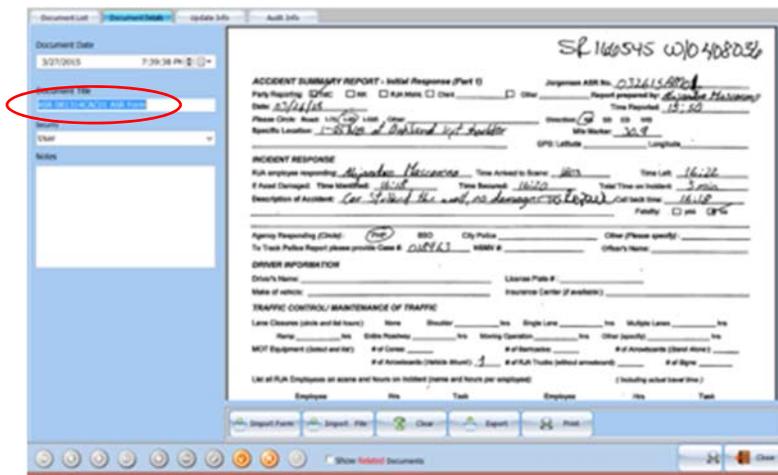
- The accident date entered into Jamms should match the date of the accident on the police report
- If there is no police report available the date the damage was found will be entered into the "Accident Date" field however once a police report is obtained, if the date differs, the date in this field must be changed.
- Work orders and DWRs for ASR's are entered as they normally would be for any service request.

### TPC Follow-Up

Reimbursement for costs associated with the repairs of damaged assets requires careful follow-up by the Administrator. The following are the steps taken to assure that all costs are reimbursed in a timely manner.

- An ASR form should have been completely filled out by the person who found the damage or who was dispatched to a scene involving damage (Maintenance Tech, Supervisor, etc.).
- If the DWRs were completed via mobile, check the work orders and DWRs to assure that the field staff attached clear before and after photos. If the photos were not attached, the Administrator will request these photos and will attach them.
- Once you receive the ASR form you should begin attaching your documents in Jamms for future use by the TPC Coordinator.

- ❖ To attach documents and or photos perform the following steps:
- ❖ Click the document or photo icon at the top of the screen 
- ❖ Click the + to add a new document
- ❖ Enter the name of the document
- ❖ Click "Import File" and import your document
- ❖ Click "Save"



- ❖ Attach your ASR form, photos, police reports, in-house work orders/subcontractor PO's, etc. separately and **name the documents** so that the TPC Coordinator can easily identify these documents.

Document Date	Document Name	Description	Type	Key
12/23/2014 10:49:28 AM	ASR 081314CAC01 Invoice to		SR	153951
8/21/2014 9:35:35 AM	ASR 081314CAC01 PR		SR	153951
8/21/2014 9:17:44 AM	ASR 082014AOF01 Repair		SR	153951
8/21/2014 9:17:25 AM	ASR 082014AOF01 Damage		SR	153951
8/18/2014 11:52:18 AM	ASR 081314CAC01 ASR Form		SR	153951
8/13/2014 5:04:17 PM	ASR 081314CAC01 Damage		SR	153951
8/13/2014 2:11:17 PM	ASR 081314CAC01 Short Form		SR	153951
8/13/2014 2:10:58 PM	ASR 081314CAC01 Chronology		SR	153951

## ASR's/TPC Processing Contd.

### Entering Insurance Information

The information concerning the owner and driver of the vehicles involved in the accident causing the damage to assets are retrieved from the police report. Once you have obtained a police report you will click on the "TPC" tab in Jamms and enter the following information.

- ❖ Enter the Insurance Company Name
- ❖ Enter the contact name and phone number to be used for follow-up with the insurance company (adjuster's name).
- ❖ Enter the policy number.
- ❖ Enter any comments that would be useful for follow up in the comments section.
- ❖ Click "Save"
- ❖ You will see at TPC number show up at the top of the TPC screen.

TPC #

**JM3 Service Request (153951)** CLOSED

SR # **153951** | SR Type: Roadway | Source Type: Client | Public | InHouse | Caused by Accident | Received Date: 8/13/2014 | Project #: I-595 Express

**Detail** | Update Info | Audit Info

Rcv Date/Time: 8/13/2014 13:23  
 Enter Date: 8/13/2014 13:37

Zone / Area: 4 - Zone 4  
 Route #: SR-862 / 86095000 = I-595  
 Road Segment: 595  
 District: 4  
 County: Broward  
 Lane Dir: Westbound  
 X SEC LOC: OFF Ramp  
 MilePost: Begin / End  
 Lat / Long: Begin / End  
 Location: I-595 WB ramp to Hiatus Rd.

**Priority:** High  
 Due Date/Time: 8/14/2014 13:23  
 Employee: Cesar Cintron  
 Req Level: Project  
 Recvd Via: Phone Call | By: Kendra Leamon  
 RMSR Method: Road Patrol Routes  
 Inspection #:

**Notes:**

**Work Description:** Repair attenuator damaged by vehicle accident - Provide temporary mitigation & secure site

**Work Orders (3)**

Work Order	Actual Start Date	Stage	Work Description	Vendor
387862	8/13/2014 1:23:00 PM	COMPLETED	Provide temporary mitigation & secure site for attenuator damaged by vehicle accident	
387863	8/13/2014 2:30:00 PM	COMPLETED	Assess damages to attenuator damaged by vehicle accident - take photos & write up ASR	
387878	8/14/2014 10:18:00 AM	COMPLETED	Repair attenuator damaged by vehicle accident	

**TPC**

TPC #: **3389** | Status: RECOVERED

Insurance Company: Geico Insurance (all but TX)  
 Contact Name / Phone: Direct Handling Team (800)841-3000  
 Contact Email:  
 Owner Name / Phone: Nicholas W. Sofianos  
 Driver Name / Phone: Nicholas W. Sofianos  
 Policy # / Claim #: 4034861932  
 Review Comments: 11/11/14 SC called ins co for claim info-Greg. They have accepted liability.

TPC # | Insurance Company | Claim Status  
 3389 | Geico Insurance (all but TX) | RECOVERED

Print TPC Packages

**DWRs (3)**

DWR #	Status	Work Description
668794	CLOSED	Repair attenuator damaged by vehicle accident

New WO | Close

## ASR's/TPC Processing Contd.

### Submit TPC to Corporate for Processing

- Once all of the information required for submitting billing to the insurance company has been obtained and an invoice is obtained from the subcontractor (if applicable) you are ready to “send” your package.
  - ❖ Double click the TPC # under the insurance company information on the SR screen.
  - ❖ Click “Edit” and enter the date processed and your name from the drop-down list
  - ❖ Enter any useful notes and click “Save”. You have sent your package to Corporate!

J
X

### JM3 TPC Processing (3389)

TPC #	3389	SR #	153951	Insurance Company	Geico Insurance (all but TX) ▼	Status	RECOVERED ▼
-------	------	------	--------	-------------------	--------------------------------	--------	-------------

Detail		Update Info	Audit Info
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<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid gray; padding: 2px;">Insurance Company</td> <td style="border: 1px solid gray;">Geico Insurance (all but TX) ▼</td> </tr> <tr> <td style="border: 1px solid gray; padding: 2px;">Claims Reporting Phone</td> <td style="border: 1px solid gray;">(800)841-3000</td> </tr> <tr> <td style="border: 1px solid gray; padding: 2px;">Claims Fax</td> <td style="border: 1px solid gray;">(202)354-5295</td> </tr> <tr> <td style="border: 1px solid gray; padding: 2px;">Claims Email</td> <td style="border: 1px solid gray;"></td> </tr> </table> <table style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td colspan="2" style="border: 1px solid gray; padding: 2px;">Billing Information</td> </tr> <tr> <td style="border: 1px solid gray; padding: 2px;">Billing Name</td> <td style="border: 1px solid gray;">Geico Insurance</td> </tr> <tr> <td style="border: 1px solid gray; padding: 2px;">Address</td> <td style="border: 1px solid gray;">PO Box 9091</td> </tr> <tr> <td style="border: 1px solid gray; padding: 2px;">City, State Zip Code</td> <td style="border: 1px solid gray;">Macon GA 31208</td> </tr> <tr> <td style="border: 1px solid gray; padding: 2px;">Contact Name</td> <td style="border: 1px solid gray;">Direct Handling Team</td> </tr> <tr> <td style="border: 1px solid gray; padding: 2px;">Contact Phone</td> <td style="border: 1px solid gray;">(800)648-2493</td> </tr> </table> <table style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="border: 1px solid gray; padding: 2px;">Ready To Invoice</td> <td style="border: 1px solid gray;">8/21/2014 ▼</td> <td style="border: 1px solid gray; padding: 2px;">By</td> <td style="border: 1px solid gray;">Kendra Leamon ▼</td> </tr> <tr> <td style="border: 1px solid gray; padding: 2px;">Preparing Invoice</td> <td style="border: 1px solid gray;">11/10/2014 ▼</td> <td style="border: 1px solid gray; padding: 2px;">By</td> <td style="border: 1px solid gray;">Susan Castro ▼</td> </tr> <tr> <td style="border: 1px solid gray; padding: 2px;">Submitted Invoice</td> <td style="border: 1px solid gray;">11/21/2014 ▼</td> <td style="border: 1px solid gray; padding: 2px;">By</td> <td style="border: 1px solid gray;">Darleen Husson ▼</td> </tr> <tr> <td style="border: 1px solid gray; padding: 2px;">Recovered</td> <td style="border: 1px solid gray;">1/2/2015 ▼</td> <td style="border: 1px solid gray; padding: 2px;">By</td> <td style="border: 1px solid gray;">Darleen Husson ▼</td> </tr> </table> <table style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="border: 1px solid gray; padding: 2px;">Actual Cost</td> <td style="border: 1px solid gray;">\$5,609.39</td> <td style="border: 1px solid gray; padding: 2px;">Invoiced Amt</td> <td style="border: 1px solid gray;">\$ 7,901.25</td> <td style="border: 1px solid gray; padding: 2px;">GM %</td> <td style="border: 1px solid gray;">29.01</td> <td style="border: 1px solid gray; padding: 2px;">Recovered Amt</td> <td style="border: 1px solid gray;">\$ 7,901.25</td> </tr> </table>	Insurance Company	Geico Insurance (all but TX) ▼	Claims Reporting Phone	(800)841-3000	Claims Fax	(202)354-5295	Claims Email		Billing Information		Billing Name	Geico Insurance	Address	PO Box 9091	City, State Zip Code	Macon GA 31208	Contact Name	Direct Handling Team	Contact Phone	(800)648-2493	Ready To Invoice	8/21/2014 ▼	By	Kendra Leamon ▼	Preparing Invoice	11/10/2014 ▼	By	Susan Castro ▼	Submitted Invoice	11/21/2014 ▼	By	Darleen Husson ▼	Recovered	1/2/2015 ▼	By	Darleen Husson ▼	Actual Cost	\$5,609.39	Invoiced Amt	\$ 7,901.25	GM %	29.01	Recovered Amt	\$ 7,901.25	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid gray; padding: 2px;">Owner Name</td> <td style="border: 1px solid gray;">Nicholas W. 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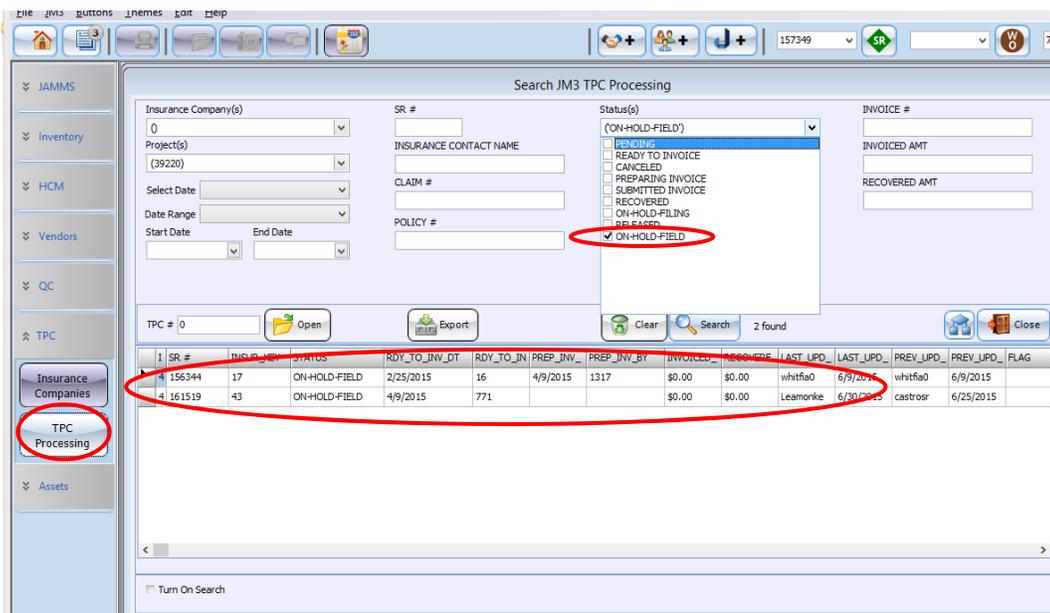
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## ASR's/TPC Processing Contd.

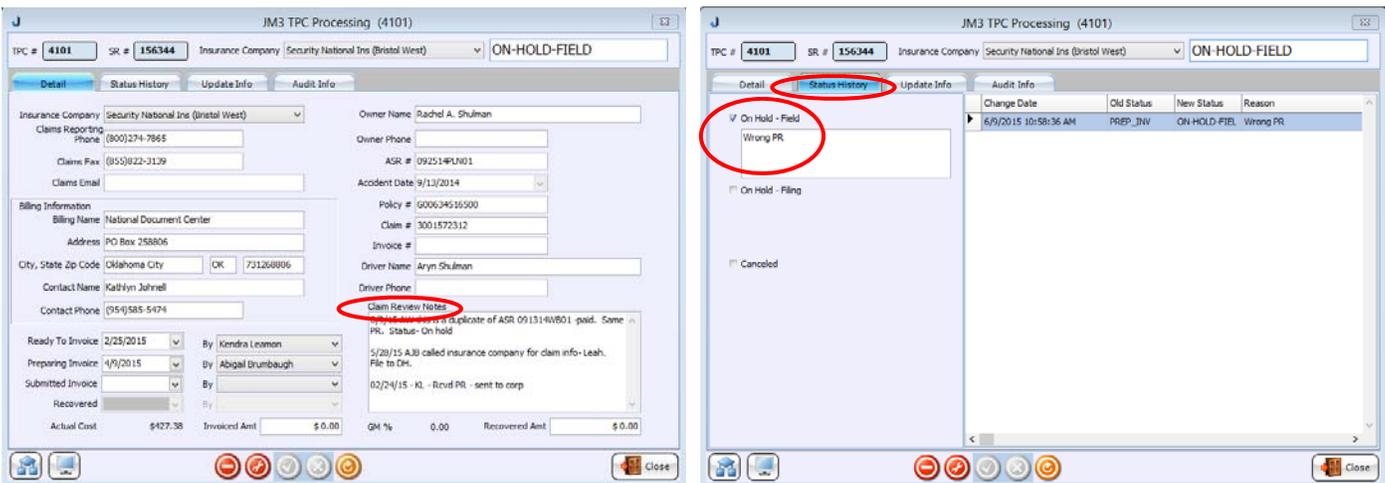
### TPC's Placed On-Hold

Hopefully once you have submitted your package as "Ready to Invoice" all of the correct information (documents, photos, DWR's, etc.) have been attached to the file. If the TPC Coordinator access the submitted file and finds information missing he/she will put the file on hold. The following are the procedures for finding and reconciling on-hold TPC's:

- Click on TPC Processing
- Choose your project
- Choose "On-Hold Field" as the status option
- Click "Search"



- Double-click a record to open and check for the reason the TPC is on hold by checking the "Claim Review Notes" AND the "On-Hold Reason" on the "Status History Tab"



## ASR's/TPC Processing Contd.

### Releasing the TPC Hold

- Once you have collected and attached all of the requested information, you will need to release the hold on the file
- In the "Claim Review Notes" field enter the date, your initials and the update you performed
- In the "Status History" tab un-click the "On-Hold" button
- The status of the file will be changed to "Released"
- The TPC Coordinators will now review the file and continue the TPC process

JM3 TPC Processing (4238)

TPC # 4238 SR # 161886 Insurance Company Geico Insurance (all but TX) **RELEASED**

**Status History** Update Info Audit Info

Insurance Company: Geico Insurance (all but TX)  
 Claims Reporting Phone: (800)841-3000  
 Claims Fax: (202)354-5295  
 Claims Email: [ ]

Billing Information  
 Billing Name: [ ]  
 Address: [ ]  
 City, State Zip Code: [ ] [ ] [ ]  
 Contact Name: [ ]  
 Contact Phone: [ ]

Owner Name: Rodney B. Pritchetts  
 Owner Phone: (754)207-1043  
 ASR #: 010915PLM02  
 Accident Date: 1/9/2015  
 Policy #: 4303877536  
 Claim #: [ ]  
 Invoice #: [ ]  
 Driver Name: Rodney B. Pritchetts  
 Driver Phone: (754)207-1043

Claim Review Notes  
 6/30/15 - RL - PK attached - released  
 6/25/15 SC place file on hold for PR.  
 6/15/15 SC emailed MT for PR, which is blank in James.

Ready To Invoice: 3/18/2015 By: Maritza Tardá  
 Preparing Invoice: 4/20/2015 By: Abigail Brumbaugh  
 Submitted Invoice: [ ] By: [ ]  
 Recovered: [ ] By: [ ]

Actual Cost: \$110.68 Invoiced Amt: \$ 0.00 CM %: 0.00 Recovered Amt: \$ 0.00

JM3 TPC Processing (4238)

TPC # 4238 SR # 161886 Insurance Company Geico Insurance (all but TX) **RELEASED**

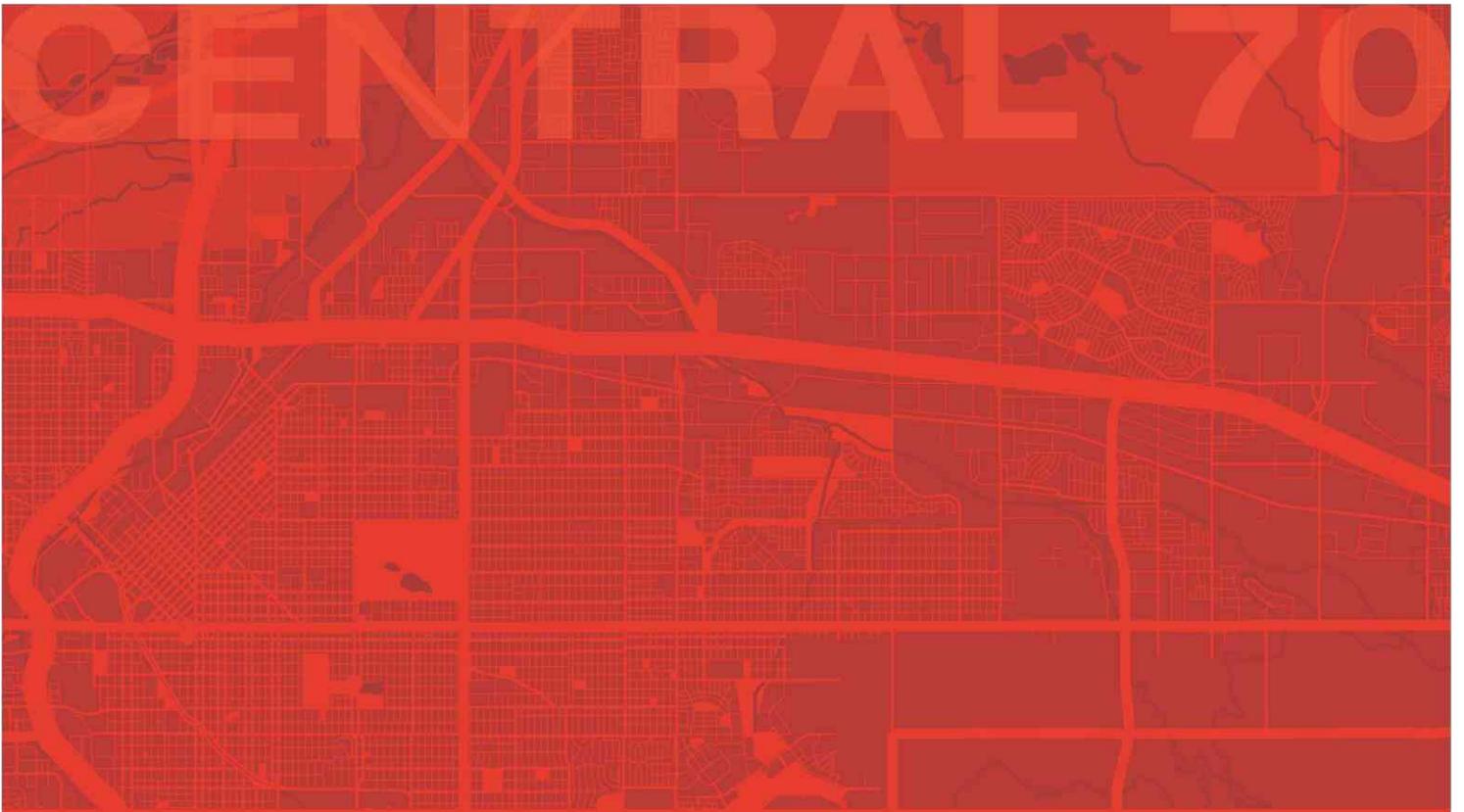
**Status History** Update Info Audit Info

**On Hold - Filed**

Change Date Old Status New Status Reason

6/30/2015 3:15:52 PM	ON-HOLD-FILED	RELEASED	
6/25/2015 1:03:18 PM	PREP_INV	ON-HOLD-FILED	Missing PR

On Hold - Filing  
 Canceled



ATTACHMENT 6

*Relates to Appendix I*

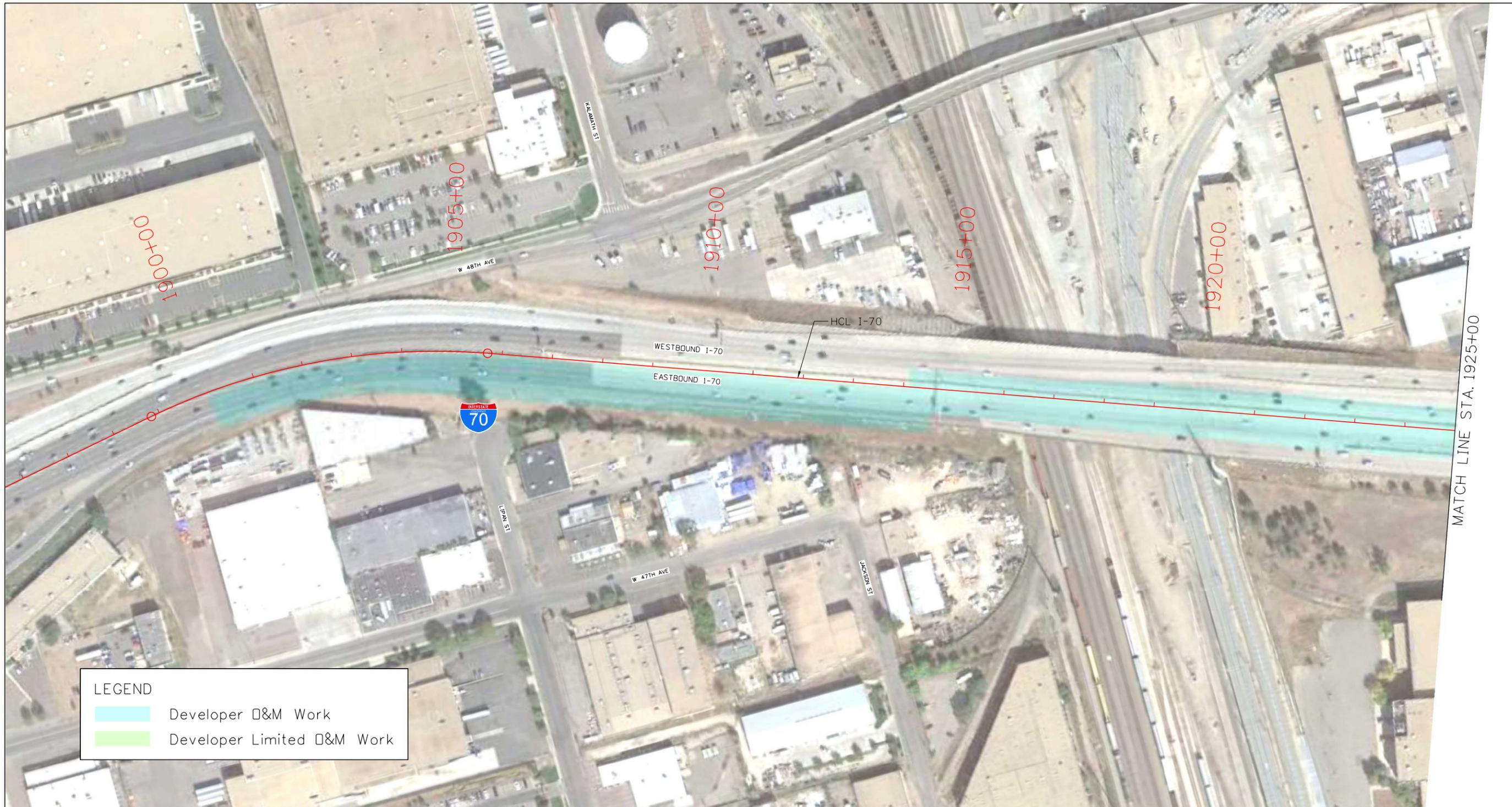


# O&M Limit Drawings

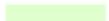


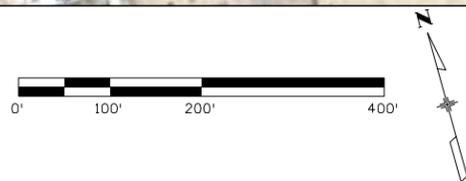
**SUBMITTED TO:**

Colorado Bridge Enterprise  
High Performance Transportation Enterprise  
c/o Colorado Department of Transportation



LEGEND

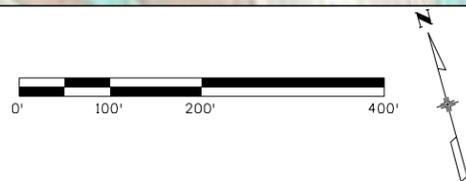
	Developer O&M Work
	Developer Limited O&M Work



CENTRAL 70 CONSTRUCTION PERIOD LIMITS STA 1900+00 TO STA 1925+00			Project No./Code FBR 0704-234
Designer: KMP	Structure Numbers	-	19631
Detailer: KMP	Subset Sheets:	of	Sheet Number CP-1



LEGEND	
	Developer O&M Work
	Developer Limited O&M Work



CENTRAL 70 CONSTRUCTION PERIOD LIMITS STA 1925+00 TO STA 1953+00			Project No./Code FBR 0704-234
Designer: KMP	Structure Numbers	-	19631
Detailer: KMP	Subset Sheets:	of	Sheet Number CP-2

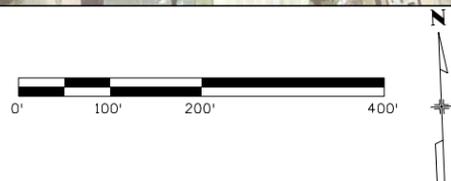


MATCH LINE STA. 1953+00

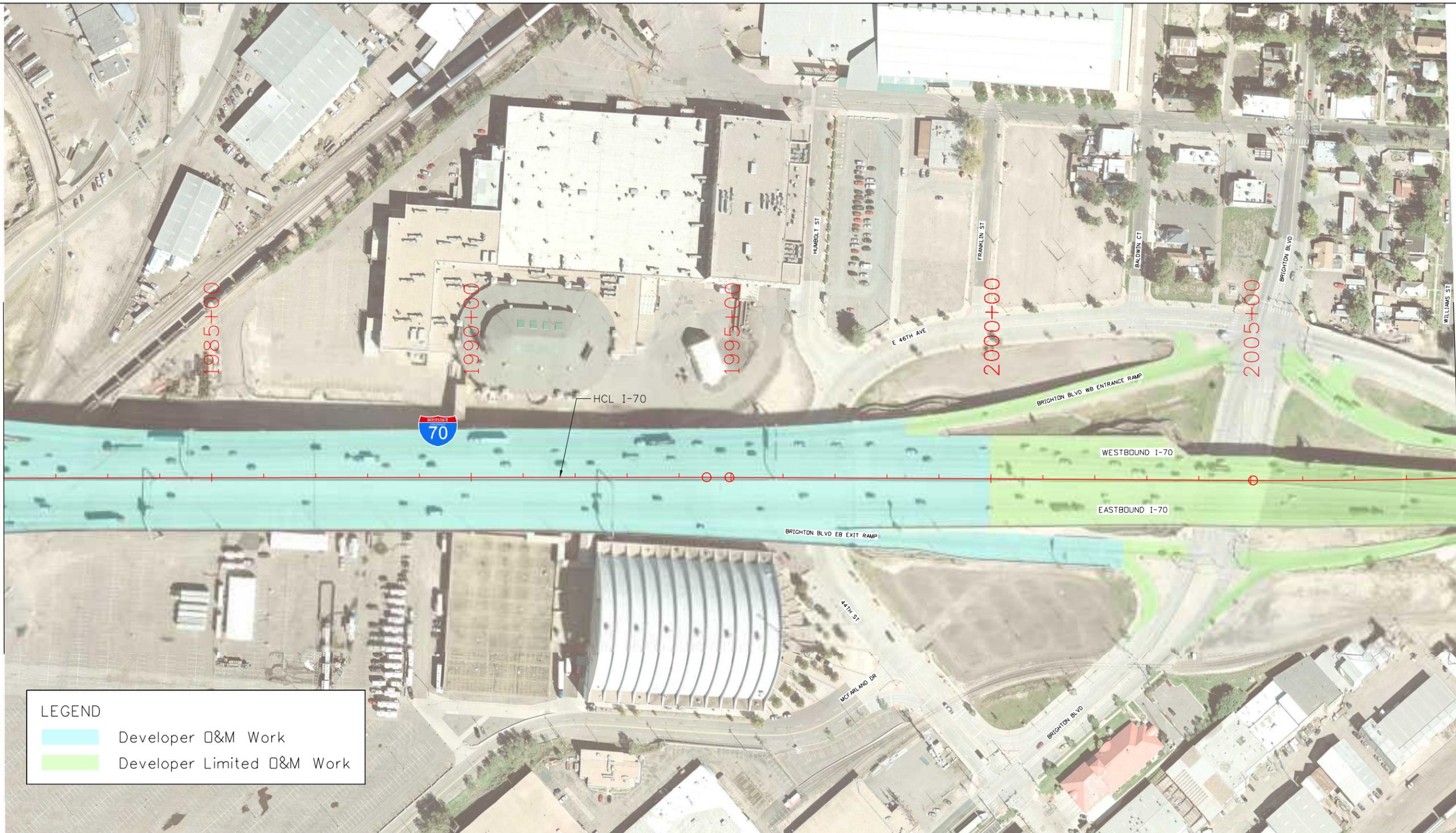
MATCH LINE STA. 1981+00

**LEGEND**

- Developer D&M Work
- Developer Limited D&M Work



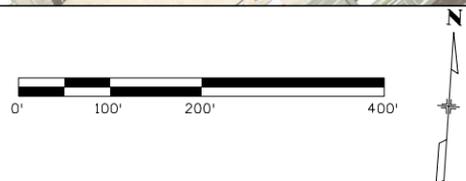
CENTRAL 70 CONSTRUCTION PERIOD LIMITS STA 1953+00 TO STA 1981+00			Project No./Code
			FBR 0704-234
Designer:	KMP	Structure Numbers	19631
Detailer:	KMP		
Subset:		Subset Sheets: of	Sheet Number CP-3



MATCH LINE STA. 1981+00

MATCH LINE STA. 2009+00

LEGEND	
	Developer O&M Work
	Developer Limited O&M Work

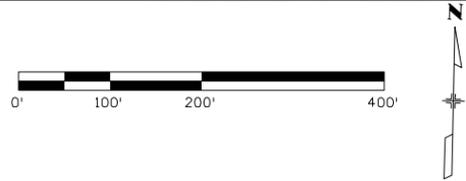


CENTRAL 70 CONSTRUCTION PERIOD LIMITS STA 1981+00 TO STA 2009+00			Project No./Code FBR 0704-234
Designer: KMP	Structure Numbers	-	19631
Detailer: KMP	Subset Sheets:	of	Sheet Number CP-4



**LEGEND**

- Developer O&M Work
- Developer Limited O&M Work



CENTRAL 70 CONSTRUCTION PERIOD LIMITS STA 2009+00 TO STA 2037+00			Project No./Code
			FBR 0704-234
Designer:	KMP	Structure	-
Detailer:	KMP	Numbers	-
Subset:		Subset Sheets:	of
			Sheet Number CP-5

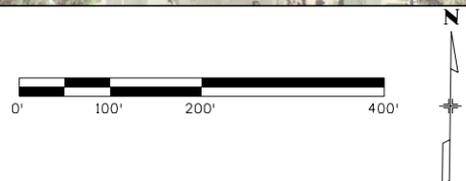


MATCH LINE STA. 2037+00

MATCH LINE STA. 2065+00

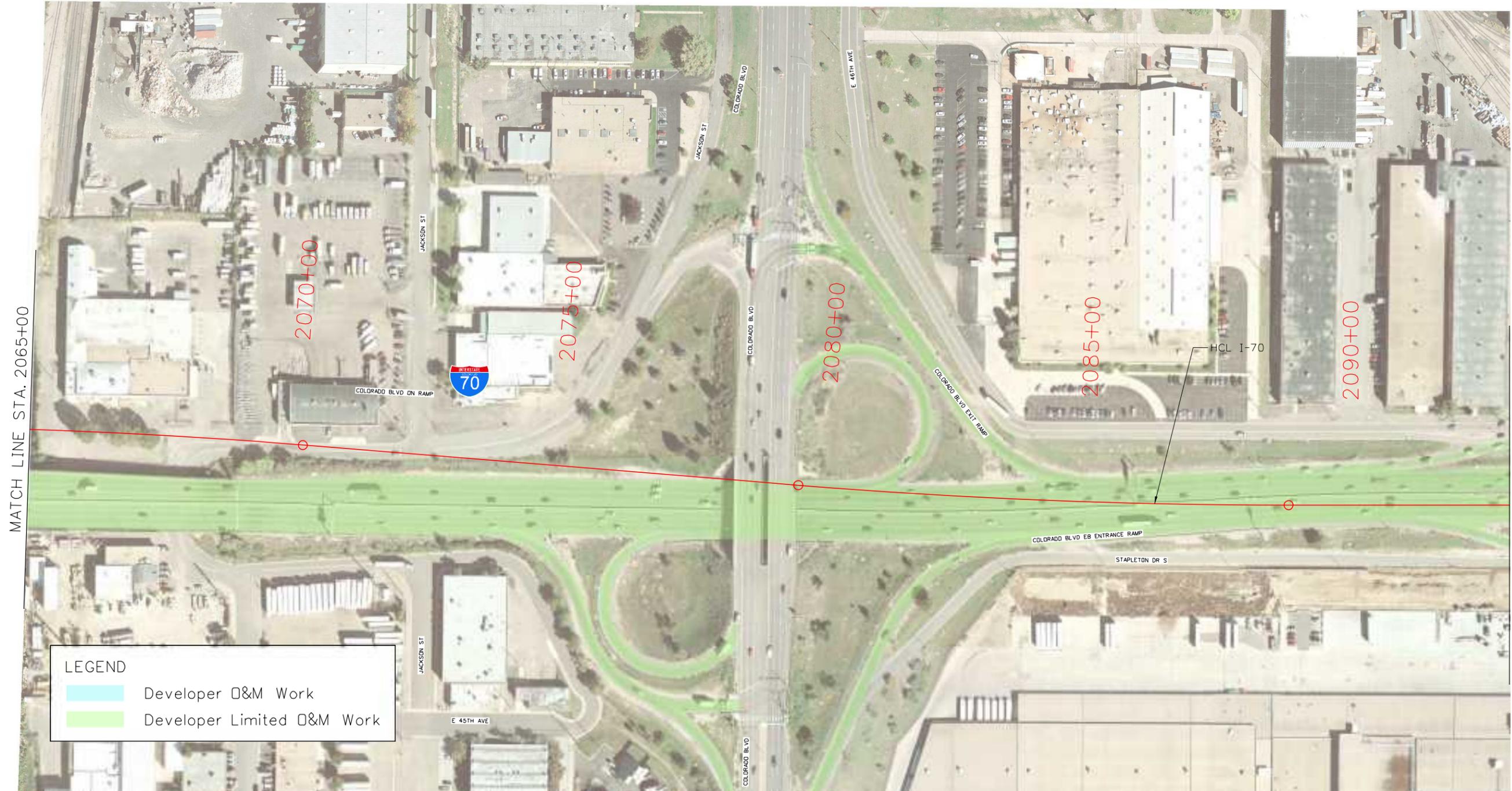
**LEGEND**

- Developer O&M Work
- Developer Limited O&M Work



CENTRAL 70 CONSTRUCTION PERIOD LIMITS STA 2037+00 TO STA 2065+00			
Designer:	KMP	Structure	-
Detailer:	KMP	Numbers	-
Subset:		Subset Sheets:	of

Project No./Code	FBR 0704-234
Sheet Number	19631
CP-6	

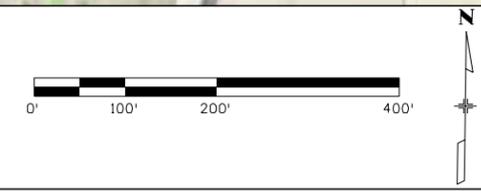


MATCH LINE STA. 2065+00

MATCH LINE STA. 2093+00

**LEGEND**

- Developer O&M Work
- Developer Limited O&M Work

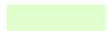


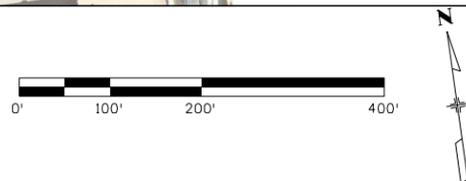
CENTRAL 70 CONSTRUCTION PERIOD LIMITS STA 2065+00 TO STA 2093+00			
Designer:	KMP	Structure Numbers	-
Detailer:	KMP	Structure Numbers	-
Subset:		Subset Sheets:	of

Project No./Code	FBR 0704-234
Sheet Number	19631
Sheet Number	CP-7



LEGEND

	Developer O&M Work
	Developer Limited O&M Work

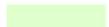


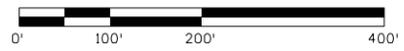
CENTRAL 70 CONSTRUCTION PERIOD LIMITS STA 2093+00 TO STA 2121+00			
Designer:	KMP	Structure	-
Detailer:	KMP	Numbers	-
Subset:		Subset Sheets:	of

Project No./Code	FBR 0704-234
	19631
Sheet Number	CP-8



LEGEND

	Developer O&M Work
	Developer Limited O&M Work



CENTRAL 70 CONSTRUCTION PERIOD LIMITS STA 2121+00 TO STA 2149+00			Project No./Code FBR 0704-234
Designer: KMP	Structure Numbers	-	19631
Detailer: KMP	Subset Sheets:	of	Sheet Number CP-9



MATCH LINE STA. 2149+00

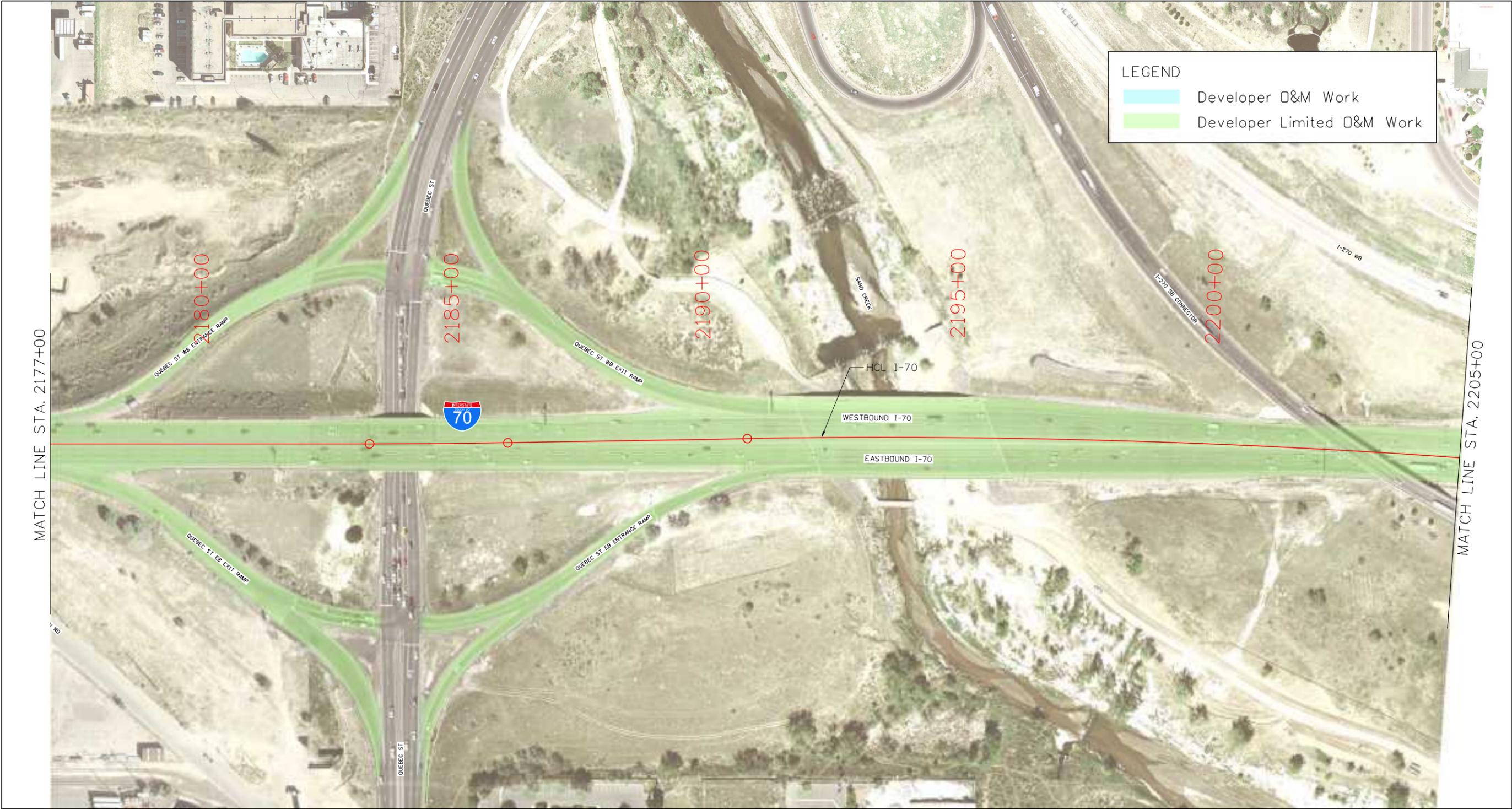
MATCH LINE STA. 2177+00

**LEGEND**

- Developer O&M Work
- Developer Limited O&M Work



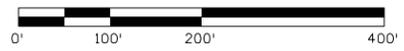
CENTRAL 70 CONSTRUCTION PERIOD LIMITS STA 2149+00 TO STA 2177+00			Project No./Code FBR 0704-234
Designer: KMP	Structure Numbers	-	19631
Detailer: KMP	Subset Sheets:	of	Sheet Number CP-10



LEGEND	
<span style="color: cyan;">■</span>	Developer O&M Work
<span style="color: green;">■</span>	Developer Limited O&M Work

MATCH LINE STA. 2177+00

MATCH LINE STA. 2205+00

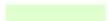


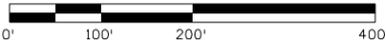
CENTRAL 70 CONSTRUCTION PERIOD LIMITS STA 2177+00 TO STA 2205+00			
Designer:	KMP	Structure Numbers	-
Detailer:	KMP	Structure Numbers	-
Subset:		Subset Sheets:	of

Project No./Code	FBR 0704-234
Sheet Number	CP-11



LEGEND

	Developer O&M Work
	Developer Limited O&M Work



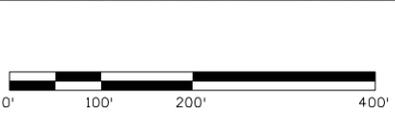
CENTRAL 70 CONSTRUCTION PERIOD LIMITS STA 2205+00 TO STA 2233+00			
Designer:	KMP	Structure	-
Detailer:	KMP	Numbers	-
Subset:		Subset Sheets:	of

Project No./Code	FBR 0704-234
	19631
Sheet Number	CP-12



LEGEND

<span style="color: lightblue;">■</span>	Developer O&M Work
<span style="color: lightgreen;">■</span>	Developer Limited O&M Work

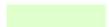


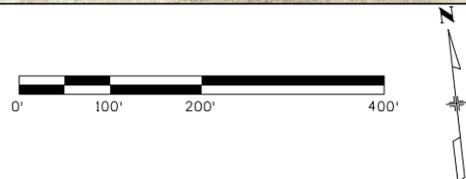
CENTRAL 70 CONSTRUCTION PERIOD LIMITS STA 2233+00 TO STA 2261+00			
Designer:	KMP	Structure	-
Detailer:	KMP	Numbers	-
Subset:		Subset Sheets:	of

Project No./Code	FBR 0704-234
	19631
Sheet Number	CP-13

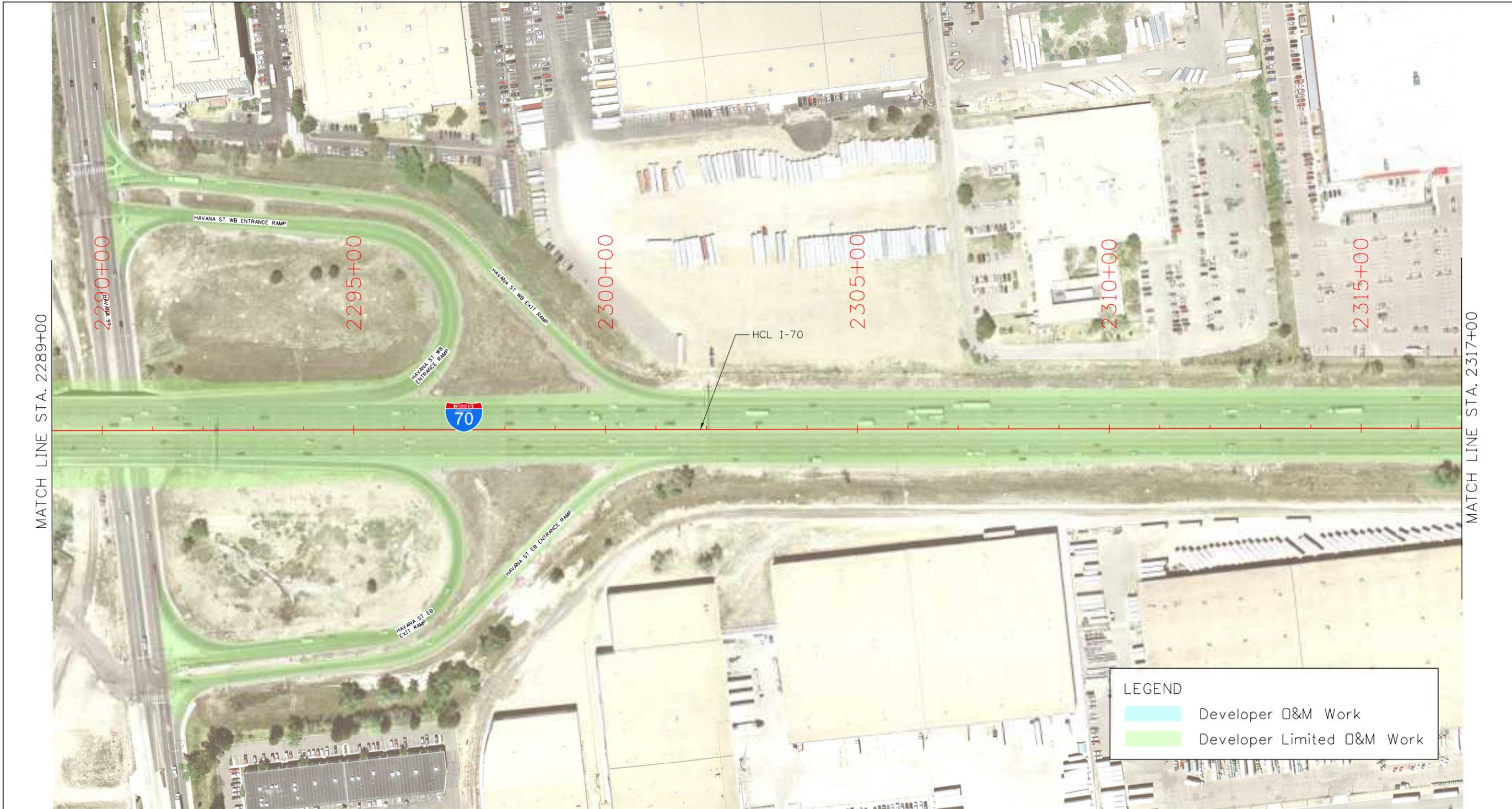


LEGEND

	Developer O&M Work
	Developer Limited O&M Work



CENTRAL 70 CONSTRUCTION PERIOD LIMITS STA 2261+00 TO STA 2289+00			Project No./Code FBR 0704-234
Designer:	KMP	Structure Numbers	-
Detailer:	KMP	Structure Numbers	-
Subset:	Subset Sheets:	of	19631
			Sheet Number CP-14

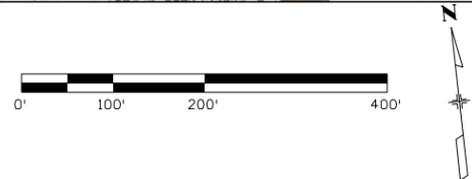


MATCH LINE STA. 2289+00

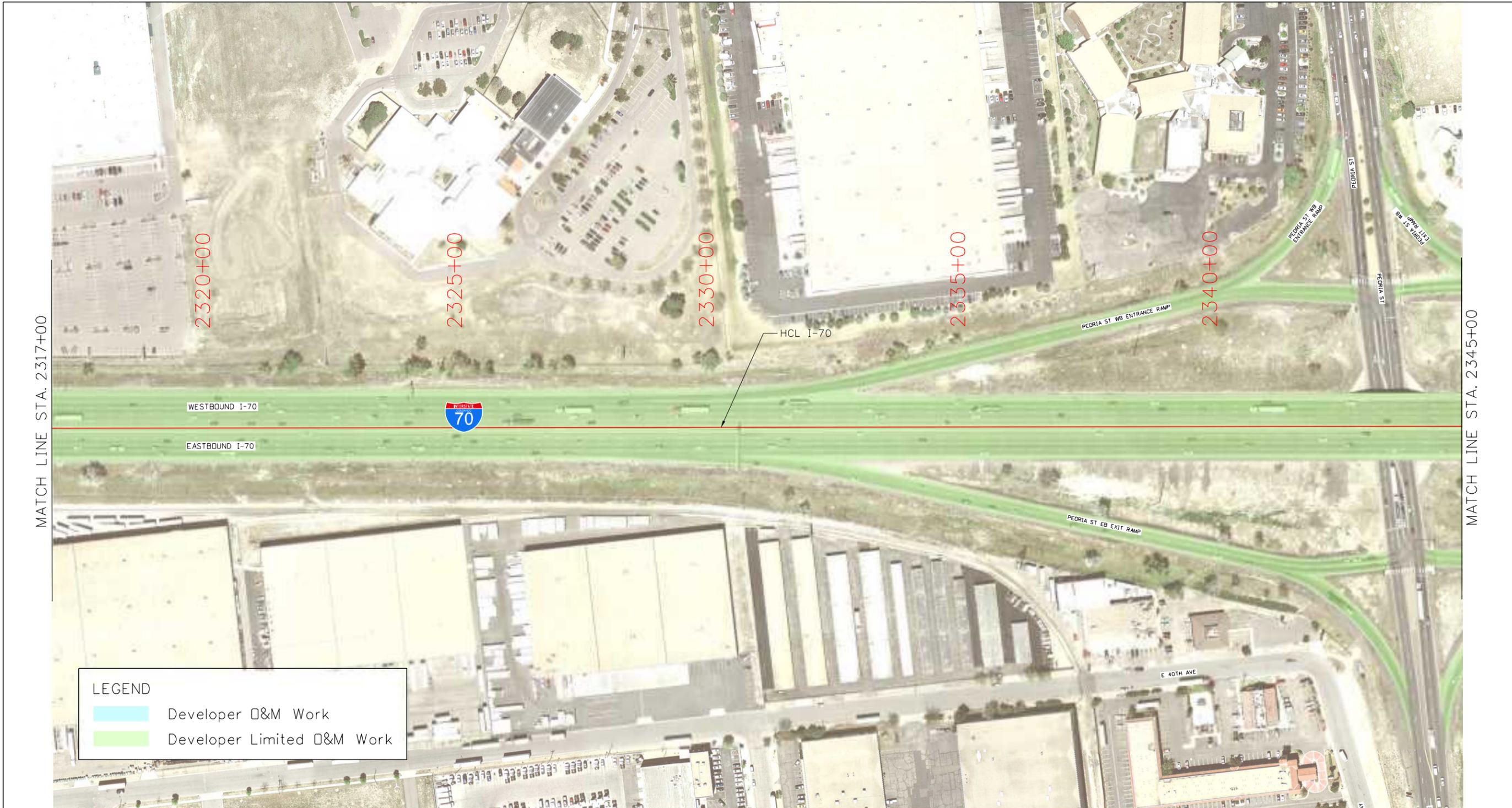
MATCH LINE STA. 2317+00

**LEGEND**

- Developer O&M Work
- Developer Limited O&M Work

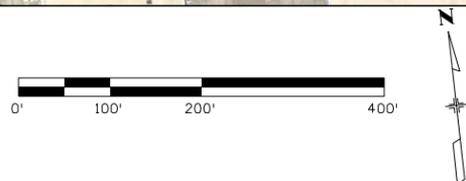


CENTRAL 70 CONSTRUCTION PERIOD LIMITS STA 2289+00 TO STA 2317+00			Project No./Code FBR 0704-234
Designer: KMP	Structure Numbers	-	19631
Detailer: KMP	Subset Sheets:	of	Sheet Number CP-15



LEGEND

	Developer O&M Work
	Developer Limited O&M Work



CENTRAL 70 CONSTRUCTION PERIOD LIMITS STA 2317+00 TO STA 2345+00			
Designer:	KMP	Structure Numbers	-
Detailer:	KMP	Structure Numbers	-
Subset:		Subset Sheets:	of

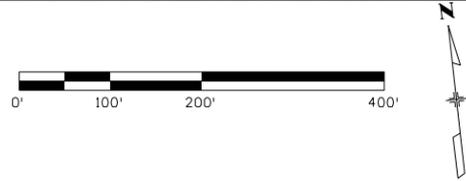
Project No./Code	FBR 0704-234
	19631
Sheet Number	CP-16



MATCH LINE STA. 2345+00

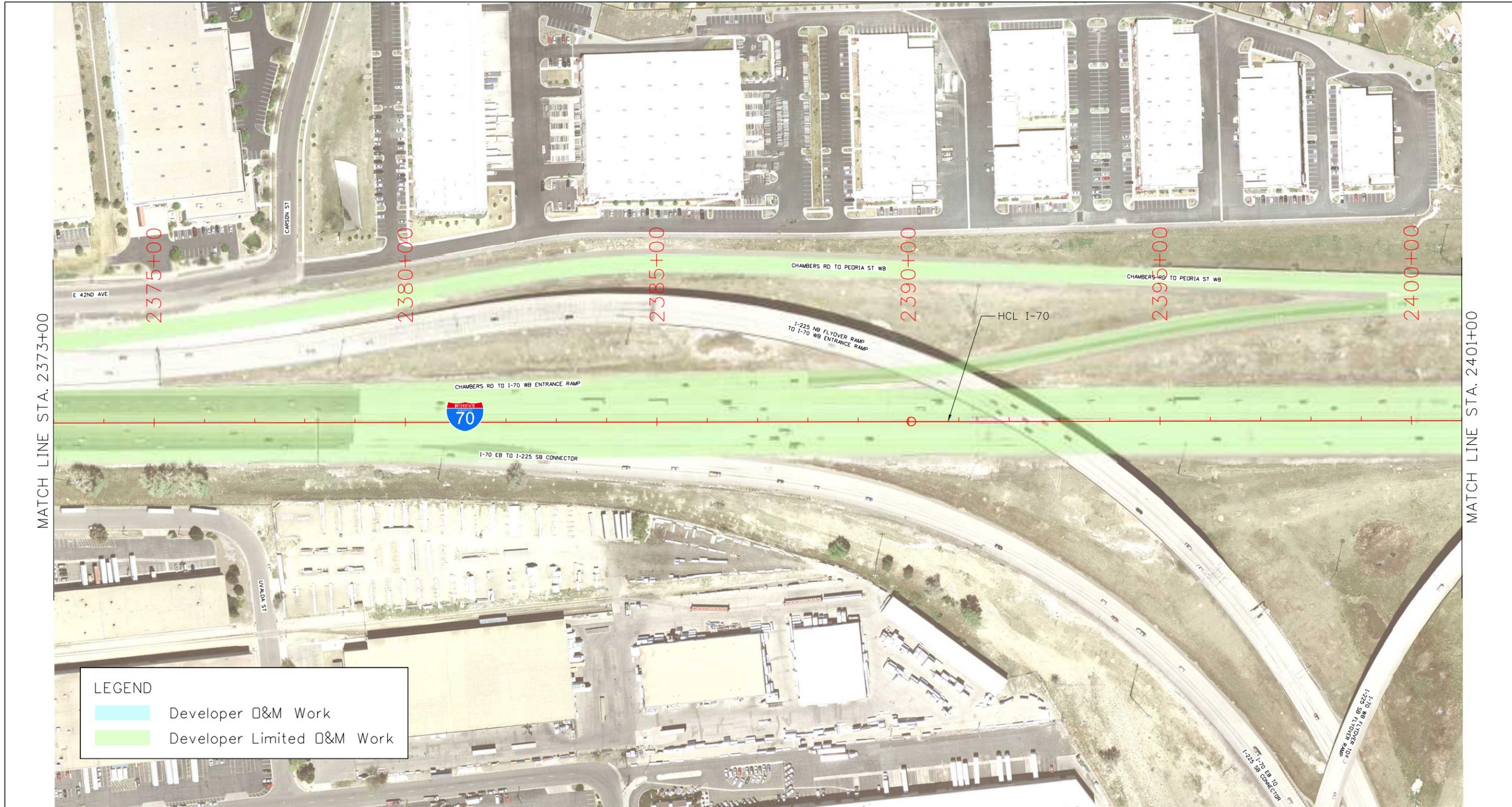
MATCH LINE STA. 2373+00

LEGEND	
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<span style="display: inline-block; width: 20px; height: 10px; background-color: lightgreen; border: 1px solid black;"></span>	Developer Limited O&M Work

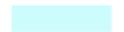
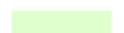


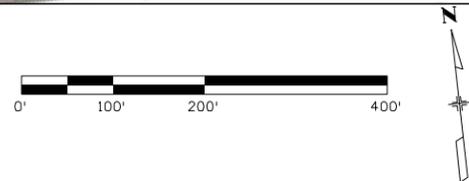
CENTRAL 70 CONSTRUCTION PERIOD LIMITS STA 2345+00 TO STA 2373+00			
Designer:	KMP	Structure	-
Detailer:	KMP	Numbers	-
Subset:		Subset Sheets:	of

Project No./Code	FBR 0704-234
	19631
Sheet Number	CP-17



LEGEND

	Developer O&M Work
	Developer Limited O&M Work



CENTRAL 70 CONSTRUCTION PERIOD LIMITS STA 2373+00 TO STA 2401+00			Project No./Code FBR 0704-234
Designer: KMP	Structure Numbers	-	19631
Detailer: KMP	Subset Sheets:	of	Sheet Number CP-18

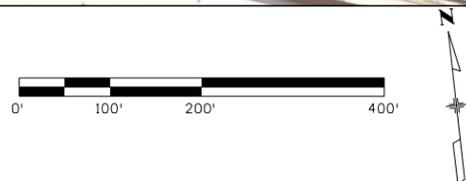


MATCH LINE STA. 2401+00

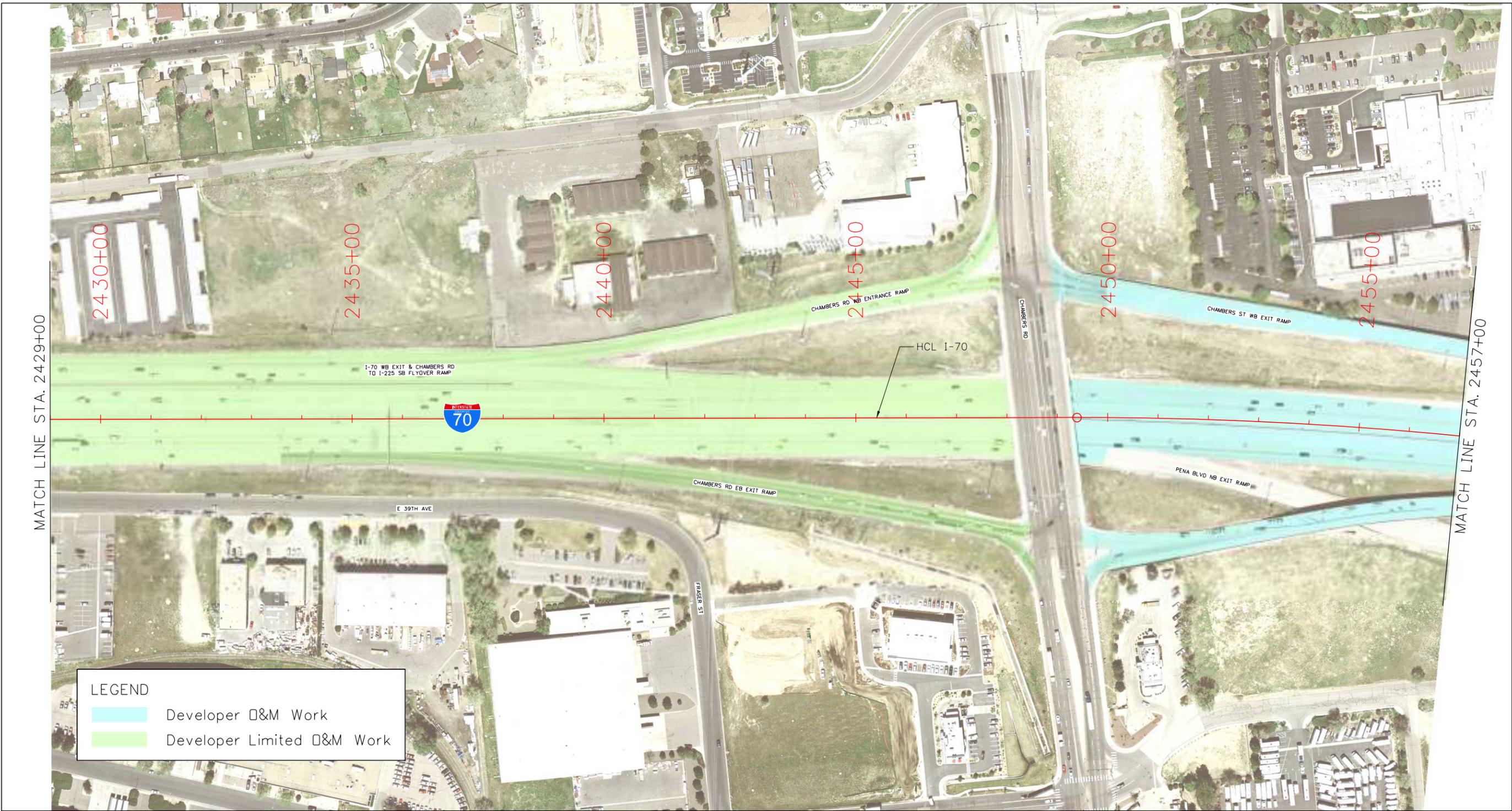
MATCH LINE STA. 2429+00

**LEGEND**

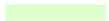
- Developer O&M Work
- Developer Limited O&M Work



CENTRAL 70 CONSTRUCTION PERIOD LIMITS STA 2401+00 TO STA 2429+00			Project No./Code FBR 0704-234
Designer:	KMP	Structure Numbers	19631
Detailer:	KMP	Structure Numbers	
Subset:		Subset Sheets: of	Sheet Number CP-19



LEGEND

	Developer O&M Work
	Developer Limited O&M Work

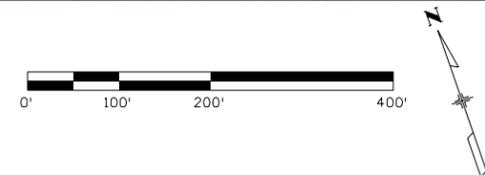


CENTRAL 70 CONSTRUCTION PERIOD LIMITS STA 2429+00 TO STA 2457+00			Project No./Code FBR 0704-234
Designer: KMP	Structure Numbers	-	19631
Detailer: KMP	Subset Sheets:	of	Sheet Number CP-20



**LEGEND**

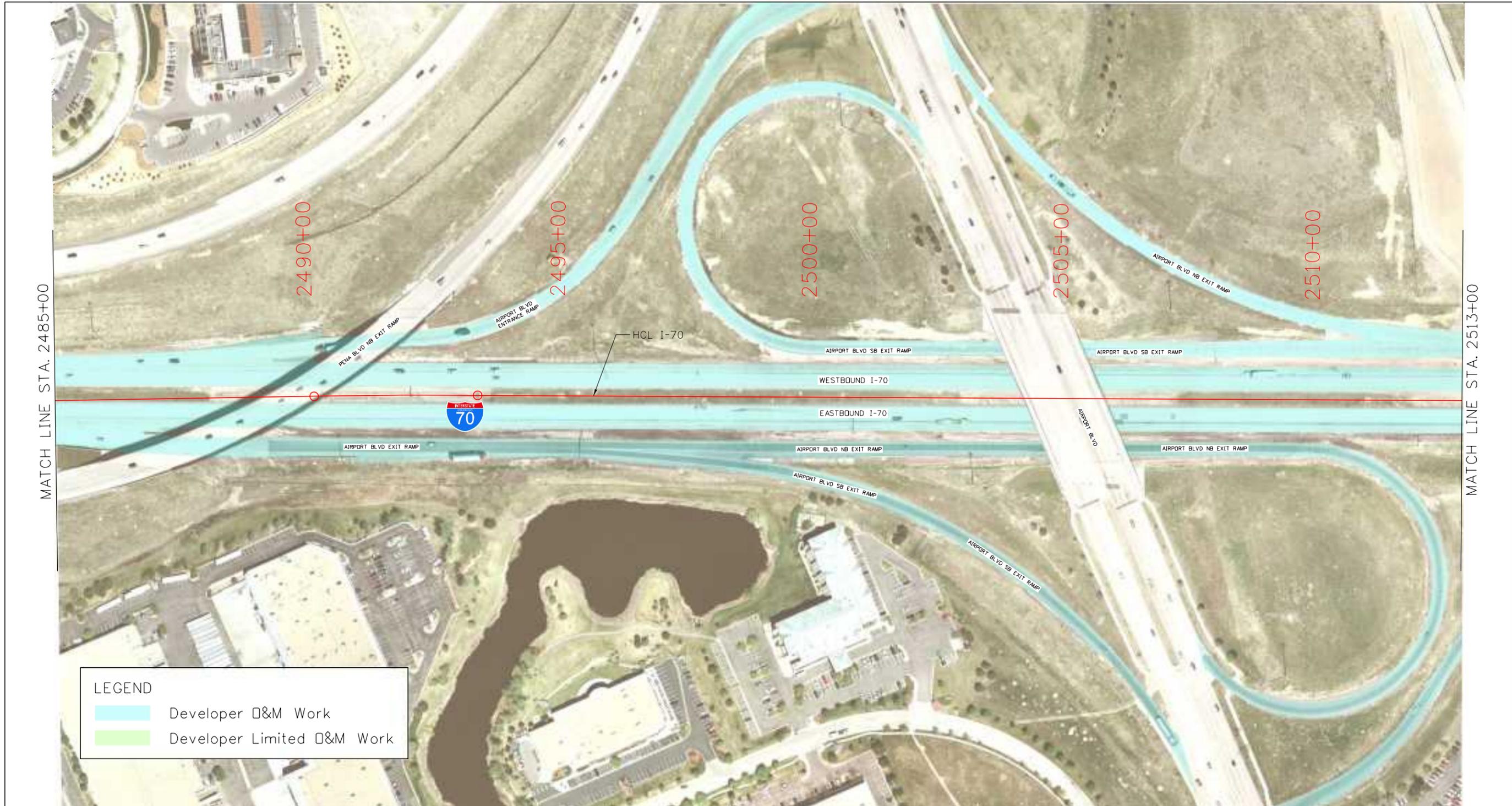
- Developer O&M Work
- Developer Limited O&M Work



CENTRAL 70 CONSTRUCTION PERIOD LIMITS STA 2457+00 TO STA 2485+00		
Designer:	KMP	Structure Numbers
Detailer:	KMP	Numbers
Subset:	Subset Sheets:	of

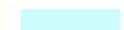
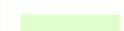
Project No./Code	FBR 0704-234
19631	
Sheet Number	CP-21

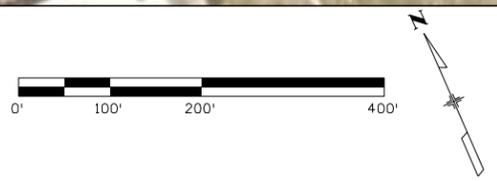
\$PLOT\_INFO\$



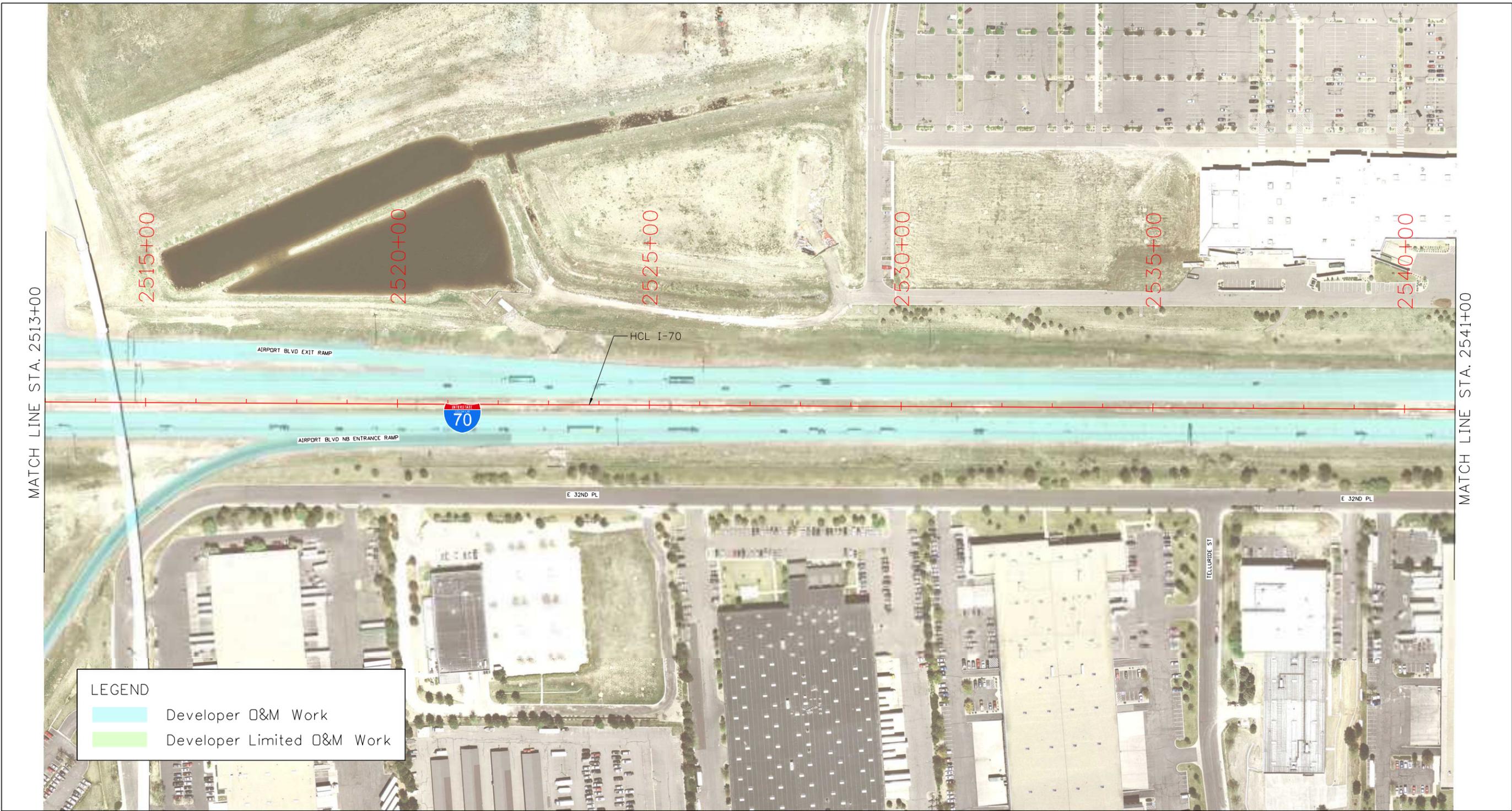
MATCH LINE STA. 2485+00

MATCH LINE STA. 2513+00

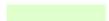
LEGEND	
	Developer O&M Work
	Developer Limited O&M Work

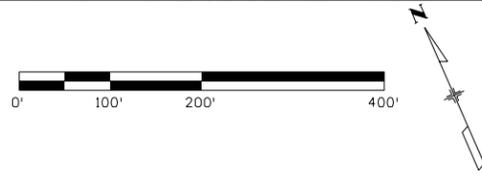


CENTRAL 70 CONSTRUCTION PERIOD LIMITS STA 2485+00 TO STA 2513+00			Project No./Code FBR 0704-234
Designer: KMP	Structure Numbers	-	19631
Detailer: KMP	Subset Sheets:	of	Sheet Number CP-22



LEGEND

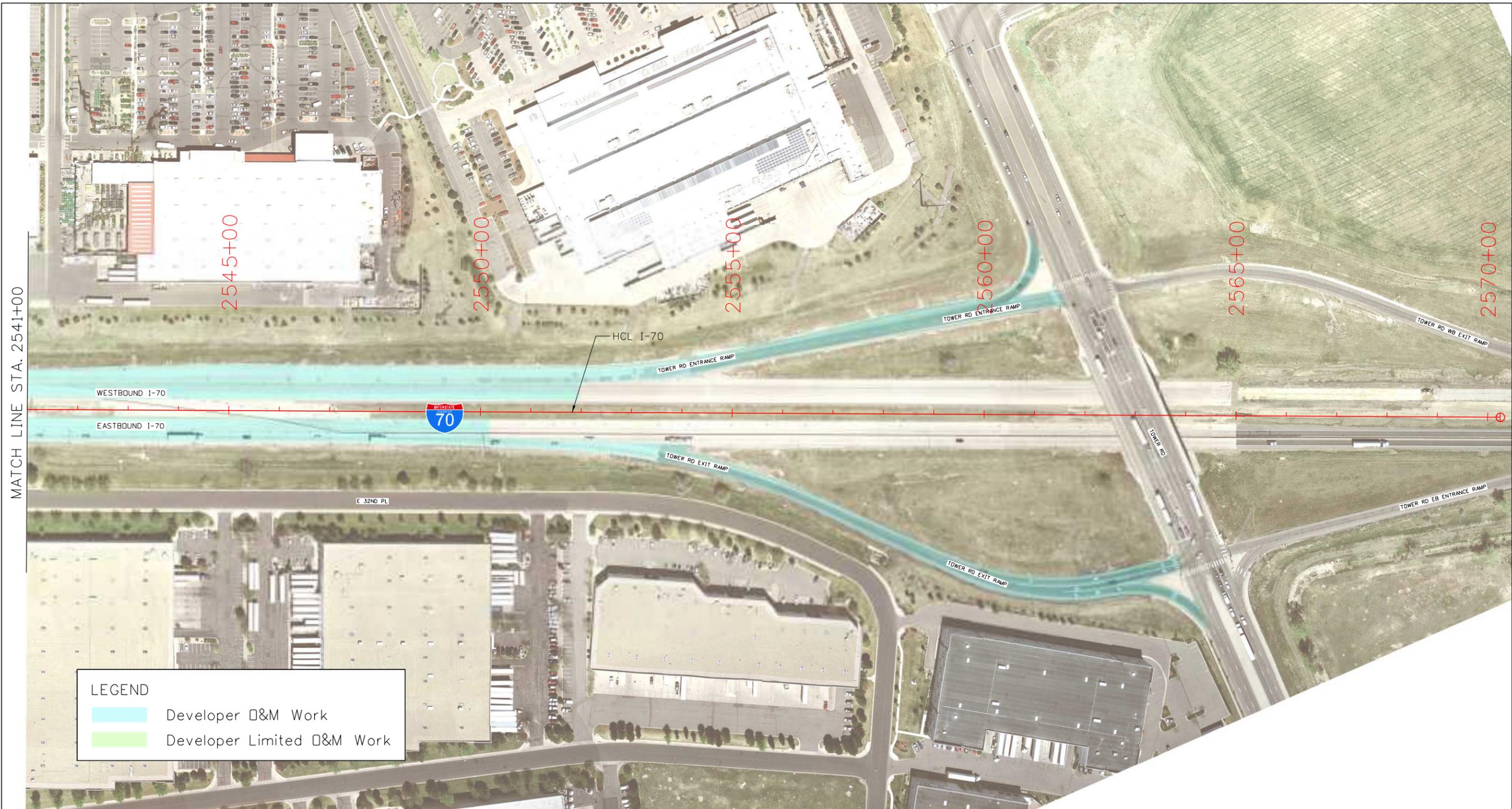
	Developer O&M Work
	Developer Limited O&M Work



CENTRAL 70  
CONSTRUCTION PERIOD LIMITS  
STA 2513+00 TO STA 2541+00

Designer:	KMP	Structure Numbers	-
Detailer:	KMP	Structure Numbers	-
Subset:		Subset Sheets:	of

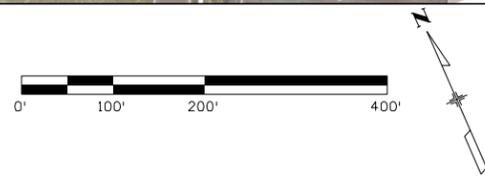
Project No./Code	FBR 0704-234
	19631
Sheet Number	CP-23



MATCH LINE STA. 2541+00

LEGEND

<span style="display:inline-block; width:20px; height:10px; background-color:lightblue;"></span>	Developer O&M Work
<span style="display:inline-block; width:20px; height:10px; background-color:lightgreen;"></span>	Developer Limited O&M Work

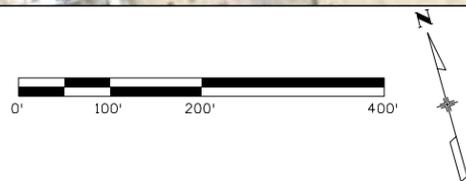


CENTRAL 70 CONSTRUCTION PERIOD LIMITS STA 2541+00 TO STA 2570+00			Project No./Code FBR 0704-234
Designer: KMP	Structure Numbers	-	19631
Detailer: KMP	Subset Sheets:	of	Sheet Number CP-24



**LEGEND**

- Local Agency Operations & Maintenance Work
- Developer O&M Work
- Developer Limited O&M Work
- Department Operations & Maintenance Work
- Developer O&M Work (in accordance with Section 3.2.2 of Schedule II of the Project Agreement).
- Developer O&M Work except for Snow and Ice Control Services



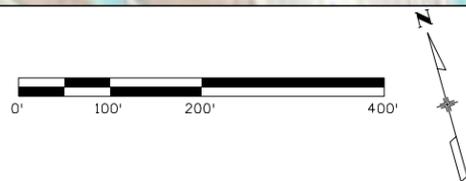
CENTRAL 70 OPERATIONS PERIOD LIMITS STA 1900+00 TO STA 1925+00			Project No./Code FBR 0704-234
Designer: KMP	Structure Numbers	-	19631
Detailer: KMP	Subset Sheets:	of	Sheet Number OP-1

\$PLOT\_INFO\$



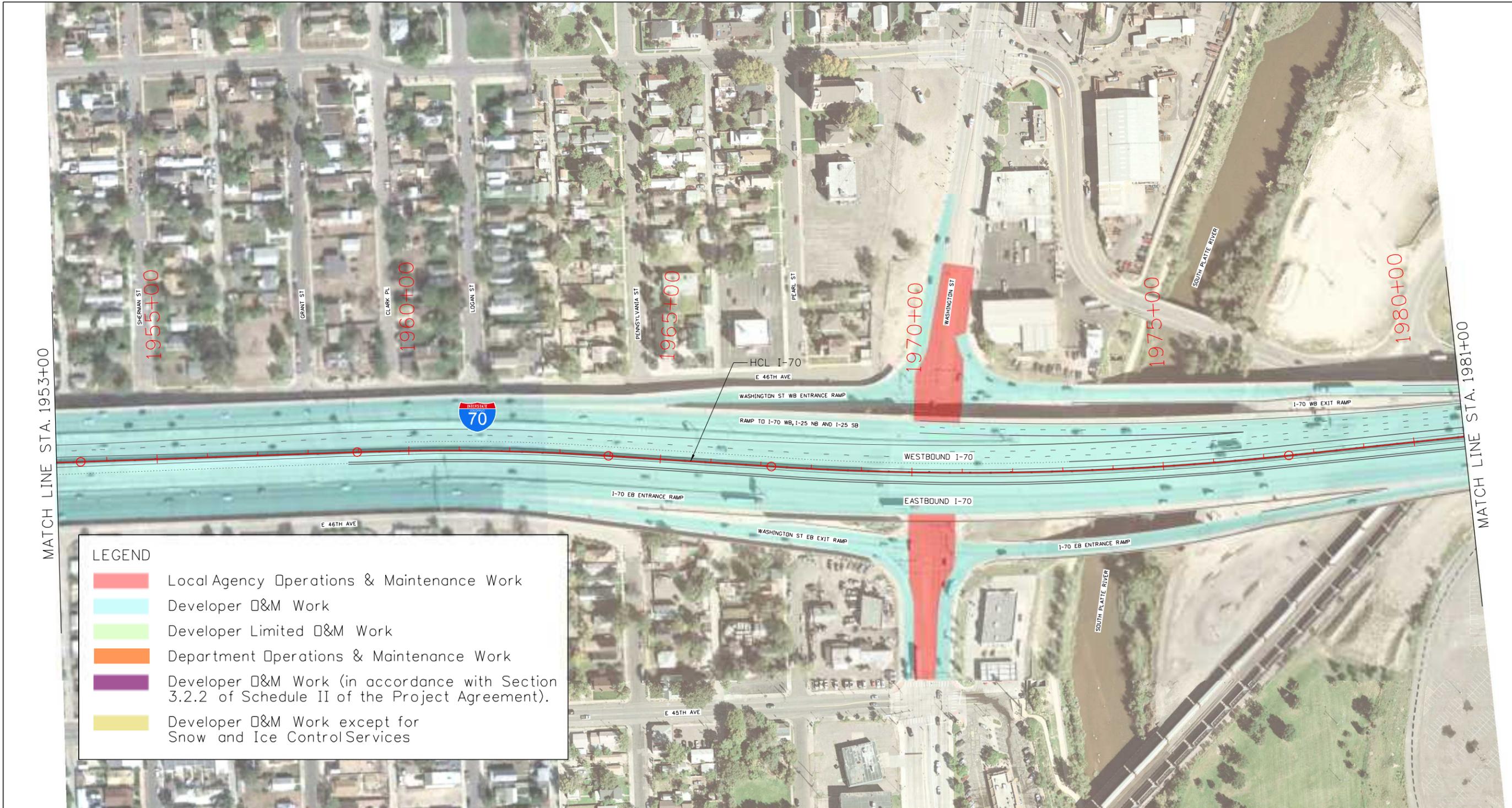
**LEGEND**

<span style="color: red;">■</span>	Local Agency Operations & Maintenance Work
<span style="color: cyan;">■</span>	Developer O&M Work
<span style="color: lightgreen;">■</span>	Developer Limited O&M Work
<span style="color: orange;">■</span>	Department Operations & Maintenance Work
<span style="color: purple;">■</span>	Developer O&M Work (in accordance with Section 3.2.2 of Schedule II of the Project Agreement).
<span style="color: yellow;">■</span>	Developer O&M Work except for Snow and Ice Control Services



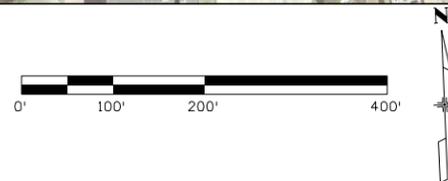
CENTRAL 70 OPERATIONS PERIOD LIMITS STA 1925+00 TO STA 1953+00			Project No./Code FBR 0704-234
Designer: KMP	Structure Numbers	-	19631
Detailer: KMP	Subset Sheets:	of	Sheet Number OP-2

\$PLOT\_INFO\$

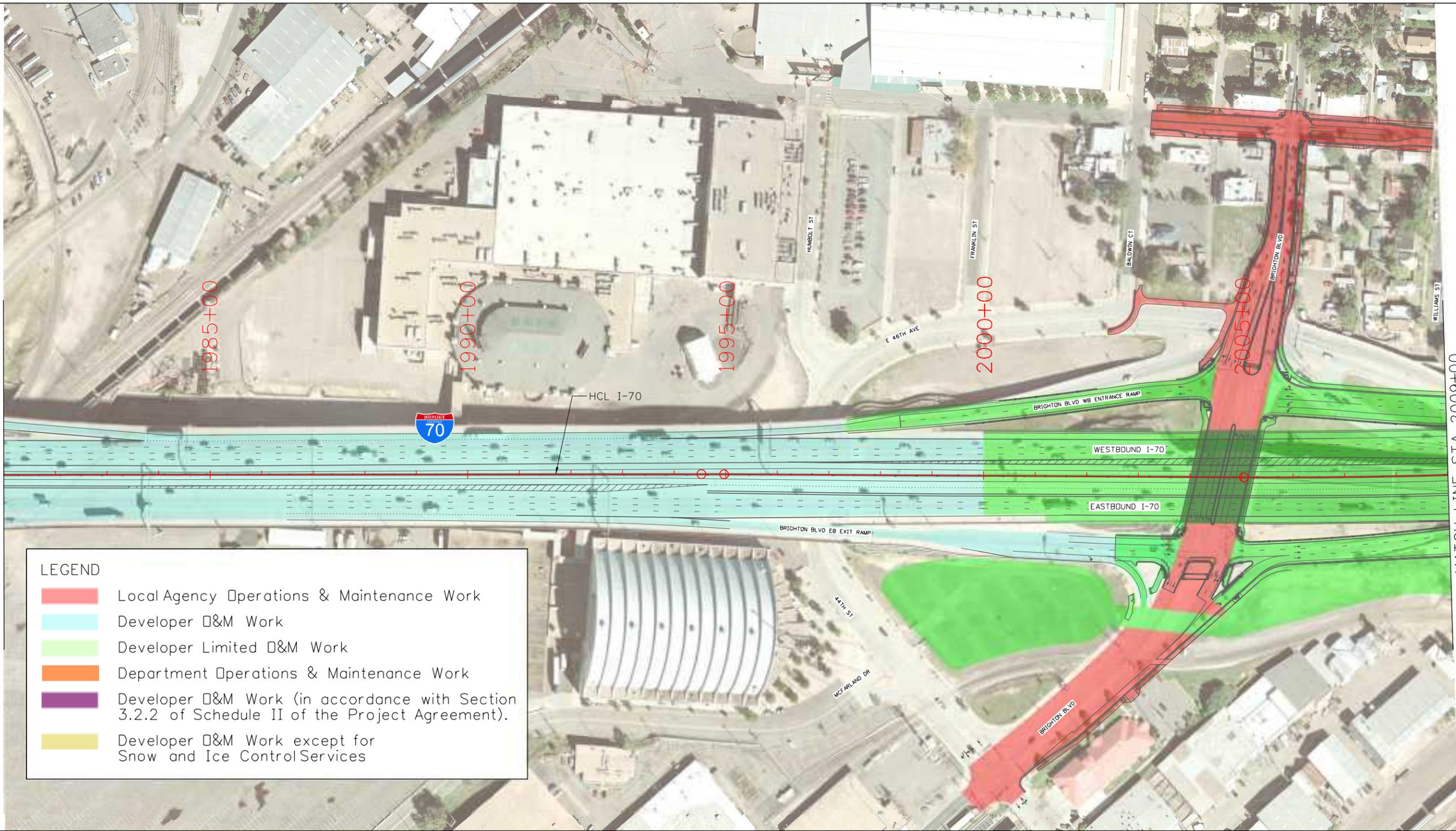


**LEGEND**

- Local Agency Operations & Maintenance Work
- Developer O&M Work
- Developer Limited O&M Work
- Department Operations & Maintenance Work
- Developer O&M Work (in accordance with Section 3.2.2 of Schedule II of the Project Agreement).
- Developer O&M Work except for Snow and Ice Control Services

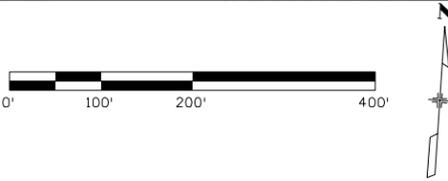


CENTRAL 70 OPERATIONS PERIOD LIMITS STA 1953+00 TO STA 1981+00			Project No./Code FBR 0704-234
Designer: KMP	Structure Numbers	-	19631
Detailer: KMP	Subset Sheets:	of	Sheet Number OP-3

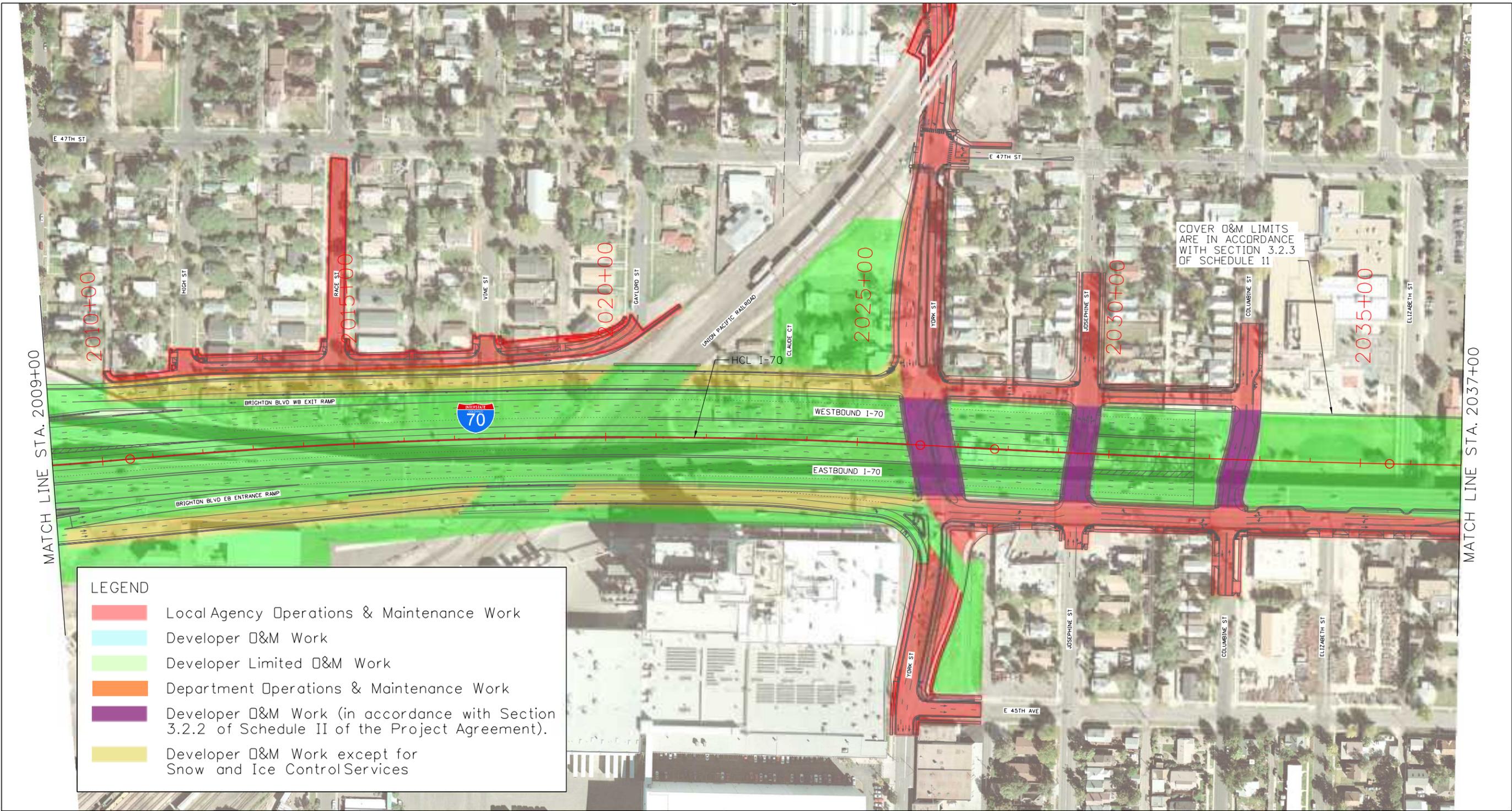


**LEGEND**

<span style="color: red;">■</span>	Local Agency Operations & Maintenance Work
<span style="color: cyan;">■</span>	Developer O&M Work
<span style="color: lightgreen;">■</span>	Developer Limited O&M Work
<span style="color: orange;">■</span>	Department Operations & Maintenance Work
<span style="color: purple;">■</span>	Developer O&M Work (in accordance with Section 3.2.2 of Schedule II of the Project Agreement).
<span style="color: yellow;">■</span>	Developer O&M Work except for Snow and Ice Control Services

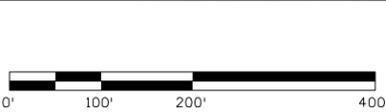


CENTRAL 70 OPERATIONS PERIOD LIMITS STA 1981+00 TO STA 2009+00			Project No./Code
			FBR 0704-234
Designer:	KMP	Structure Numbers	-
Detailer:	KMP	Structure Numbers	-
Subset:		Subset Sheets:	of
			Sheet Number OP-4



**LEGEND**

- Local Agency Operations & Maintenance Work
- Developer O&M Work
- Developer Limited O&M Work
- Department Operations & Maintenance Work
- Developer O&M Work (in accordance with Section 3.2.2 of Schedule II of the Project Agreement).
- Developer O&M Work except for Snow and Ice Control Services



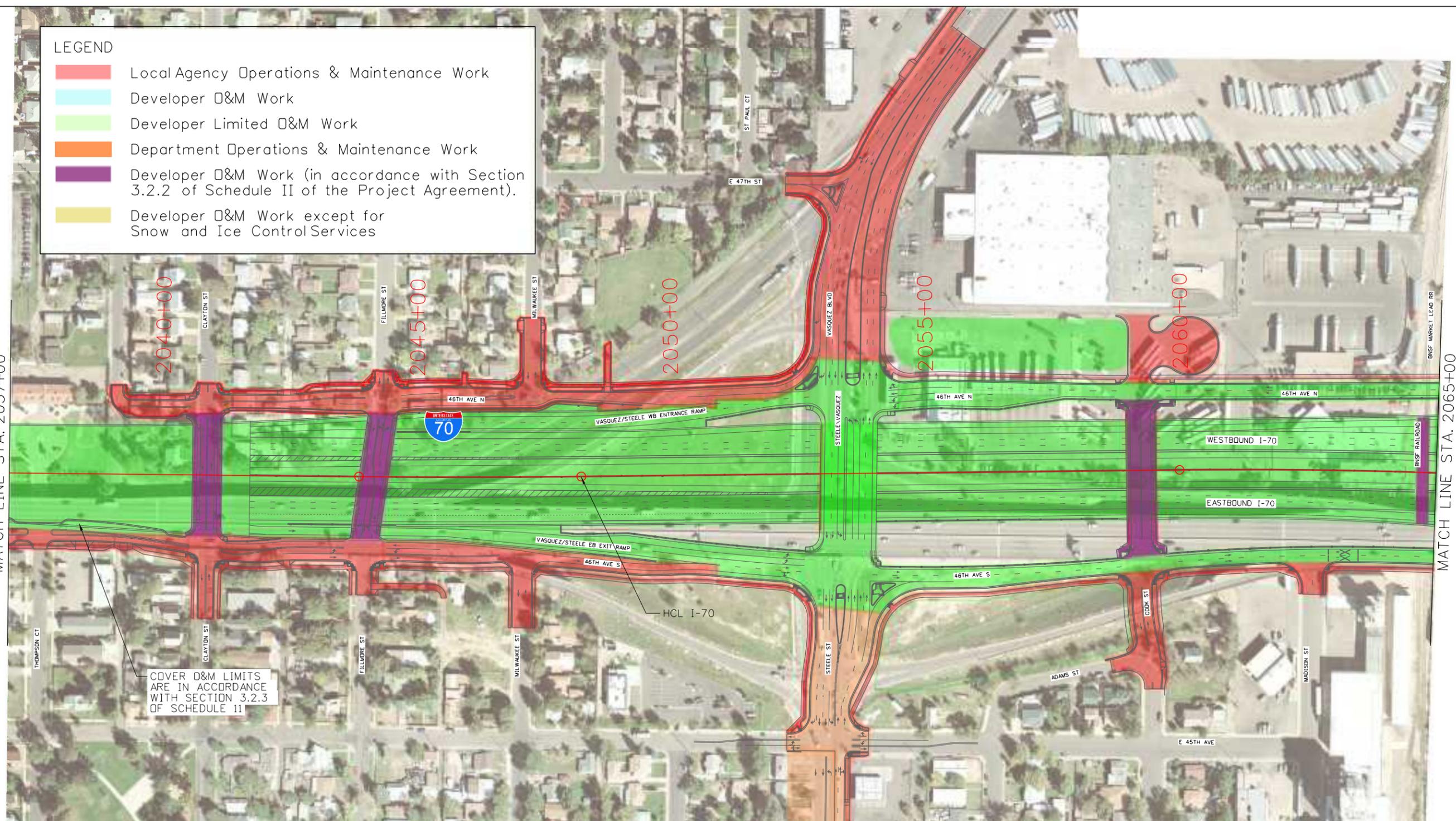
CENTRAL 70 OPERATIONS PERIOD LIMITS STA 2009+00 TO STA 2037+00			Project No./Code FBR 0704-234
Designer: KMP	Structure	-	19631
Detailer: KMP	Numbers	-	
Subset:	Subset Sheets:	of	Sheet Number OP-5

**LEGEND**

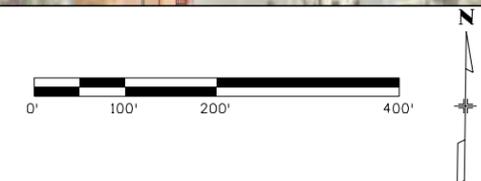
- Local Agency Operations & Maintenance Work
- Developer O&M Work
- Developer Limited O&M Work
- Department Operations & Maintenance Work
- Developer O&M Work (in accordance with Section 3.2.2 of Schedule II of the Project Agreement).
- Developer O&M Work except for Snow and Ice Control Services

MATCH LINE STA. 2037+00

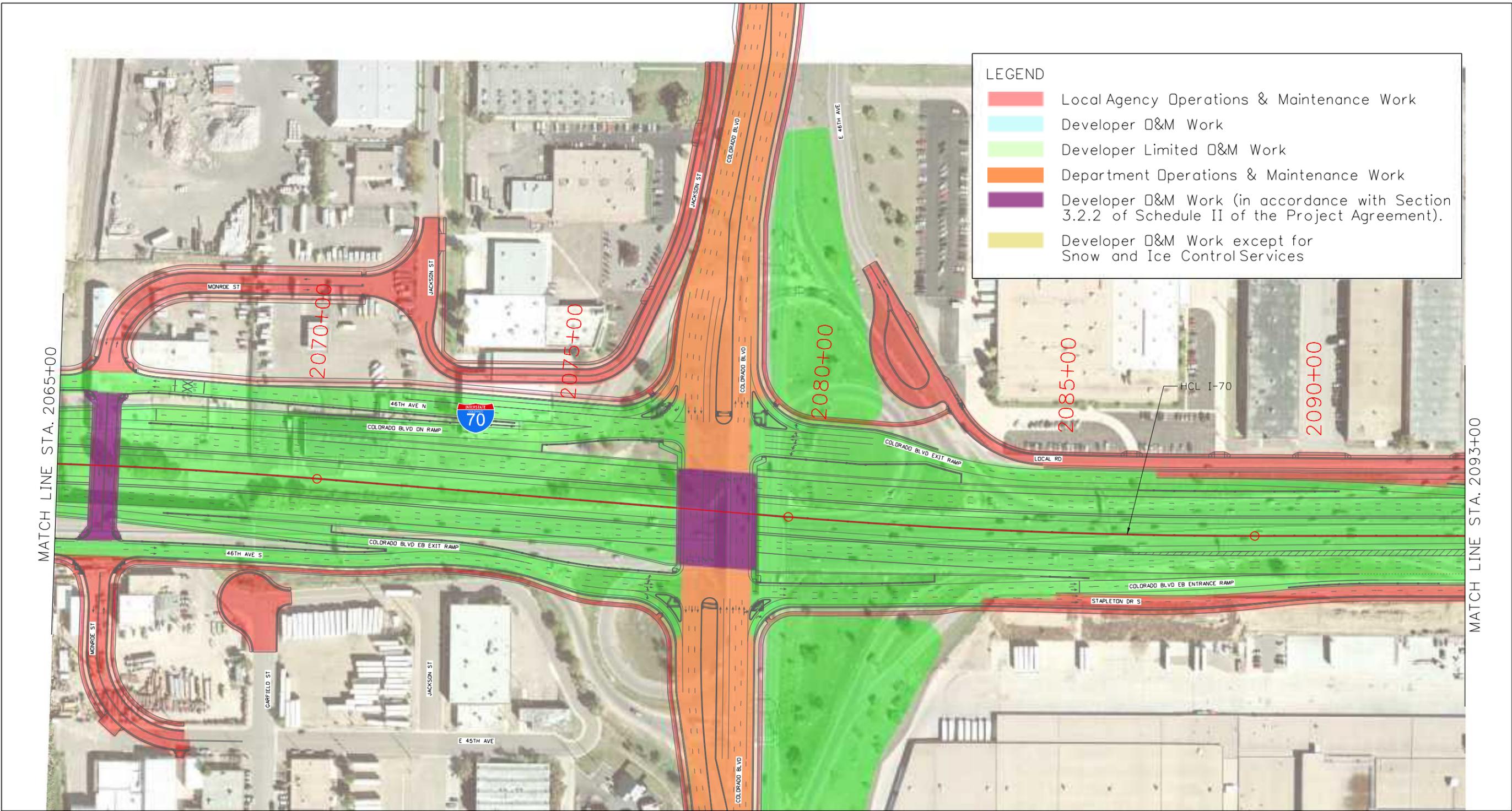
MATCH LINE STA. 2065+00



COVER O&M LIMITS ARE IN ACCORDANCE WITH SECTION 3.2.3 OF SCHEDULE II



CENTRAL 70 OPERATIONS PERIOD LIMITS STA 2037+00 TO STA 2065+00			Project No./Code
			FBR 0704-234
Designer:	KMP	Structure Numbers	19631
Detailer:	KMP	Structure Numbers	
Subset:		Subset Sheets: of	Sheet Number 0P-6

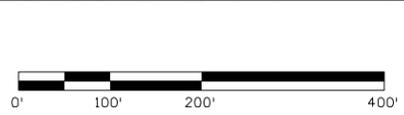


**LEGEND**

- Local Agency Operations & Maintenance Work
- Developer D&M Work
- Developer Limited D&M Work
- Department Operations & Maintenance Work
- Developer D&M Work (in accordance with Section 3.2.2 of Schedule II of the Project Agreement).
- Developer D&M Work except for Snow and Ice Control Services

MATCH LINE STA. 2065+00

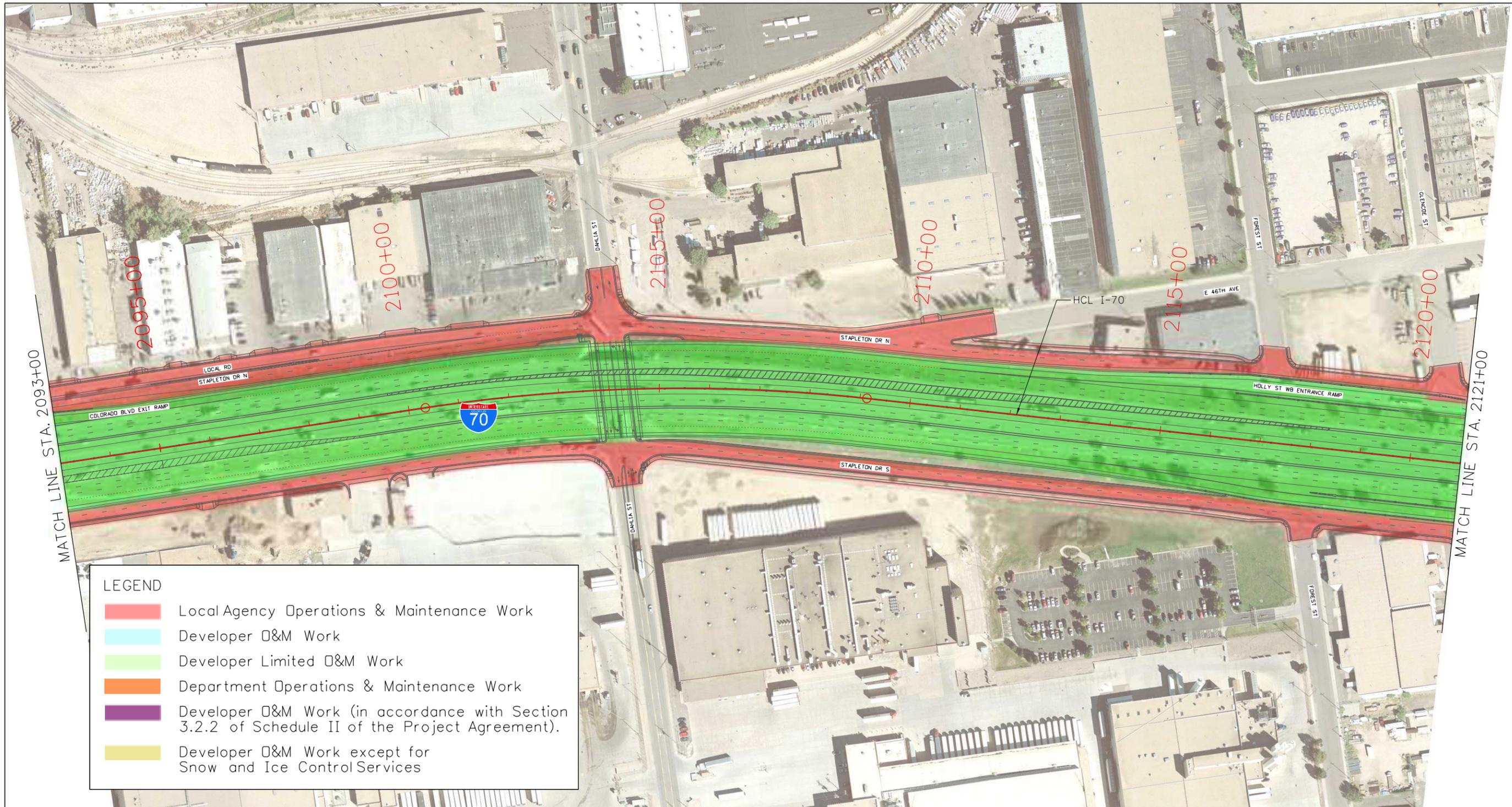
MATCH LINE STA. 2093+00



**CENTRAL 70  
OPERATIONS PERIOD LIMITS  
STA 2065+00 TO STA 2093+00**

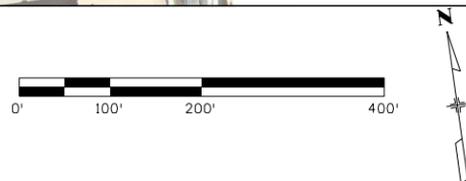
Designer:	KMP	Structure Numbers	-
Detailer:	KMP	Structure Numbers	-
Subset:		Subset Sheets:	of

Project No./Code
FBR 0704-234
19631
Sheet Number <b>0P-7</b>



**LEGEND**

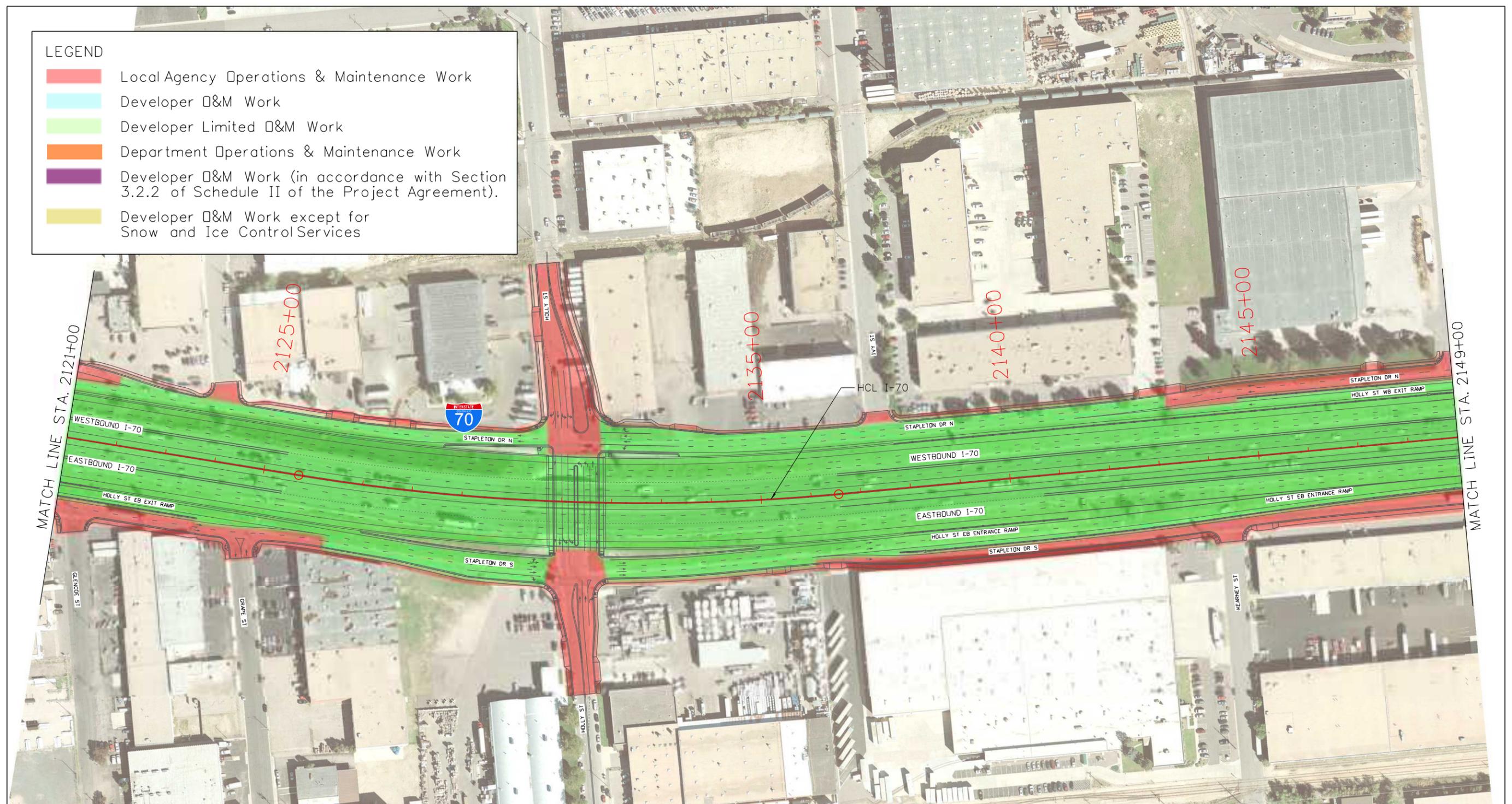
- Local Agency Operations & Maintenance Work
- Developer O&M Work
- Developer Limited O&M Work
- Department Operations & Maintenance Work
- Developer O&M Work (in accordance with Section 3.2.2 of Schedule II of the Project Agreement).
- Developer O&M Work except for Snow and Ice Control Services



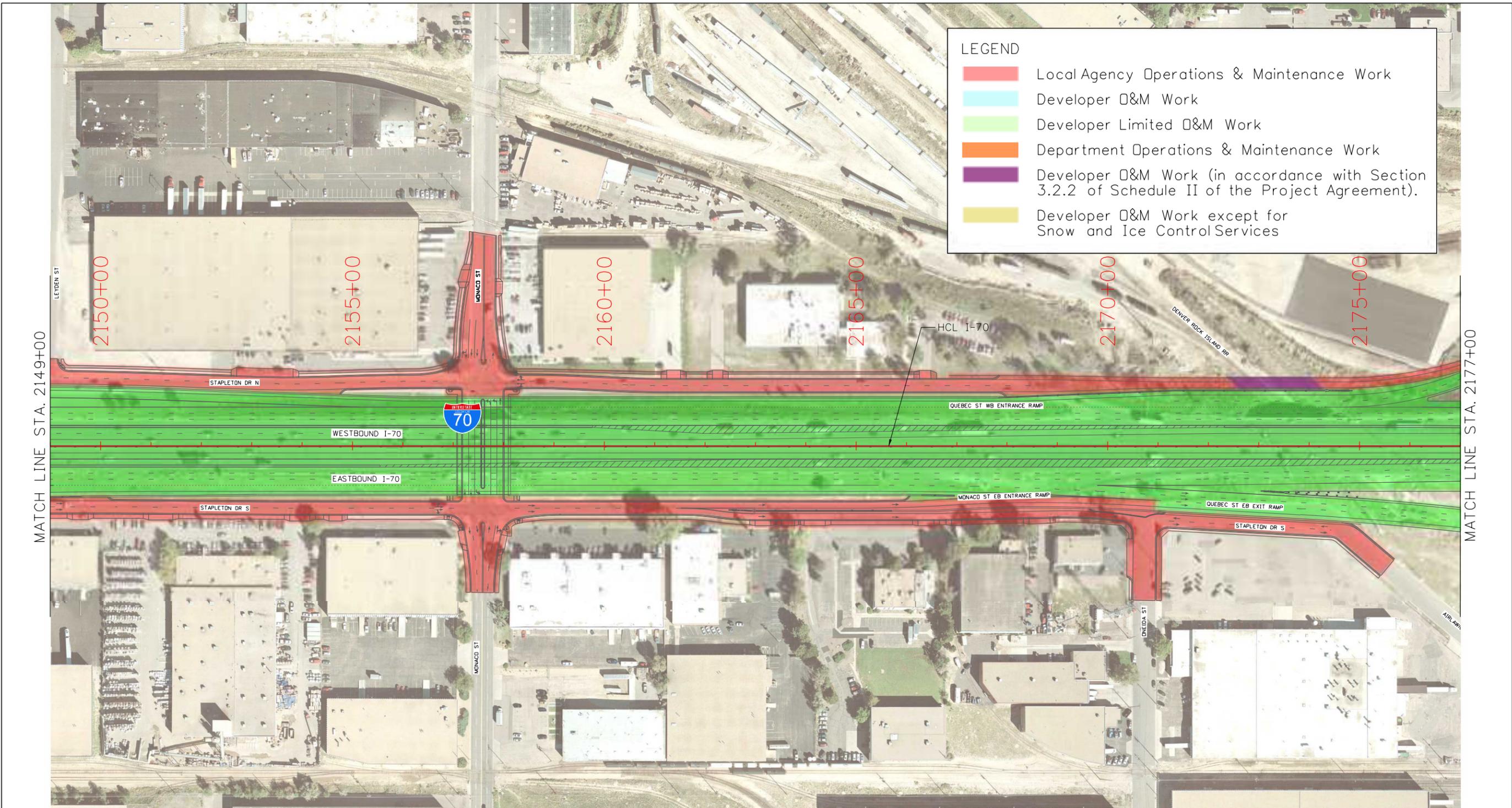
CENTRAL 70 OPERATIONS PERIOD LIMITS STA 2093+00 TO STA 2121+00			Project No./Code
			FBR 0704-234
Designer:	KMP	Structure	-
Detailer:	KMP	Numbers	-
Subset:		Subset Sheets:	of
			Sheet Number OP-8

**LEGEND**

- Local Agency Operations & Maintenance Work
- Developer O&M Work
- Developer Limited O&M Work
- Department Operations & Maintenance Work
- Developer O&M Work (in accordance with Section 3.2.2 of Schedule II of the Project Agreement).
- Developer O&M Work except for Snow and Ice Control Services



CENTRAL 70 OPERATIONS PERIOD LIMITS STA 2121+00 TO STA 2149+00			Project No./Code FBR 0704-234
Designer: KMP	Structure Numbers: -	19631	
Detailer: KMP	Structure Numbers: -	Sheet Number OP-9	
Subset:	Subset Sheets: of		

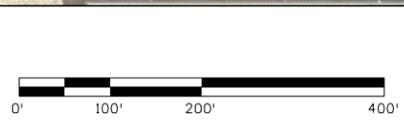


**LEGEND**

- Local Agency Operations & Maintenance Work
- Developer D&M Work
- Developer Limited D&M Work
- Department Operations & Maintenance Work
- Developer D&M Work (in accordance with Section 3.2.2 of Schedule II of the Project Agreement).
- Developer D&M Work except for Snow and Ice Control Services

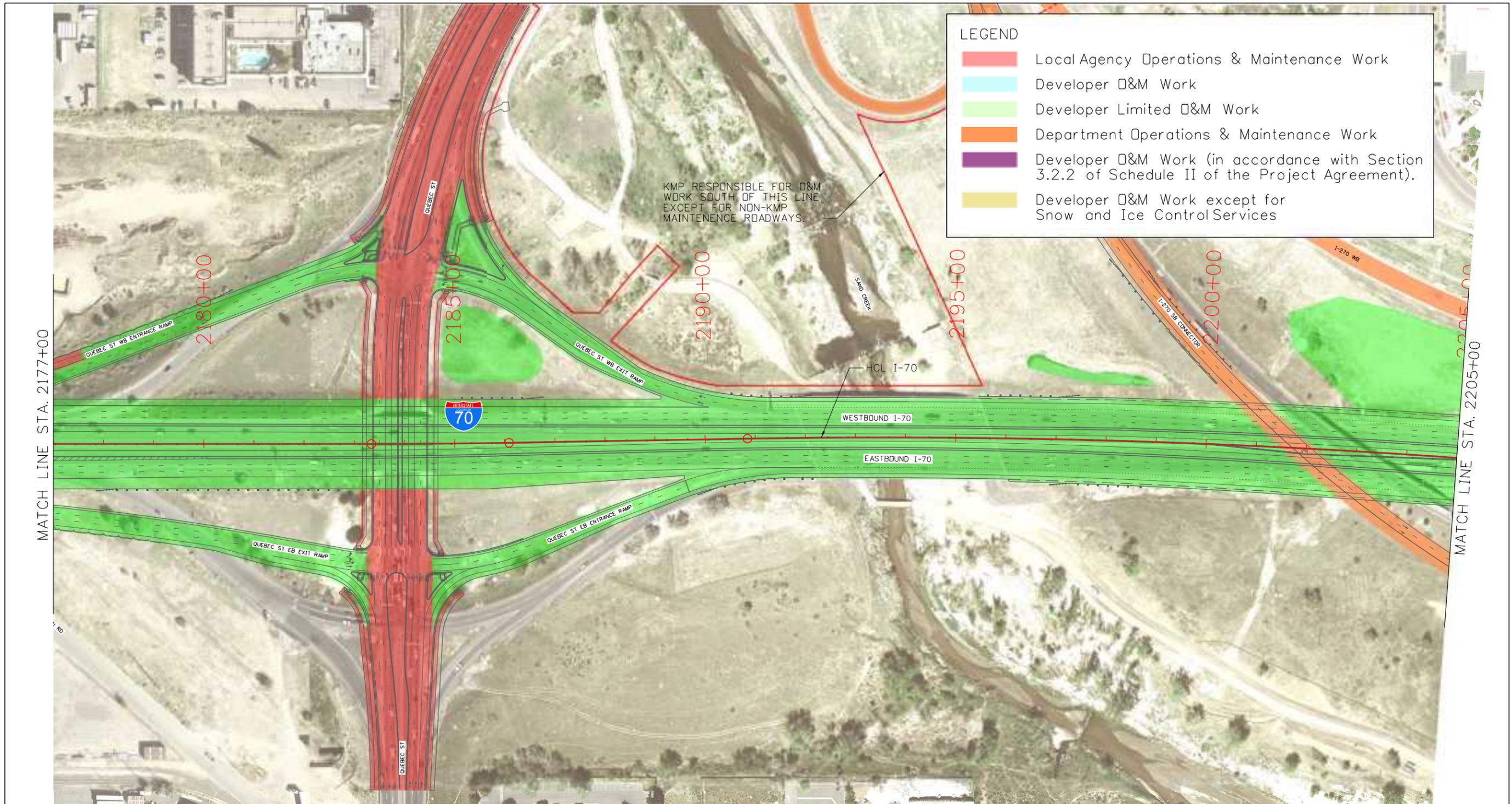
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MATCH LINE STA. 2177+00



CENTRAL 70 OPERATIONS PERIOD LIMITS STA 2149+00 TO STA 2177+00			
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Detailer:	KMP	Structure Numbers	-
Subset:		Subset Sheets:	of

Project No./Code	FBR 0704-234
	19631
Sheet Number	OP-10



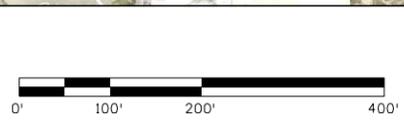
**LEGEND**

- Local Agency Operations & Maintenance Work
- Developer O&M Work
- Developer Limited O&M Work
- Department Operations & Maintenance Work
- Developer O&M Work (in accordance with Section 3.2.2 of Schedule II of the Project Agreement).
- Developer O&M Work except for Snow and Ice Control Services

KMP RESPONSIBLE FOR O&M WORK SOUTH OF THIS LINE EXCEPT FOR NON-KMP MAINTENANCE ROADWAYS.

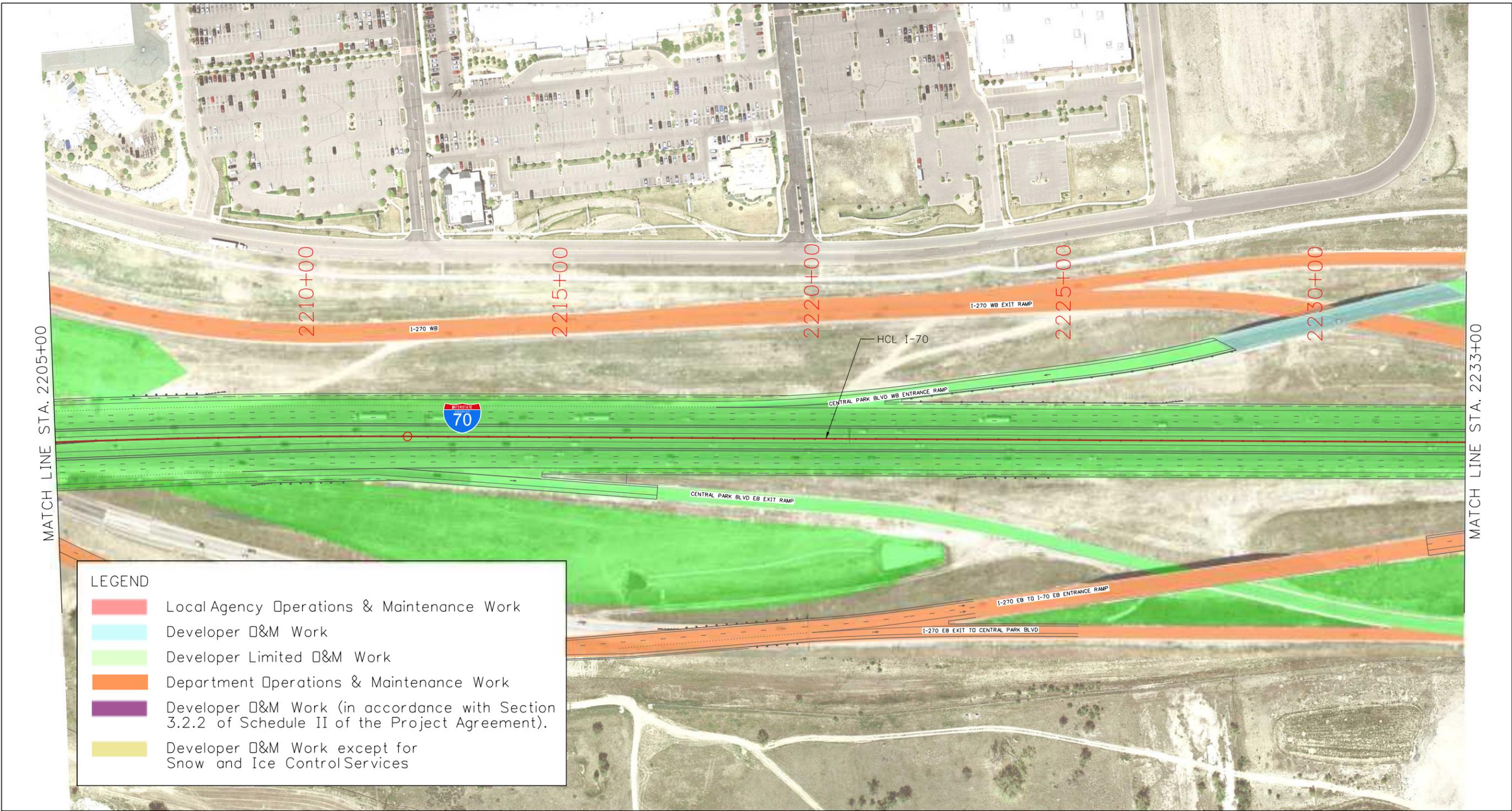
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MATCH LINE STA. 2205+00



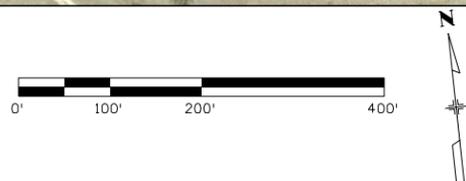
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Subset:		Subset Sheets:	of

Project No./Code	FBR 0704-234
	19631
Sheet Number	OP-11



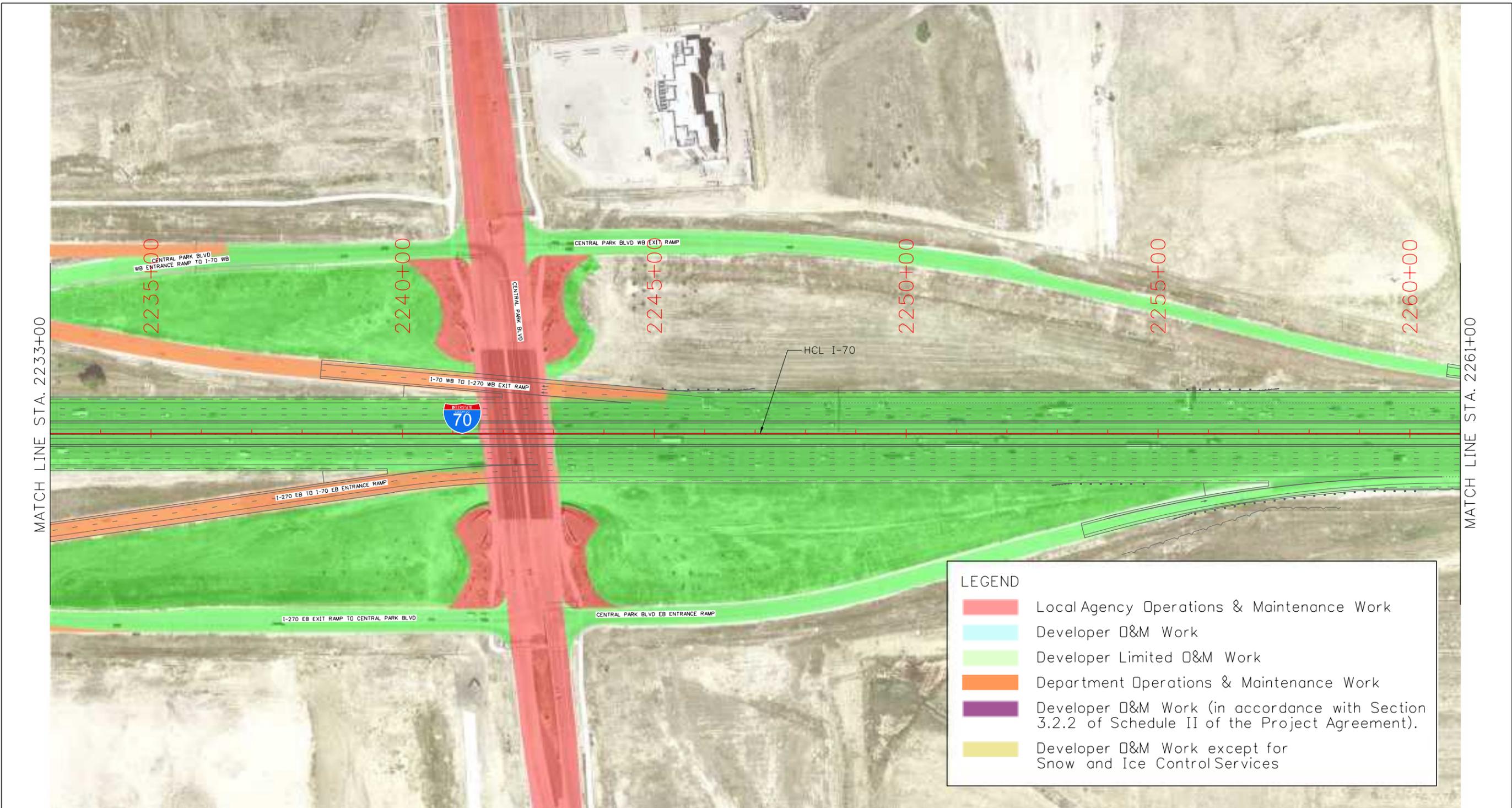
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<span style="color: cyan;">█</span>	Developer O&M Work
<span style="color: lightgreen;">█</span>	Developer Limited O&M Work
<span style="color: orange;">█</span>	Department Operations & Maintenance Work
<span style="color: purple;">█</span>	Developer O&M Work (in accordance with Section 3.2.2 of Schedule II of the Project Agreement).
<span style="color: yellow;">█</span>	Developer O&M Work except for Snow and Ice Control Services



CENTRAL 70 OPERATIONS PERIOD LIMITS STA 2205+00 TO STA 2233+00			Project No./Code
			FBR 0704-234
Designer:	KMP	Structure	-
Detailer:	KMP	Numbers	-
Subset:		Subset Sheets:	of
			Sheet Number OP-12

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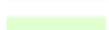


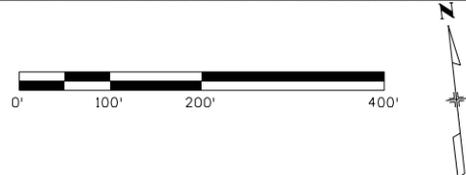
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Designer:	KMP	Structure	-
Detailer:	KMP	Numbers	-
Subset:		Subset Sheets:	of

Project No./Code	FBR 0704-234
	19631
Sheet Number	OP-13



**LEGEND**

	Local Agency Operations & Maintenance Work
	Developer O&M Work
	Developer Limited O&M Work
	Department Operations & Maintenance Work
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	Developer O&M Work except for Snow and Ice Control Services

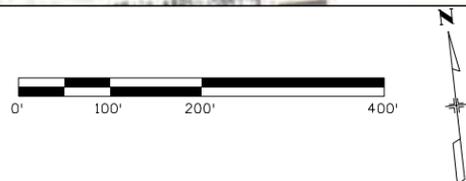


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Detailer: KMP	Subset Sheets:	of	Sheet Number OP-14



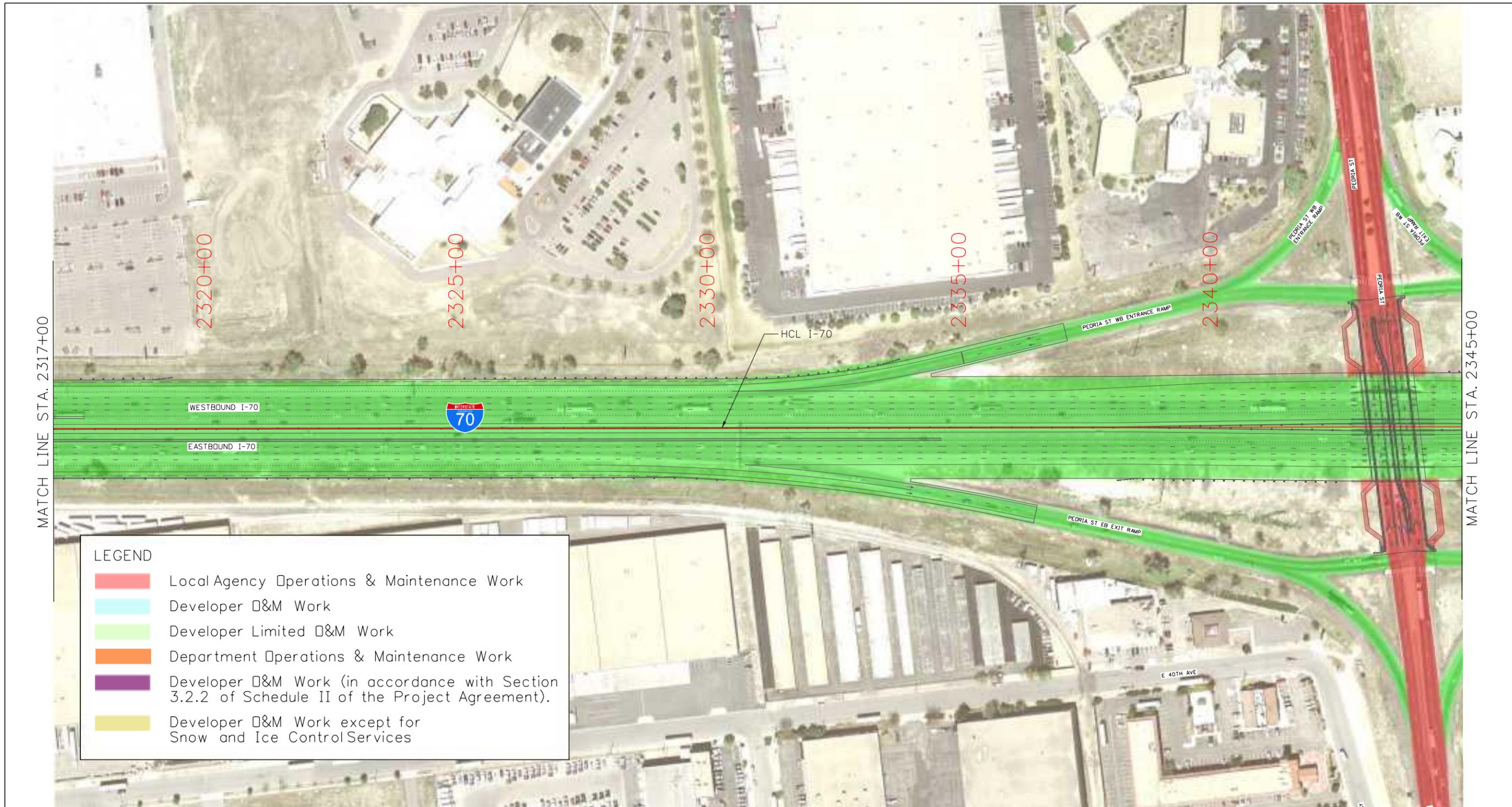
**LEGEND**

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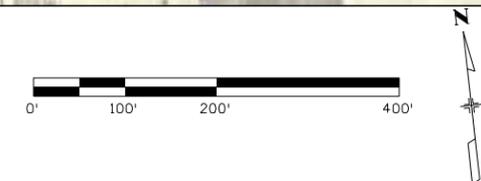
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Designer:	KMP	Structure Numbers	19631
Detailer:	KMP		
Subset:		Subset Sheets: of	Sheet Number OP-15

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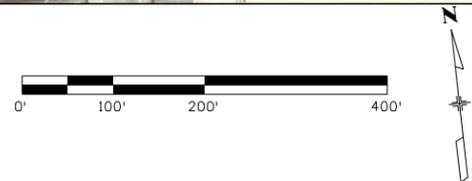
**LEGEND**

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<span style="color: cyan;">■</span>	Developer O&M Work
<span style="color: lightgreen;">■</span>	Developer Limited O&M Work
<span style="color: orange;">■</span>	Department Operations & Maintenance Work
<span style="color: purple;">■</span>	Developer O&M Work (in accordance with Section 3.2.2 of Schedule II of the Project Agreement).
<span style="color: yellow;">■</span>	Developer O&M Work except for Snow and Ice Control Services



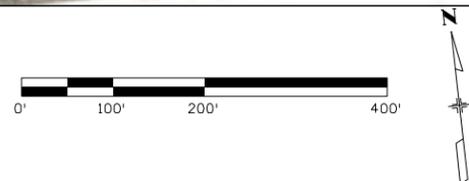
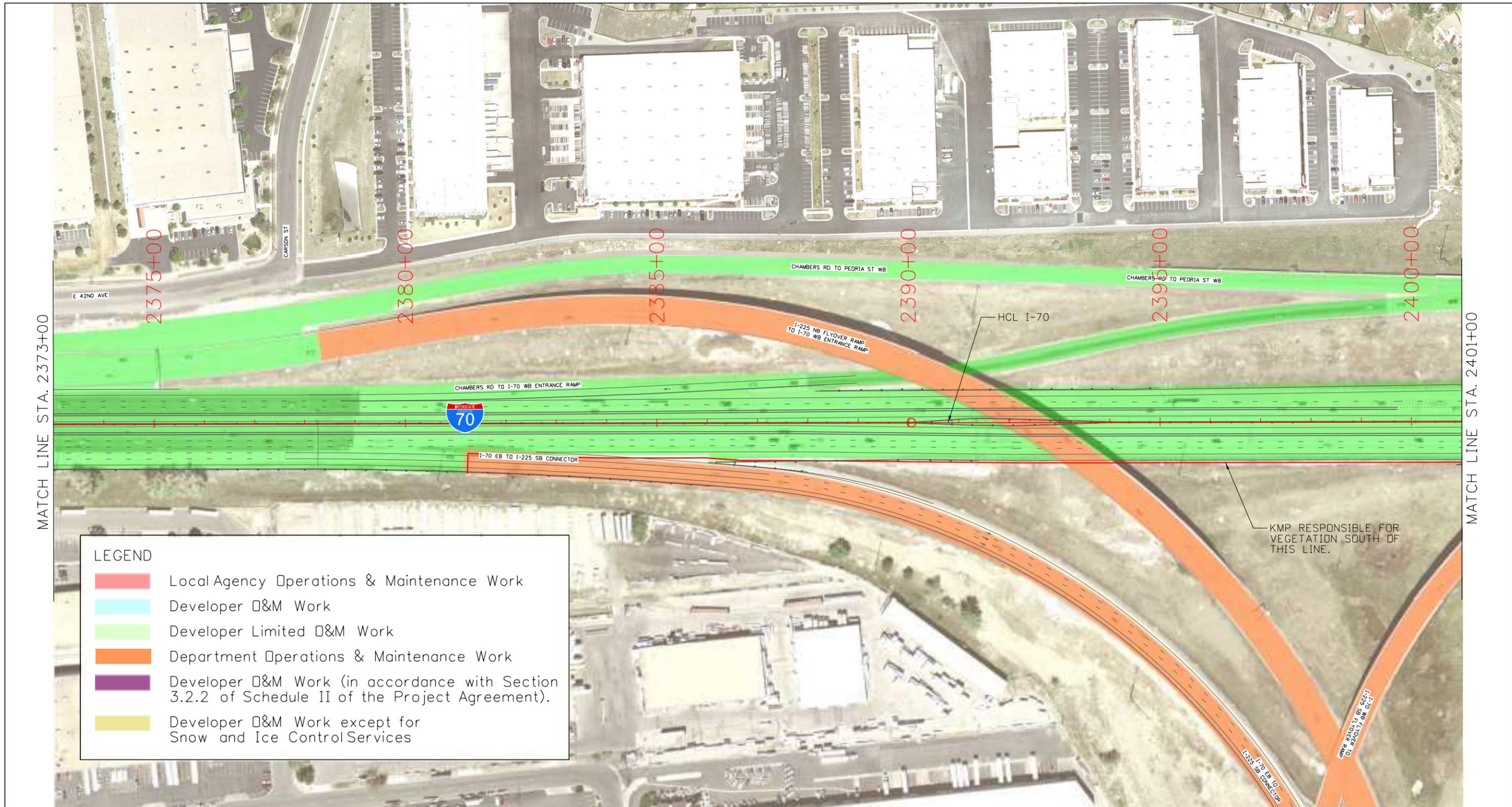
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			FBR 0704-234
Designer:	KMP	Structure Numbers	19631
Detailer:	KMP	Structure Numbers	
Subset:		Subset Sheets: of	Sheet Number OP-16

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CENTRAL 70 OPERATIONS PERIOD LIMITS STA 2345+00 TO STA 2373+00			
Designer:	KMP	Structure	-
Detailer:	KMP	Numbers	-
Subset:		Subset Sheets:	of

Project No./Code	FBR 0704-234
	19631
Sheet Number	OP-17



CENTRAL 70 OPERATIONS PERIOD LIMITS STA 2373+00 TO STA 2401+00			Project No./Code
			FBR 0704-234
Designer:	KMP	Structure Numbers	19631
Detailer:	KMP		
Subset:		Subset Sheets: of	Sheet Number OP-18

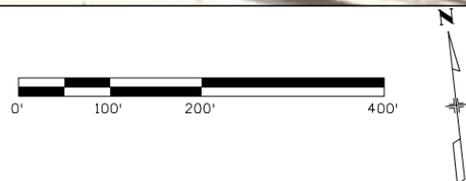


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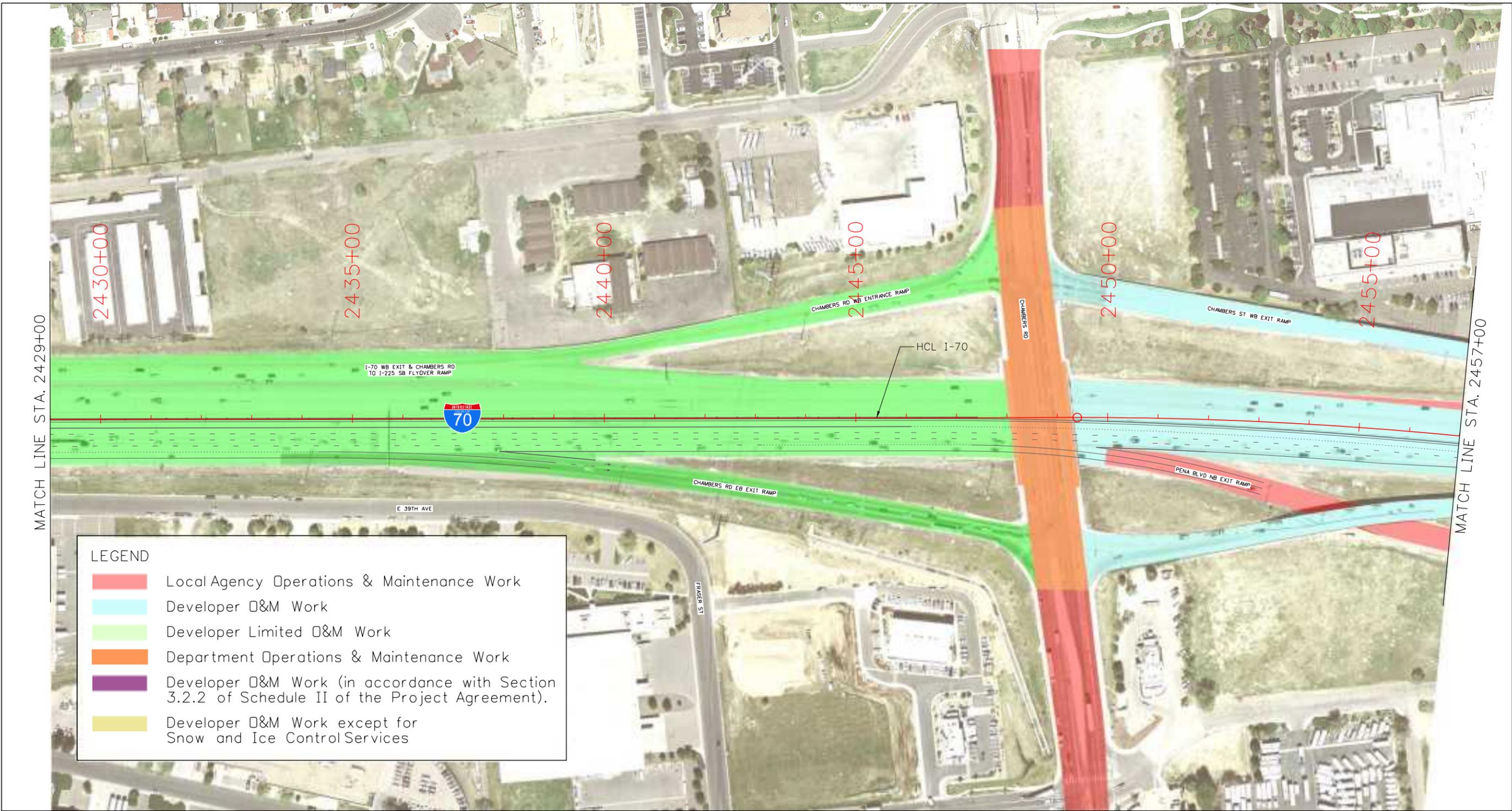
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**LEGEND**

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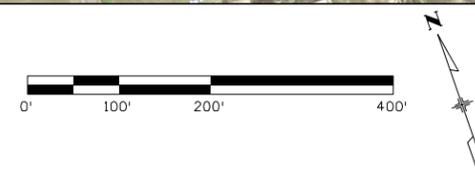


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Designer:	KMP	Structure	-
Detailer:	KMP	Numbers	-
Subset:		Subset Sheets:	of
			Sheet Number 0P-19



CENTRAL 70 OPERATIONS PERIOD LIMITS STA 2429+00 TO STA 2457+00		
Designer:	KMP	Structure Numbers
Detailer:	KMP	Numbers
Subset:	Subset Sheets:	of

Project No./Code	FBR 0704-234
19631	
Sheet Number	OP-20



CENTRAL 70 OPERATIONS PERIOD LIMITS STA 2457+00 TO STA 2485+00			Project No./Code FBR 0704-234
Designer: KMP	Structure Numbers	-	19631
Detailer: KMP	Subset Sheets:	of	Sheet Number OP-21

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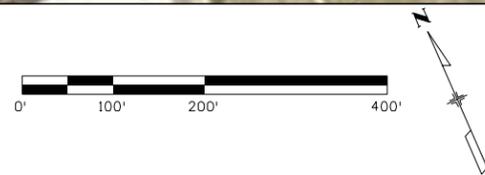


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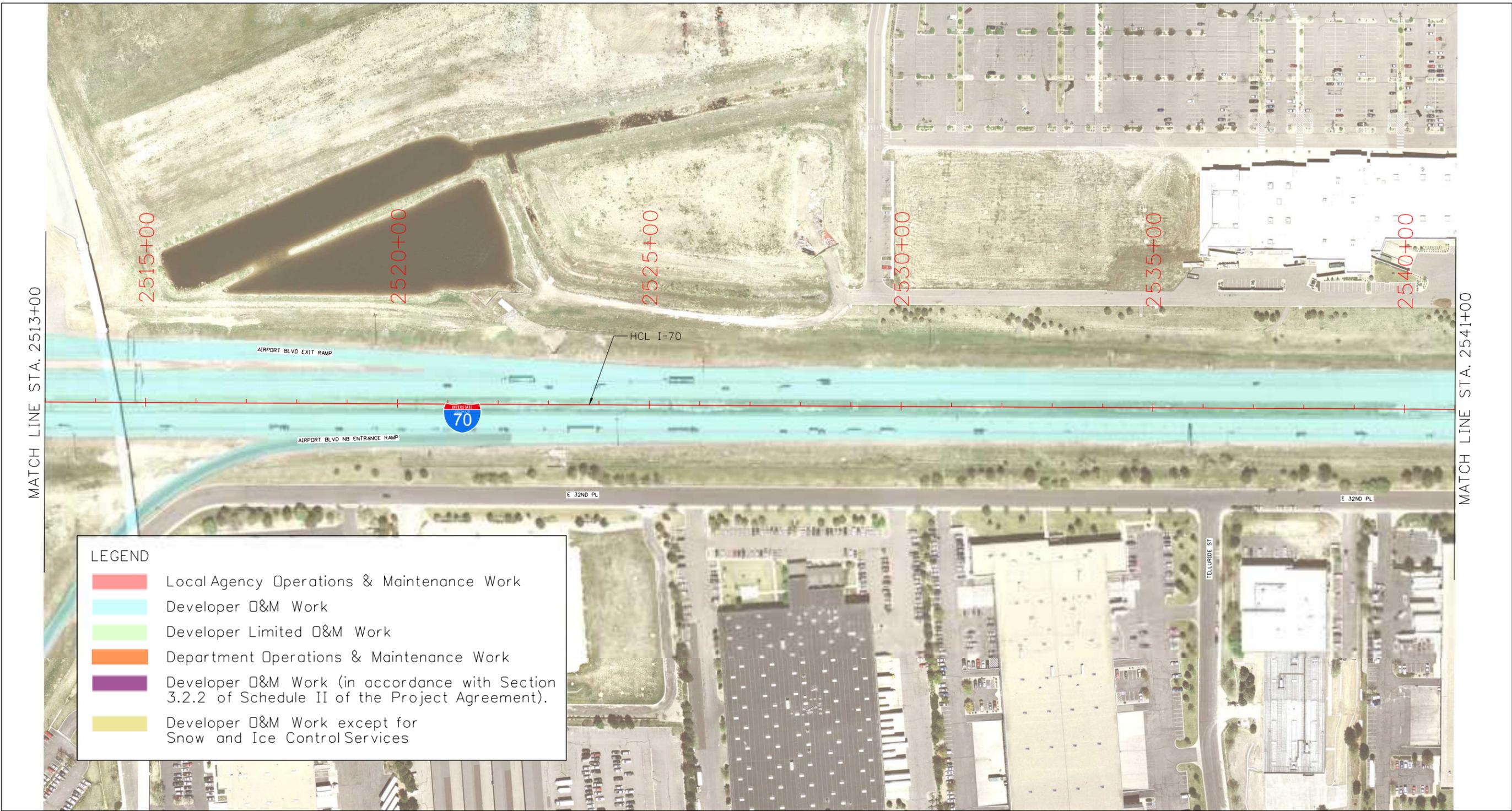
MATCH LINE STA. 2513+00

**LEGEND**

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CENTRAL 70 OPERATIONS PERIOD LIMITS STA 2485+00 TO STA 2513+00			Project No./Code
			FBR 0704-234
Designer:	KMP	Structure	-
Detailer:	KMP	Numbers	-
Subset:		Subset Sheets:	of
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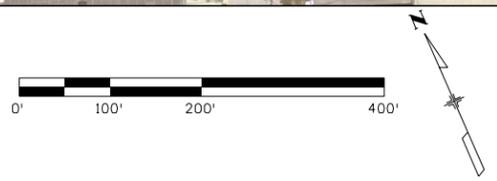


MATCH LINE STA. 2513+00

MATCH LINE STA. 2541+00

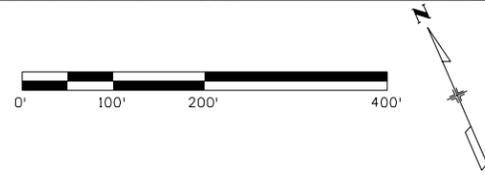
**LEGEND**

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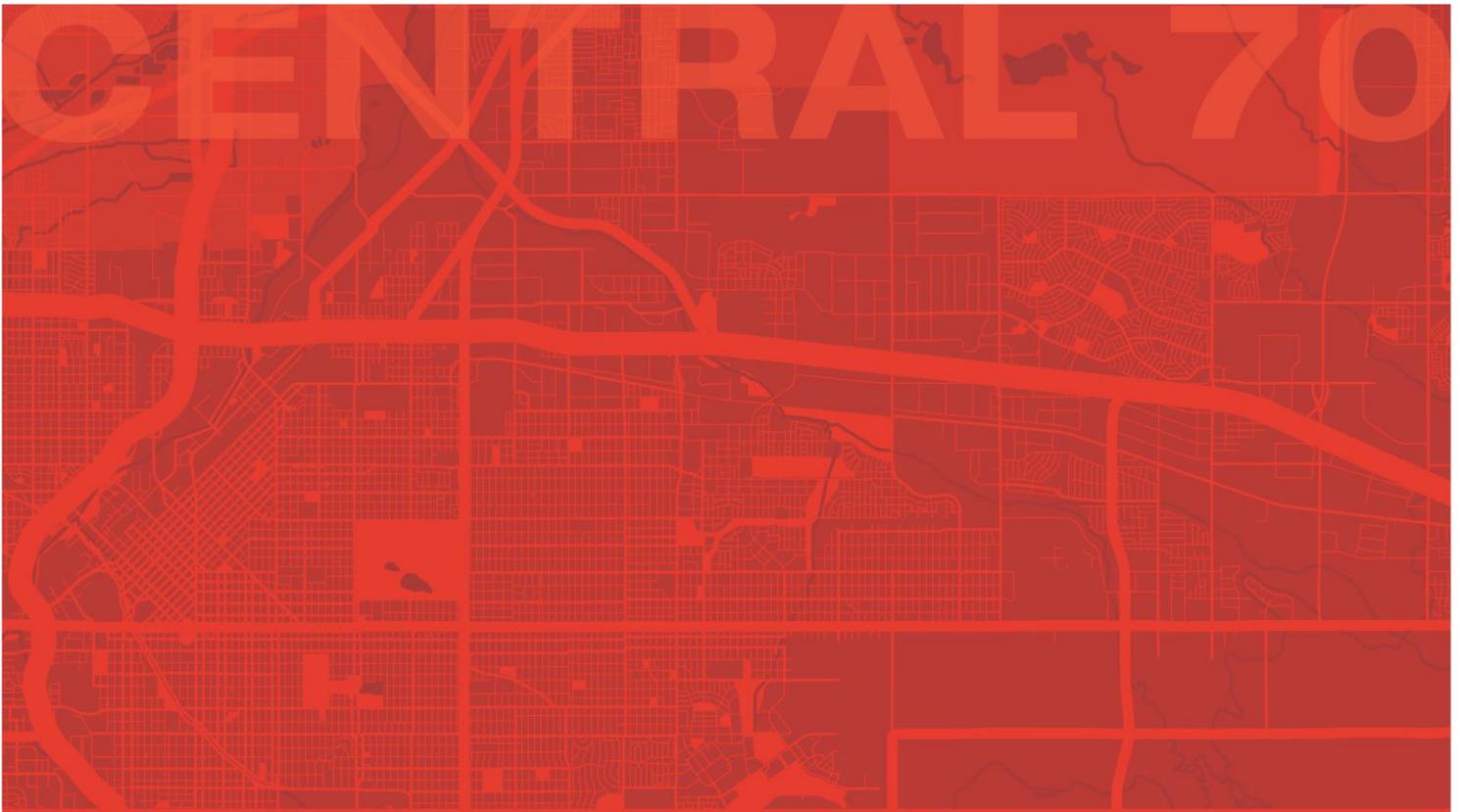
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Designer:	KMP	Structure Numbers	-
Detailer:	KMP	Structure Numbers	-
Subset:		Subset Sheets:	of

Project No./Code	FBR 0704-234
	19631
Sheet Number	OP-23



CENTRAL 70 OPERATIONS PERIOD LIMITS STA 2541+00 TO STA 2570+00		
Designer:	KMP	Structure Numbers
Detailer:	KMP	Numbers
Subset:	Subset Sheets:	of

Project No./Code	FBR 0704-234
19631	
Sheet Number	OP-24



ATTACHMENT 7

*Relates to Appendix I*



# Schedule 11 Performance Requirements



**SUBMITTED TO:**

Colorado Bridge Enterprise  
High Performance Transportation Enterprise  
c/o Colorado Department of Transportation

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**Appendix A-1 – Performance and Measurement Criteria During Construction**

Unless stated otherwise, Measurement Criteria for pavement related Performance Requirements shall be measured using procedures, techniques and measuring equipment consistent with the Colorado DOT Distress Manual for HMA and PCC Pavements by National Center for Pavement Preservation, Appendix B of the Development of a Pavement Preventative Maintenance Program for the Colorado Department of Transportation, Report No. CDOT-DTD-R- 2004-17 Final Report.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
<b>1. PAVEMENT (ROADWAY, RAMPS, ACCESS ROADS AND OTHER PAVED AREAS)</b>						
1.1	I-70 Mainline, CDOT Roadways, and Local Agency Roadways and connecting structures	Elements to be free from obstructions and debris.	1 hr	N/A	Visual Inspection	No obstructions or debris noted by visual inspection.
1.2	Pavement - All roadways, including ramps, detours, and shoulders (mainline including the bridge deck, covers, gratings, frames, expansion joints and boxes)	Smooth and quiet surface course with adequate skid resistance and free from Defects.	2 hrs	12 mo.	<p><b>a) Localized deficiencies -</b> Physical measurement.</p> <p><b>b) Faulting</b></p> <p><b>c) Lane to lane, and lane to shoulder drop-off -</b> Physical measurement</p> <p><b>d) Instances of pavement failures-</b> Visual Inspection of roadway surfacing</p> <p><b>e) Edge drop-offs</b> Physical measurement of edge drop-off level to adjacent surface</p>	<p>Maintain or exceed condition as identified in the BACR.</p> <p>Maintain or exceed condition as identified in the BACR.</p> <p>No instances of drop-off greater than 1.0 inch.</p> <p>No instances of failure, including potholes, greater than 1.0 sq-ft and 1.5 inch in depth. No instances of base failures, punch-out's and jointed concrete pavement failures.</p> <p>Maintained roadway (including shoulder) free from instances greater than 2".</p>

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
1.3	Pavement - All roadways, including ramps, detours, and shoulders (mainline including the bridge deck, covers, gratings, frames, expansion joints and boxes)	Removal of deleterious material and repair of damaged pavement.	12 hrs	N/A.	Oil, antifreeze, gasoline or other liquids spilled from vehicles onto traffic lanes is removed from the roadway.	Incident logs and maintenance records demonstrate scheduled inspections and clean up times.
1.4	Crossovers, access roads and other paved areas	Elements are free of Defects.	12 hrs	12 mo.	Measurement of potholes and base failures.	No instances of potholes or base failures.
1.5	Curbs	Maintain or exceed the condition as identified in the BACR.	7 days	N/A	Visual inspection	Maintain or exceed condition as identified in the BACR.
1.6	Hard Capped Surface	Free of Defects and removal of deleterious material.	24 hrs	6 mo.	Visual inspection	No instances of material tracking onto pavements or presence of weeds/grass.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
<b>2. DRAINAGE SYSTEMS</b>						
2.1	Storm Sewer Systems (conduit, catch basins, inlets, manholes, outfalls), including adjacent drainage conduit extending from an existing drainage structure to the next downstream existing drainage structure	Each element of the drainage system is maintained to ensure it functions correctly from the point at which water drains to the outfall or drainage way.	2 hrs	N/A	Compliance with the CDOT Level of Service Manual (Drainage Inlets and Structures).  Measurement of clogging of pipes, conduits, catch basins, inlets, or outfalls.	Maintain or exceed condition as identified in the BACR.
2.2	Open Water Carriers (standard roadside ditches, median ditches, relocated channels, channel linings)	Each Element of the drainage system is maintained to ensure it functions correctly.	24 hrs	N/A	Visual inspection and all elements rated in accordance with the CDOT Level of Service Manual (Drainage Ditches).	Maintain or exceed condition as identified in the BACR.  No instances of: Undermining, undercutting, erosion, or obstructions impeding the flow of water

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
2.3	Pavement Drainage (trench drains, slotted drains, gutters, catch basins, inlets, outlets)	Each element of the drainage system is maintained to ensure that it functions correctly.	2 hrs	N/A	Measurement of standing water within the I-70 Mainline and on paved surfaces.	Maintain or exceed condition as identified in the BACR.
2.4	Culverts	Culvert is maintained and functions correctly, joints remain soil tight and erosion controlled.	2 hrs	N/A.	Culvert condition and functionality.	Culvert functioning as designed.
2.5	End Treatments (Headwalls, precast reinforced concrete outlets, concrete apron)	Elements are maintained and function correctly.	24 hrs	N/A	Visual inspection of erosion, undercutting, scour, cracked, spalled, or broken concrete.	Maintain or exceed condition as identified in the BACR.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
2.6	Storm water systems	Storm water systems installed as permanent features maintained, functioning correctly, and operating as designed.	24 hrs	N/A	<p>Compliance with regulations and standards and in accordance with CDOT's Erosion Control and Storm Water Quality Guide (ECSQG).</p> <p><b>Manufactured Systems:</b> Compliance with manufacturers manuals</p> <p><b>Vegetated Biofilters/Filter Strips:</b> Inspection of slopes and ditch bottom; vegetation management; debris and litter management.</p> <p><b>Detention Ponds:</b> Inspected and checked for compliance with management plan.</p> <p><b>Bioretention Cell, Infiltration:</b> Inspected for excessive ponding; overgrown vegetation, litter/debris; erosion and deposition; and outlet structure clogging</p> <p><b>Infiltration Basin/Trenches:</b> Inspected for debris, overgrown vegetation, level of sedimentation; and condition of observation wells.</p> <p><b>Constructed Wetlands:</b> Effectiveness of vegetation management; absence of erosion, clogging; litter/debris and sediment.</p>	<p>Operate as designed and no instances of non-compliance with regulations and standards and ECSQG.</p> <p>Operate as designed and routine clean-out, removed material sampled and tested in line with manufacturers manuals</p> <p>Filters performing as designed.</p> <p>All systems operate as designed and no instances of excessive ponding, threats to structural soundness of embankments and outlet structures; excessive erosion and sediment, seepage from embankments, overgrown vegetation, outlet clogging or litter/debris.</p>

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
2.7	Discharge systems	Surface water discharge systems perform their proper function and discharge to groundwater and waterways complies with the relevant regulations and permits.	24 hrs	N/A	Compliance with regulations and in accordance with CDOT's Erosion Control and Storm Water Quality Guide.	No instances of non-compliance.
<b>3. STRUCTURES</b>						
3.1	Structures having an opening measured along the center of the roadway of more than 20 feet between under copings of abutments or springlines of arches or extreme ends of openings or multiple boxes.	Substructures and superstructures are free of: <ul style="list-style-type: none"> <li>• undesirable vegetation</li> <li>• debris and bird droppings</li> <li>• blocked drains, weep pipes manholes and chambers</li> <li>• blocked drainage holes in structural components</li> <li>• Defects in joint sealants</li> <li>• Defects in pedestrian protection measure</li> <li>• scour damage</li> <li>• corrosion of rebar</li> <li>• paint system failures</li> <li>• impact damage</li> </ul> Bridge structures maintain a minimum vertical clearance of 16.5 feet over traveled lanes. Maintain structures to specified condition rating.	24hrs	6 mo.	Inspection and assessment in accordance with the requirements of federal National Bridge Inspection Standards (NBIS) of the Code of Federal Regulations, 23 Highways – Part 650, the current version of the CDOT Pontis Bridge Inspection Coding Guide and AASHTO Manual for Bridge Evaluation, the FHWA Bridge Inspector Reference Manual, AASHTO Manual for Bridge Element Inspection, and Recording and Coding Guide for the Structural Inventory and Appraisal of the Nation's Bridges.	Records as required in the current version of the CDOT Pontis Bridge Inspection Coding Guide and AASHTO Manual for Bridge Evaluation.  No occurrence of NBI and Pontis condition rating below the BACR condition.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
3.2	Structure component	i) Expansion joints are free of: • dirt debris and vegetation • Defects in drainage systems • loose nuts and bolts • Defects in gaskets • leaking  ii) The deck drainage system is free of all and operates as intended.  iii) Barriers are free of: • loose nuts or bolts • blockages of hollow section drain holes • vegetation • accident damage  iv) Bearings and bearing shelves are clean.	24 hrs	6 mo.	Inspection and assessment in accordance with the requirements of federal National Bridge Inspection Standards (NBIS) of the Code of Federal Regulations, 23 Highways – Part 650, the current version of the CDOT Pontis Bridge Inspection Coding Guide and AASHTO Manual for Bridge Evaluation, the FHWA Bridge Inspector Reference Manual, AASHTO Manual for Bridge Element Inspection, and Recording and Coding Guide for the Structural Inventory and Appraisal of the Nation’s Bridges.	Records as required in the current version of the CDOT Pontis Bridge Inspection Coding Guide and AASHTO Manual for Bridge Evaluation.  No occurrences of NBI and Pontis condition rating below the BACR condition.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
3.2 (cont.)	Structure component (continued)	<p>v) Sliding and roller surfaces are clean and greased to ensure satisfactory performance. Additional advice contained in bearing manufacturers' instructions, in the Current CDOT M&amp;S Standard Plans, Standard Specification for Road and Bridge Construction is followed. Special finishes are clean and perform to the appropriate standards.</p> <p>vi) All non-structural items such as hoists and electrical fixings, operate correctly, are clean and lubricated as appropriate, in accordance with the manufacturer's recommendations and certification of lifting devices are maintained.</p> <p>vii) Maintain structures to specified condition rating.</p>				Maintain or exceed condition as identified in the BACR.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
3.3	Structures (general) – including existing viaduct.	Safe operation of structures, maintained to prevent safety issues arising	1 hr	12 months	Inspection of surfaces adjacent to and above the Roadway, and all structural components.	No instances of delaminated concrete above the Roadway.  Maintain or exceed condition as identified in the BACR.
3.4	Non-bridge class culverts	Non-bridge-class culverts are free of: <ul style="list-style-type: none"> <li>• vegetation and debris and silt</li> <li>• Defects in sealant to movement joints</li> <li>• scour damage</li> </ul>	24 hrs	6 months	Inspection and assessment in accordance with the requirements of federal National Bridge Inspection Standards (NBIS) of the Code of Federal Regulations, 23 Highways – Part 650, the current version of the CDOT Pontis Bridge Inspection Coding Guide and AASHTO Manual for Bridge Evaluation, the FHWA Bridge Inspector Reference Manual, AASHTO Manual for Bridge Element Inspection, and Recording and Coding Guide for the Structural Inventory and Appraisal of the Nation's Bridges.	Records as required in the current version of the CDOT Pontis Bridge Inspection Coding Guide and AASHTO Manual for Bridge Evaluation.  No occurrences of NBI and Pontis condition rating below the BACR condition.  Vegetation, debris and silt levels to be at or lower than that identified in the BACR.  None with Defects in sealant and movement joints.  None with scour damage.
3.5	Retaining walls	Maintain retaining walls free of vertical, lateral or rotational movement with no material Defects compromising the intended performance.	24 hrs	6 months	Physical Measurement and Inspections.	Maintain or exceed condition as identified in the BACR.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
3.6	Sign structures	Sign gantries and foundations are structurally sound and free of: loose nuts and bolts, Defects in surface protection systems	24 hrs	6 months	Inspection and assessment in accordance with the requirements of CDOT Recording and Coding Guide for the Inventory and Inspection of Colorado's Overhead Signs, Signals and High Mast Lights and CDOT M&S Standard Plans.	Maintain or exceed all Pontis condition states as identified in the BACR.  None with loose assemblies.  None with Defects in surface protection.
3.7	Load ratings	All structures maintain the design load capacity	24 hrs	6 months	Load rating calculations in accordance with the AASHTO Manual for Bridge Evaluation, the current version of the CDOT Pontis Bridge Inspection Coding, and CDOT Bridge Rating Manual.  Load restriction requirements as per AASHTO Manual for Bridge Evaluation, the current version of the CDOT Pontis Bridge Inspection Coding, and CDOT Bridge Rating Manual.	Comply with load restrictions on new structures for Colorado legal loads (including legally permitted vehicles)

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat. 2 Permanent Repair	MEASUREMENT CRITERIA*	TARGET*
<b>4. ROADWAY MARKING</b>						
4.1	Pavement markings – General (temporary and permanent)	Pavement markings are: <ul style="list-style-type: none"> <li>• clean and visible during the day and at night</li> <li>• whole and complete and of the correct color, type, width and length</li> <li>• correctly placed to meet the MUTCD and CDOT M&amp;S Standard Plans.</li> </ul> Non-applicable pavement markings are removed.	24 hrs	1 mo.	Compliance with regulations  Using a calibrated retro-reflectometer, in conformance with ASTM E 1710 or AASHTO TP111 procedures, collect the following readings for each day striping work has been conducted or when reading collected: <ul style="list-style-type: none"> <li>• within a mile test section, collect 10 readings for each longitudinal line stripe, at no less than 40 feet intervals</li> <li>• where striping is less than 500 feet in length, collect reading at 50 foot intervals</li> <li>• readings collected shall be averaged. Excess beads to be removed prior to reading</li> </ul> Bridge decks longitudinal lines, words and symbols shall be measured by presence and reflectivity on pavement surface  Removal of non-applicable pavement markings or conflicting pavement markings	100% in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) and the CDOT M&S Standard Plans.  Retro-reflectivity reading in test section (mcd/m <sup>2</sup> /lux): Longitudinal Lines – White 150 Longitudinal Lines – Yellow 100  Measured minimum presence: Longitudinal Lines 80% Words and Symbols 85%  Visual inspection

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
4.2	Reflective markers	Reflective pavement markers (RPM's), are: <ul style="list-style-type: none"> <li>• clean and clearly visible</li> <li>• of the correct color and type</li> <li>• reflective or retroreflective as required in the MUTCD and CDOT M&amp;S Standards</li> <li>• correctly located, aligned and at the correct level</li> <li>• are firmly fixed</li> <li>• are installed in a way that will ensure that they remain at the correct level.</li> </ul>	24 hrs	6 mo.	Number of pavement markers in any 10 consecutive markers that are ineffective. (Ineffective includes missing, nonreflective, broken, damaged, settled or sunk)  Number of pavement marker casting securely fastened (Category 1 Defect)  Uniformity; percentage (replacement RPM's having equivalent physical and performance characteristics to adjacent markers.)	Maintain or exceed condition as identified in the BACR.
4.3	Delineators & Markers	Object markers and delineators are: <ul style="list-style-type: none"> <li>• clean and visible</li> <li>• of the correct color and type</li> <li>• legible and reflective</li> <li>• straight and vertical</li> <li>• placed per MUTCD and CDOT M&amp;S Standards</li> </ul>	2 hrs	28 days	Number of object markers or delineators defective or missing  Sign sheeting material for object markers and delineator shall meet manufacturers minimum reflective requirements	Maintain or exceed condition as identified in the BACR.  100%

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
<b>5. GUARD RAILS, BARRIERS, IMPACT ATTENUATORS</b>						
5.1	Guard rails and barrier walls	All guardrails, traffic barriers and other concrete barriers are maintained free of Defects. They are placed per MUTCD, CDOT's M&S Standards and CDOT's Roadway Design Manual and FHWA Roadside Design Guide.	2 hrs	1 mo.	<p>Length free from Defects (loose nuts/bolts)</p> <p>Surface condition</p> <p>Guardrail installed and maintained at correct height and distance from roadway and obstacle in accordance with relevant standards.</p> <p>Posts</p> <p>Spacer Blocks</p>	<p>All nuts, bolts and connections to be properly tightened</p> <p>90% of surfaces to be free from Defects (spalling of concrete, failure of corrosion protection) within a 12.5 foot section. No Defect greater than 1 foot square or 1 cubic foot of missing material within a 12.5 foot section.</p> <p>100% within 3 inches vertical of correct system height.</p> <p>Vegetation maintained and mowed at least 5 feet behind guardrail.</p> <p>No missing posts. No post shall have section loss greater than 25%, No two adjacent post shall have a combined section loss greater than 25%.</p> <p>No missing spacer or rotated blocks. No section loss greater than 10%.</p>

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
5.2	Impact attenuators, anchor assembly, and end assembly	All impact attenuators, anchor assemblies, and end assemblies are appropriately placed and correctly installed per MUTCD, CDOT's M&S Standards and maintained free of damage.	2 hrs	1 mo.	Percentage of impact attenuators, anchor assemblies, and end assemblies correctly placed and installed and free of damage  Integrity of the system	100%  100% cell replacement (unit replacement) following impact.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
<b>6. SIGNS</b>						
6.1	General– all sign panels	<p>Signs are clean, correctly located, clearly visible, legible, reflective, at the correct height and free from structural and electrical Defects.</p> <p>Identification markers are provided, correctly located, visible, clean and legible.</p> <p>Sign mounting posts are vertical, structurally sound and rust free.</p> <p>Visibility distances meet those stated in the MUTCD and CDOT M&amp;S Standards.</p> <p>Sign information is of the correct size, location, type and wording to meet its intended purpose.</p>	24 hrs	6 mo.	<p>Compliance with regulations</p> <p>Retroreflectivity in accordance with the requirements of MUTCD</p> <p>Face Damage or Blockage</p> <p>Placement</p> <p>Sign information is of the correct size, location, type and wording to meet its intended purpose and requirements of MUTCD M&amp;S Standards, Guide Signing Policies and Procedures Manual, CDOT Sign Design Manual, and Colorado Supplement Signs.</p> <p>Visual Inspection</p>	<p>No missing signs and 100% in accordance with the MUTCD</p> <p>Retroreflectivity is no less than that required by MUTCD.</p> <p>No signs with face damage greater than 10% of area or 0% if text is damaged or fading. No vegetation is impeding sign visibility.</p> <p>Signs are placed in accordance with Requirements of the MUTCD and CDOT M&amp;S Standards</p> <p>100%</p> <p>Post shall be plum.</p>

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
6.2	Safety critical signs	Requirements as 6.1, plus: "Stop," "Yield," "Do Not Enter," "One Way", and "Wrong Way" and all Turn-Prohibition signs are clean, legible and undamaged.	1 hr	7 days	Safety critical signs functionally legible when viewed from a vehicle travelling at posted speed  Sign mounting posts and multi-Post breakaway installed and maintained per CDOT and/or CCD requirements.	No instances of signs functionally illegible (no twisting or leaning).  All connections shall be free from Defects and free from debris or material that would impede function.
6.3	Obsolete, illegal or obscene signs, banners, flags, or posters	Removed from the Project	2 hr	N/A	Time for obsolete, illegal or obscene signs to be removed	100% compliance
<b>7. Traffic Signals</b>						
7.1	Traffic Signals - General	Traffic Signals and their associated equipment are:  .Be clean and visible, heads and buttons correctly aligned and operational  .All traffic signal elements including cabinets, foundations, signing, vehicle detection (cameras or loops), electrical power	1 hr	6 mo.	Review of Maintenance records  <b>a) General condition</b> Visual inspection  <b>b) Damage</b> Visual inspection  <b>c) Standards</b> Adhere to MUTCD and CCD	Maintained in accordance with Good Industry Practice  Signals are clean and visible 100% of the time  All signals are in compliance with MUTCD and CCD Standards.  All signals are fully operational 100% of

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
		and boxes: are aligned correctly, structurally sound, full operational and free from damage caused by accident or vandalism			Standards	the time.  Signals and signal elements are undamaged 100% of the time  Electrical power 100% of the time  Signal interconnect is fully functionally for permanent signals.
7.2	Traffic Signals Operations	Compliance with Accepted Temporary TCP	1 hr	1 mo.	Visual Inspection	100% of the time per Section 2.11 of Schedule 10.
7.3	Traffic Signals – Contingency	Contingency plans are in place to rectify Category 1 Defects not immediately repairable to assure alternative traffic control is provided during a period of failure.	NA	1 mo.	<b>Contingency Plan</b> Record Reviews	Full contingency plans are in place 100% of the time.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
<b>8. Lighting</b>						
8.1	Existing Roadway Lighting – General	All lighting is free from Defects and provides acceptable uniform lighting quality.  Lanterns are clean and correctly positioned.	24hr	NA	Visual inspection and reporting log listing the following as a minimum:  1. Issue (e.g. inefficiencies, malfunction, cleanliness, etc.) 2. date and time of issue occurrence 3. date and time of report 4. reporting person 5. date and time of issue resolution	Written notification of outdoor lightning outage or repair requirement to Xcel Energy and Department, and reporting on a log 100% of time.
8.2	Existing Lighting Structures	Columns are upright correctly founded and structurally sound.	24 hrs	NA	Visual inspection and reporting log as per Ref.8.1 in this <u>Appendix A-1</u> .	Written notification of outdoor lightning repair requirement to Xcel Energy and Department, and reporting on a log 100% of time.  Structure is plumb.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
8.3	Existing Lighting Fixtures	All luminaries functioning on each pole	24 hrs	NA	Visual inspection and reporting log as per Ref. 8.1 in this <u>Appendix A-1</u> .	Written notification of outdoor lightning repair requirement to Xcel Energy and Department, and reporting on a log 100% of time.
8.4	Temporary Lighting- General, including pedestrian lighting	All lighting is free from Defects and provides acceptable uniform lighting quality.  Lanterns are clean and correctly positioned.	24 hrs	14 days	Visual inspection and reporting log as per Ref.8.1 in this <u>Appendix A-1</u> .	Level as per required in <u>Section 2</u> of <u>Schedule 10</u> .
8.5	Temporary Lighting Structures, including pedestrian lighting	Columns are upright correctly founded and structurally sound	24 hrs	14 days	Visual inspection and reporting log as per Ref.8.1 in this <u>Appendix A-1</u> .  Structure is plumb.	Columns are plumb, bases are not damaged and np section loss.  No hazard with wiring and loos assemblies to public.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
8.6	Temporary Lighting Fixtures, including pedestrian lighting	All luminaries functioning on each pole	24 hrs	14 days	Visual inspection and reporting log as per Ref. 8.1 in this <u>Appendix A-1</u> .	Lighting levels per <u>Section 2</u> of <u>Schedule 10</u> .  No instances of three consecutive lamps not working per circuit.  No instances of two or more lamps not working per high mast pole.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
<b>9. FENCES AND WALLS</b>						
9.1	Fences and Walls - Design and Location	Fences and walls act as designed and serve the purpose for which they were intended	1 hr	6 mo.	Visual Inspection	Maintain or exceed condition as identified in the BACR.
9.2	Fences and Walls - Construction (includes existing)	Integrity and structural condition of the fence is maintained	1 hr	6 mo.	Structural assessment if visual inspection warrants.	Maintain or exceed condition as identified in the BACR, and ensuring there are no structural safety issues.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
<b>10. ROADSIDE</b>						
10.1	Vegetated Areas - Except landscaped areas – General  (for areas that are not undergoing active construction)	Vegetation is maintained so that: <ul style="list-style-type: none"> <li>i. Height of grass and weeds is kept within the limits described for urban and rural areas. Mowing begins before vegetation reaches the maximum height.</li> <li>ii. Spot mowing at intersections, ramps or other areas maintains visibility of appurtenances and sight distance.</li> <li>iii. Grass or vegetation does not encroach into or on paved shoulders, main lanes, sidewalks, islands, riprap, traffic barrier or curbs.</li> </ul>	48 hrs	28 days	<b>Urban areas</b> Physical measurement of height of grass and weeds  <b>Encroachment</b> Visual inspection of instances of encroachment of vegetation  <b>Wildflowers</b> Visual Inspection with audit of process  <b>Sight lines</b> Visual inspection  <b>Noxious weeds</b> Visual inspection and/or notification	Individual measurement areas to have 80% of height of grass and weeds between 8” to 10”, and not shorter than 6”  Occurrences of vegetation encroachment shall not exceed the condition identified in the BACR.  Maintain or exceed the condition identified in the BACR.  No instances of impairment of sight lines or sight distance to signs, including control of weeds in pavement and barrier. No blocked view of roadside reflectors  Not more than 15% (aggregate) of a 1 mile section of roadway contains noxious weeds.  Not more than 15% (aggregate) of a 1/10 mile section of ramp contains noxious weeds.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
10.1 (cont.)		iv. A herbicide program is undertaken to control noxious weeds in accordance with the EO D 006 99.  v. Development and implementation of noxious weed management program to control noxious weeds and to eliminate grass in pavement or concrete.  Avoid mowing zone 2 and 3 between April 15 <sup>th</sup> and August 15, as required in Manual of Maintenance Procedures.				

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
10.2	Landscaped Areas  (for areas that are not undergoing active construction)	i. All landscaped areas are maintained to their originally constructed condition. Landscaped areas are as designated in the plans.  ii. Mowing, litter pickup, irrigation system maintenance and operation, plant maintenance, pruning, insect, disease and pest control, fertilization, mulching, bed maintenance, watering is undertaken as per MMP.	48 hrs	28 days	Visual inspection Roadside appearance is excellent, characterized by well-tended landscaping and vegetation.	The percent of landscaping area meeting the General Requirement is 85%.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
10.2 (cont.)	Landscaped Areas	iii. The height of grass and weeds is kept between 8" to 10", and not shorter than 6". Mowing begins before vegetation reaches a hazardous condition, such as sight distance, blocking reflectors, hiding animals or causing drifting snow.  iv. Damaged or dead vegetation is replaced.				
10.3	Fire hazards	Fire hazards are controlled	24 hrs	N/A	Instances of dry brush or vegetation forming a fire hazard are removed.	No instances of plant material that is a fire hazard.
10.4	Trees, brush and ornamentals	i) Trees, brush and ornamentals on the right of way, except in established no mow areas, are trimmed in accordance with CDOT standards.  ii) Trees, brush and ornamentals are trimmed to insure they do not interfere with vehicles or sight distance, or inhibit the	24 hrs	28 days	Visual inspection and/or notification	Maintain or exceed the condition identified in the BACR.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
		visibility of signs or shading on the road.  iii) Dead trees, brush, ornamentals and branches are removed. Potentially dangerous trees or limbs are removed.  iv) All undesirable and unplanned trees and vegetation are removed. Diseased trees or limbs are treated or removed by licensed personnel.				
10.5	Wetlands	Wetlands are properly managed, and in accordance with any applicable permit requirements.	48 hrs	N/A	In accordance with applicable permit requirements	Maintain or exceed the condition identified in the BACR.
10.6	Water Quality Ponds	Maintenance of all vegetation within the pond area	24 hrs	28 days	Visual inspection of ponds	Maintained as required per the design

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
<b>11. EARTHWORKS &amp; EMBANKMENTS</b>						
11.1	Slope – Stability	All structural or natural failures of the embankment, cut slopes, and slope and ditch paving on the Site are repaired.	1 hr	6 mo.	Visual inspection by geotechnical specialist and further tests as recommended by the specialist.	Maintain or exceed the condition identified in the BACR.
11.2	Slopes - General	Slopes are maintained in general conformance to the original graded cross-sections.	24 hrs	6 mo.	Areas where replacement of landscaping materials, reseeding and re-vegetation for erosion control purposes and removal and disposal of all eroded materials from the roadway and shoulders are required.	Maintain or exceed the condition identified in the BACR.
<b>12. GRAFFITI</b>						
12.1	Graffiti	Graffiti removal on all Elements including but not limited to: <ul style="list-style-type: none"> <li>• Signs, walls, barriers, guardrail, lighting, traffic signals, structural elements, fence, water quality and drainage features.</li> </ul>	24 hrs	28 days	Removed in a manner and using materials that restore the surface to a like appearance similar to adjoining surfaces.	Inspection records showing 100% compliance

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
12.2	Offensive Graffiti	Offensive graffiti (i.e. graffiti that is insulting or causes offense to the public) is removed	6 hrs	N/A	Removed in a manner and using materials that restore the surface to a like appearance similar to adjoining surfaces. All offensive graffiti is considered a Category 1 Defect.	Inspection records showing 100% compliance
<b>13. INCIDENT RESPONSE</b>						
13.1	General	Respond to Incidents in accordance with the Incident Response Plan.	1 hr	N/A	Incident Response Plan. No complaints from Emergency Services.	Response times met for 98% of Incidents measured on a 1 year rolling basis.
13.2	Spillage of Hazardous Materials	For any hazardous materials spills, comply with the requirements of Schedule 17.	1 hr	1 day	Incident Response Plan details the process and procedures in place and followed.	Inspection records showing compliance.
13.3	Elements damaged as a result of Incident - Structural Assessment	Evaluate damage to structures and liaise with emergency services to ensure safe working in clearing the Incident.	1 hr	1 day	Inspections and surveys of relevant Elements as required.  (Note. CDOT staff bridge office shall be notified immediately to complete an inspection.)	Inspection records showing 100% compliance

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
13.4	Elements damaged as a result of Incident - Temporary and permanent remedy	Propose and implement temporary measures or permanent repairs to Defects arising from the Incident.  Ensure the structural safety of any structures affected by the Incident.	24 hrs	6 mo.	Review and inspection of the relevant Elements.	Inspection records showing 100% compliance.
<b>14. MAINTENANCE YARD<sup>2</sup></b> (The requirements set out in this Section 14 shall apply with effect from the Snow and Ice Control Commencement Date).						
14.1	Developer Identification Signs	Signs installed at the entrance(s)/exit(s) to/from the Maintenance Yard.	7 days	12 mo.	Signs installed depicting the name and contact information for Developer.	Signs functioning as designed.
14.2	Environmental contamination	No increase in contamination.	2 hr	6 mo.	Environmental site assessment or other inspections, as necessary.	No increase in contamination during the O&M Period During Construction.
14.3	Maintenance of grounds and buildings	Kept in a neat and tidy order. Kept structurally safe.	24 hr	6 mo.	Good housekeeping practice used to maintain buildings and land in a well maintained and neat condition, free from environmental damage. Regular inspection performed.	100% compliance

<sup>2</sup> Section 14 only to be included if Preferred Proposer elects to use the Maintenance Yard.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
<b>15. SNOW AND ICE REMOVAL</b>						
15.1	Response Time, material application vehicle	The manning and loading of material application vehicles for a Precipitation Event	½ hr	N/A	All spreading vehicles on any route ready to load anti-icing or de-icing materials within ½ hour as measured by winter operation records and AVL system monitoring.	The required maximum time to complete the manning and loading of all material application vehicles for an event is 0.5 hours from the time precipitation has started.
15.2	Response Time, plowing vehicle	The manning of a snowplow vehicle for a Precipitation Event	½ hr	N/A	All snowplow vehicles on any route have left the yard and ready to begin work within ½ hour as measured by winter operation records and AVL system monitoring.	The required maximum time to complete the manning of all snowplow vehicles for an event is 0.5 hours from the time precipitation has started to the time the unit has left its yard to begin work.
15.3	Plowing and material application	Continuous plowing and material application	½ hr	N/A	All units operating as measured by winter operation records and AVL monitoring systems.	Once operations have begun, all units as identified in the Snow and Ice Control Service Plan shall operate continuously on all routes so that bare and wet pavement is maintained.
15.4	Circuit time	Complete one entire route within 1 hour	1 hr	N/A	AVL systems monitoring and/or winter operation record.	Circuit time shall be 1 hour from the time a winter unit begins its plowing and/or material application route until the time it is complete.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
15.5	All lanes and ramps (including paved shoulders)	Bare and wet pavement during the Precipitation Event	1 hr  24 hr (paved shoulder)	N/A	Visual inspection and AVL system monitoring	Maintain Bare and Wet pavement during the Precipitation Event, or immediately at the End of Precipitation Event (meaning the time when snow or freezing rain stops falling and accumulating on any portion of a Route, when drifting ceases to cause accumulation on the Pavement or when frost is no longer creating a slippery condition) if all equipment listed in the most recently Accepted Snow and Ice Services Plan are continuously deployed.
15.6	Hazards	Address any snow and ice hazard immediately upon detection or notification	1 hr	N/A	Visual inspection, AVL system monitoring, or notification	100% compliance
15.7	Isolated slippery conditions	Address isolated slippery conditions.	1 hr	N/A	Visual inspection, AVL system monitoring, or notification	All isolated slippery conditions as identified by Developer, or notified by Emergency Services, the Department, and/or User are addressed.
15.8	Winter Snow and Ice Materials storage	Winter snow and Ice materials stored in tanks or covered buildings at all times.	½ hr	N/A	Visual inspection.	No instances of uncovered storage of winter de-icing/anti-icing materials or winter maintenance liquids.
15.9	Reporting requirements	All reporting requirements identified in <u>Schedule 11</u> are accurate, complete, and timely 100% of the time.	1 day	N/A	Audit records and AVL system monitoring.	100% accuracy.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
15.10	Automated Vehicle Locator system	All identified vehicles equipped with on board AVL at all times, as required in <u>Section 12</u> of this <u>Schedule 11</u>	24 hrs	1 mo.	Random audit, AVL system monitoring.	95% of all AVL units operational 100% of the time.  No loss of data due to network service loss.
15.11	Material Spreader calibration	Spreader controller (including winter liquids) calibration is operational.	24 hrs	N/A	Random audit, AVL system monitoring	95% units operational 100% of the time
15.12	Winter Drainage	Melting snow and ice causing flooding.	1 hr	6 hrs	Visual inspection, AVL system monitoring	No flooding on roadway caused by snow and/or ice impeding drainage through or to drains, culverts and ditches at the End of Precipitation Event (as defined in REF 15.5 in <u>Appendix A-1</u> ).
<b>16. COURTESY PATROL</b>						
16.1	Courtesy Patrol	Respond to any calls on the General Purpose Lanes or Tolled Express Lanes 15min after being dispatched.	1/4 hr	N/A	Measured by patrol records, and AVL system.	Response times met for 98% of dispatches measured on a 1 year rolling basis.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
<b>17. SWEEPING AND CLEANING</b>						
17.1	Sweeping	i) Keep all channels, lanes, hard shoulders, gore areas, ramps, intersections, islands and frontage roads, and curb and gutter swept clean. ii) Clear and remove debris from all paved areas other than as required in <u>Section 1.1</u> of this <u>Appendix A-1</u> . iii) Remove all sweepings without stockpiling in the right of way and dispose of at approved site.	1 hrs	28 days	Visual Inspection of buildup dirt, ice, rock, debris (from accidents and/or otherwise).	Inspection records showing 100% compliance.
17.2	Litter	i) Keep the Site in a neat condition, remove litter regularly ii) Pick up large litter items before mowing and sweeping operations. iii) Dispose of all litter and debris collected at an approved solid waste site. iv) Remove dead animals from the Site.	24 hrs	28 days	Visual Inspection of pieces of litter.	Inspection records showing 100% compliance

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
17.3	Sweeping	Clear and remove granular and sand material used as deicer or tractive material at the End of Precipitation Event (as defined in item 15.5).	1 hr	48 hrs	Visual Inspection.	Inspection records showing 100% compliance.
<b>18. Cover (Note. The requirements in REF 18.1 to 18.18 of Section 18 (Cover) of Appendix A-2 (Performance and Measurement Criteria After Construction) shall apply to this Section 18 (Cover) of this Appendix A-1 (Performance and Measurement Criteria During Construction) at completion of Milestone 3.)</b>						
18.1 to 18.18	See 'Element' in REF 18.1 to 18.18 in Appendix A-2	See 'General Requirement' in REF 18.1 to 18.18 in Appendix A-2	See 'Cat 1' in REF 18.1 to 18.18 in Appendix A-2	See 'Cat 2' in REF 18.1 to 18.18 in Appendix A-2	See 'Measurement Criteria' in REF 18.1 to 18.18 in Appendix A-2	See 'Target' in REF 18.1 to 18.18 in Appendix A-2

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
<b>19. ITS AND ETC FACILITIES</b>						
19.1	ITS Devices including but not limited to CCTV, microwave vehicle radar detection, road weather information systems, automatic traffic recorders, ramp meters, variable message signs and doppler radar units	Existing equipment shall be maintained to ensure equipment are fully functional and communicating, including but not limited: <ul style="list-style-type: none"> <li>• Equipment are clean;</li> <li>• Defective equipment, fiber or devices are replaced or repaired</li> </ul>	24 hr	1 mo.	Visual inspection and/or as identified by Department	90% of time
19.2	ITS and ETC Equipment (owned by Local Agency or by Department) installed by Developer and Backbone communication	Developer to provide reporting on inefficiencies or malfunction of ITS and ETC equipment, and backbone communication.	4 hrs	24 hrs	ITS and ETC reporting log or records.	100% reporting and follow up reporting on equipment corrections, repairs and connections to communication lines to ETC System Integrator, CTMC, and the Local Agency.

**Appendix A-2 – Performance and Measurement Criteria After Construction**

Unless stated otherwise, Measurement Criteria for pavement related Performance Requirements shall be measured using procedures, techniques and measuring equipment consistent with the Colorado DOT Distress Manual for HMA and PCC Pavements by National Center for Pavement Preservation, Appendix B of the Development of a Pavement Preventative Maintenance Program for the Colorado Department of Transportation, Report No. CDOT-DTD-R- 2004-17 Final Report.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
<b>1. PAVEMENT (ROADWAY, RAMPS, ACCESS ROADS AND OTHER PAVED AREAS)</b>						
1.1	I-70 Mainline, CDOT Roadways, and Local Agency Roadways and connecting structures.	Free from obstructions and debris.	1 hrs	N/A	Visual Inspection	No obstructions or debris noted by visual inspection
1.2	Pavement - All roadways, including ramps, detours, and shoulders, (mainline including the bridge deck, covers, gratings, frames, expansion joints and boxes)	Smooth and quiet surface course with adequate skid resistance and free from Defects.	2 hrs	12 mo.	<p><b>a) Ruts</b>                      Percentage of wheel path length with ruts greater than 0.40 inches in depth.</p> <p>Depth of rut at any spot location.</p> <p><b>b) Ride quality</b>                      Measured International Roughness Index (IRI) calculated according to ASTM E-1926 using equipment meeting AASHTO M-328 and operated in accordance with AASHTO R-57 using equipment verified and operators certified according to AASHTO R-56.</p>	<p>80% of project has ruts less than 0.40 inches.</p> <p>Not greater than 0.55 inches.</p> <p>Throughout 80% of maintained roadway area less than or equal to 95 inches per mile on a contiguous 1/10th mile basis.</p> <p>Throughout 100% of maintained roadway area less than or equal to 160 inches per mile.</p>

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
1.2 (cont.)	Pavement - All roadways, including ramps, detours, and shoulders, (mainline including the bridge deck, covers, gratings, frames, expansion joints and boxes)	Smooth and quiet surface course with adequate skid resistance and free from Defects.	2 hrs	12 mo.	<p>Localized roughness measured as mean IRI to ASTM E 1926 using a continuous 25 foot (7.6 m) base length analysis for each wheelpath. The area 25 feet each side of bridge decks may be deleted from the profile before IRI is determined. This excluded area, including the bridge decks, shall be evaluated for localized roughness.</p> <p><b>c) Instances of Pavement Failures</b>                      Visual Inspection of roadway surface. Specific Defects are defined in Publication No.FHWA-RD-03-031, Long-Term Pavement Performance Program’s Distress Identification Manual.</p>	<p>No instance of IRI greater than 300 inches per mile on a 25’ continuous base length.</p> <p>No instances of failure including potholes, base failures, delamination of pavement layers, blowups, faulting (&gt; 0.12”), punchouts.</p> <p>No instances of lane-to-lane or lane- to-shoulder separation or drop-off greater than 0.5 inches.</p> <p>No unsealed low and/or moderate (as defined by FHWA RD- 03-031) Longitudinal cracking or joint separation &lt;100 feet/tenth lane mile.</p> <p>No unsealed low and/or moderate (as defined by FHWA RD- 03-031) Transverse cracking &lt;10 each/tenth lane mile.</p> <p>PCCP Specific:</p> <ul style="list-style-type: none"> <li>• Unsealed D-Cracking &lt;2 slabs/tenth lane mile.</li> <li>• Corner Breaks&lt;5 each/tenth mile</li> </ul>

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
1.2 (cont.)	Pavement - All roadways, including ramps, detours, and shoulders (mainline including the bridge deck, covers, gratings, frames, expansion joints and boxes)	<p>Skid resistance shall be measured on 4 year cycle or after a resurfacing.</p> <p>Posting of slippery road signs on sections exceeding skid resistance threshold.</p>	7 days	6 mo.	<p><b>d) Edge drop-offs</b> Physical measurement of edge drop- off level to adjacent surface,</p> <p><b>e) Edge Break</b> Physical measurement of pavement edge break.</p> <p><b>Skid resistance</b> Skid resistance measured in accordance with ASTM E 274 Standard Test Method for Skid Resistance Testing of Paved Surfaces at 40 MPH using a full scale smooth tire meeting the requirements of ASTM E 524.</p> <p>Signs posted within timescale measured from test date.</p>	<ul style="list-style-type: none"> <li>Scaling&lt;70 sq ft/tenth mile</li> <li>Spalling&lt;2 sq ft/tenth mile</li> <li>No slabs broken in more than 3 pieces</li> <li>No more than 2 broken slabs / tenth mile</li> </ul> <p>Maintained roadway (including shoulder) free from instances greater than 2"</p> <p>No more than 50 cumulative feet of edge breaking greater than 4" wide.</p> <p>Average test value 25 or higher within any 0.5 mile section of mainline lanes, shoulders and ramps.</p> <p>100% of the time</p> <p>Average test value 25 or higher within any 0.5 mile section of mainline lanes, shoulders and ramps.</p>

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
1.2 (cont.)		Perform site investigation and implement resultant required corrective action where skid resistance exceeds thresholds.	30 days	6 mo.	Delivery of site investigation report and implementation of resultant corrective actions within timescale measured from test date.	100% of the time Average test value 25 or higher within any 0.5 mile section of mainline lanes, shoulders and ramps.
		Removal of deleterious material and repair of damaged pavement	24 hrs	12 mo.	Oil, antifreeze, gasoline or other liquids spilled from vehicles onto traffic lanes is removed from the roadway	Incident logs and maintenance records demonstrate scheduled inspections and clean up times.
		Noise measurement is carried out when problem is suspected or complaints warrant investigation.	N/A	12 mo.	Pavement noise as measured by on board sound intensity and speed requirements in accordance with AASHTO TP 76 (measurements taken on a contiguous 1/10th mile basis)	Mainline and system ramps: < 105db
1.3	Crossovers, access roads and other paved areas	Crossovers, access roads and other paved areas are free of Defects.	4 hrs	12 mo.	Measurement of potholes and base failures	No instances of potholes or base failures
1.4	Curbs	Curbs are free from Defects.	24 hrs	12 mo.	Curb condition or length of alignment.	95% of continuous length of curb free from Defects and separation < ¼” from roadway surface. Curbs no more than 1” out of alignment over 10’.  No exposed rebar.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
1.5	Hard Capped Surface	Free of Defects and removal of deleterious material	24 hrs	6 mo.	Visual inspection	No instances of material tracking onto pavements or presence of weeds/grass.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
<b>2. DRAINAGE SYSTEMS</b>						
2.1	Storm Sewer Systems (conduit, grates, catch basins, inlets, manholes, outfalls), including adjacent drainage conduit extending from an existing drainage structure to the next downstream existing drainage structure.	Each element of the drainage system is maintained to ensure it functions correctly from the point at which water drains to the outfall or drainage way,	1 hr	6 mo.	<p>All storm sewers, pipes and conduits, regardless of size or location, inspected and rated in accordance with the CDOT Level of Service Manual (Drainage Inlets and Structures)</p> <p>Measurement of clogging and condition of pipes, conduits, catch basins, grates, inlets, or outfalls.</p> <p>Measurement of discontinuities and settlement between adjacent conduit segments or within conduit segment.</p> <p>Measurement of cracking, spalling in concrete pipes, catch basins, inlets, culverts</p> <p>Measurement of joints in drainage system.</p>	<p>No instance of a condition rating for any inspected ratable item rated as Level of Service "B" or worse.</p> <p>No instances of:</p> <ul style="list-style-type: none"> <li>• Clogging or blockage of pipes, conduits, grates, catch basins or inlets in pavement or adjacent to pavement, or outlet/outfalls greater than 10% of hydraulic capacity.</li> <li>• Clogging or blockage of catch basins or inlets in ditches greater than 25% of hydraulic capacity.</li> <li>• Damaged, insecure, rusted, or missing grates, end sections, metal structure or hardware</li> </ul> <p>No offsets greater than 1.5 inches or ponding greater than 3 inches</p> <p>No cracks open greater than 1/8". No spalling, or scaling deeper than 3/4", or exposed reinforcement.</p> <p>No instances of separated joints or missing joint material or joints not soil tight.</p>

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
2.2	Open Water Carriers (standard roadside ditches, median ditches, relocated channels, channel linings)	Each Element of the drainage system is maintained to ensure it functions correctly.	24 hrs	12 mo.	Visual inspection and all elements rated in accordance with the CDOT Level of Service Manual (Drainage Ditches).  Ditches/channel length out of alignment, and damages or missing sections in ditches/channel lining.	No instance of a condition rating for any inspected ratable item rated as "B" or worse.  No instances of: Undermining, undercutting, erosion, or obstructions impeding the flow of water  No ditches/channel length out of alignment, and no damaged or missing sections in ditches/channel lining.
2.3	Pavement Drainage (trench drains, slotted drains, gutters, catch basins, inlets, outlets)	Each element of the drainage system is maintained to ensure it functions correctly.	1 hrs	6 mo.	Measurement of standing water within I-70 Mainline, paved shoulder, or other paved surfaces.	No instances of standing water in any I-70 Mainline and paved surfaces, and no greater than 1" in depth elsewhere
2.4	Culverts	Culvert is maintained and functions correctly, joints remain soil tight and erosion controlled.	1 hrs	6 mo.	Culvert condition and functionality.	Culvert functioning as designed.
2.5	End Treatments (Headwalls, reinforced concrete outlets, concrete apron)	Elements are maintained to ensure they function correctly.	24 hours	6 mo.	Visual inspection of erosion, undercutting, scour, cracked, spalled, or broken concrete.	No instances of undercutting, scour, cracked, spalled, exposed rebar, or broken concrete.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
2.6	Storm Water systems	Storm Water Systems installed as permanent features maintained, functioning correctly, and operating as designed.	24 hrs	6 mo.	<p>Compliance with regulations and standards and in accordance with CDOT's Erosion Control and Storm Water Quality Guide (ECSCG).</p> <p><b>Manufactured Systems:</b> Compliance with manufacturers manuals</p> <p><b>Vegetated Biofilters/Filter Strips:</b> Inspection of slopes and ditch bottom; vegetation management; debris and litter management.</p> <p><b>Detention Ponds:</b> Inspected and checked for compliance with management plan.</p> <p><b>Bioretention Cell, Infiltration:</b> Inspected for excessive ponding; overgrown vegetation, litter/debris; erosion and deposition; and outlet structure clogging</p> <p><b>Infiltration Basin/Trenches:</b> Inspected for debris, overgrown vegetation, level of sedimentation; and condition of observation wells;</p> <p><b>Constructed Wetlands:</b> Effectiveness of vegetation management; absence of</p>	<p>Operate as designed and no instances of non-compliance with regulations and standards and ECSQG.</p> <p>Operate as designed and routine clean-out, removed material sampled and tested in line with manufacturers manuals</p> <p>Filters performing as designed.</p> <p>All systems operate as designed and no instances of excessive ponding, threats to structural soundness of embankments and outlet structures; excessive erosion and sediment, seepage from embankments, overgrown vegetation, outlet clogging or litter/debris.</p>

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
					erosion, clogging; litter/debris and sediment.	
2.7	Discharge systems	Surface water discharge systems perform their proper function and discharge to groundwater and waterways complies with the relevant regulations and permits.	24 hrs	6 mo.	Compliance with regulations and in accordance with CDOT's Erosion Control and Storm Water Quality Guide.	No instances of non-compliance.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
<b>3. STRUCTURES</b>						
3.1	Structures having an opening measured along the center of the roadway of more than 20 feet between under copings of abutments or springlines of arches or extreme ends of openings or multiple boxes. (Includes the Cover's structural components)	Substructures and superstructures are free of: <ul style="list-style-type: none"> <li>• undesirable vegetation</li> <li>• debris and bird droppings</li> <li>• blocked drains, weep pipes manholes and chambers</li> <li>• blocked drainage holes in structural components</li> <li>• Defects in joint sealants</li> <li>• Defects in pedestrian protection measure</li> <li>• scour damage</li> <li>• corrosion of rebar</li> <li>• paint system failures</li> <li>• impact damage</li> </ul> Bridge structures maintain a minimum vertical clearance of 16.5 feet over traveled lanes.  Maintain structures to specified condition rating.	24 hrs	6 mo.	Inspection and assessment in accordance with the requirements of federal National Bridge Inspection Standards (NBIS) of the Code of Federal Regulations, 23 Highways – Part 650, the current version of the CDOT Pontis Bridge Inspection Coding Guide and AASHTO Manual for Bridge Evaluation of Bridges, the FHWA Bridge Inspector Reference Manual, AASHTO Manual for Bridge Element Inspection, and Recording and Coding Guide for the Structural Inventory and Appraisal of the Nation's Bridges.	Records as required in the current version of the CDOT Pontis Bridge Inspection Coding Guide and AASHTO Manual for Bridge Evaluation.  No occurrence of NBI condition rating below seven for any new and widened deck, superstructure or substructure.  No occurrence of NBI condition rating below six for any existing or rehabilitated deck, superstructure or substructure, prior to reconstruction of a new structure.  All Pontis condition states to be one or two for all structure components.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
3.2	Structure component (Includes the Cover's structural components)	i) Expansion joints are free of: • dirt debris and vegetation • Defects in drainage systems • loose nuts and bolts • Defects in gaskets • leaking ii) The deck drainage system is free of all and operates as intended. iii) Barriers are free of: • loose nuts or bolts • blockages of hollow section drain holes • vegetation • accident damage iv) Bearings and bearing shelves are clean. v) Maintain settlement within specified requirement.	24 hrs	6 mo.	Inspection and assessment in accordance with the requirements of federal National Bridge Inspection Standards (NBIS) of the Code of Federal Regulations, 23 Highways – Part 650, the current version of the CDOT Pontis Bridge Inspection Coding Guide and AASHTO Manual for Condition Evaluation of Bridges, the FHWA Bridge Inspector Reference Manual, AASHTO Manual for Bridge Element Inspection, and Recording and Coding Guide for the Structural Inventory and Appraisal of the Nation's Bridges.	Records as required in the current version of the CDOT Pontis Bridge Inspection Coding Guide and AASHTO Manual for Bridge Evaluation.  No occurrences of NBI condition rating below seven for any new and widened deck, superstructure or substructure  No occurrence of NBI condition rating below six for any existing or rehabilitated deck, superstructure or substructure, prior to reconstruction of a new structure.  All Pontis condition states to be one or two for all structure components.  Differential settlement of bridge approach slabs: Less than 1-inch total settlement and less than 0.5 inch differential between end of approach slabs.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
3.2 (cont.)	Structure component (continued)	<p>vi) Sliding and roller surfaces are clean and greased to ensure satisfactory performance.</p> <p>Additional advice contained in bearing manufacturers' instructions, in the Current CDOT M&amp;S Standard Plans, Standard Specification for Road and Bridge Construction is followed.</p> <p>Special finishes are clean and perform to the appropriate standards.</p> <p>vii) All non-structural items such as hoists and electrical fixings, operate correctly, are clean and lubricated as appropriate, in accordance with the manufacturer's recommendations and certification of lifting devices are maintained.</p> <p>viii) Maintain structures to specified condition rating.</p>				100% compliance for Elements without Pontis or NBI condition rating targets.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
3.3	Structures – General (Includes the Cover’s structural components)	Safe operation of structures, maintained to prevent safety issues arising	1 hr	12 mo.	Inspection of concrete surfaces adjacent to and above the Roadway	No instances of delaminated concrete above the Roadway.
3.4	Structures – Bridge girders/beams (Includes the Cover’s structural components)	Design stress is not exceeded in bridge girders/ beams (particularly in skew bridge decks)	1 hr	12 mo.	Measurement of out of plumb twisting/rotation of bridge girders/beams.	The out-of-plumb rotation of bridge girders/beams shall not exceed 0.6° or 1/8 in. per ft
3.5	Non-bridge class culverts	Non-bridge-class culverts are free of: <ul style="list-style-type: none"> <li>• vegetation and debris and silt</li> <li>• Defects in sealant to movement joints</li> <li>• scour damage</li> </ul>	24 hrs	6 mo.	Inspection and assessment in accordance with the requirements of federal National Bridge Inspection Standards (NBIS) of the Code of Federal Regulations, 23 Highways – Part 650, the current version of the CDOT Pontis Bridge Inspection Coding Guide and AASHTO Manual for Bridge Evaluation, the FHWA Bridge Inspector Reference Manual, AASHTO Manual for Bridge Element Inspection, and Recording and Coding Guide for the Structural Inventory and Appraisal of the Nation’s Bridges.	<p>Records as required in the current version of the CDOT Pontis Bridge Inspection Coding Guide and AASHTO Manual for Bridge Evaluation.</p> <p>No occurrences of NBI condition rating below seven for any culvert elements.</p> <p>All Pontis condition states to be one or two for all structure components.</p> <p>None with vegetation, debris and silt.</p> <p>None with Defects in sealant and movement joints.</p> <p>None with scour damage.</p>

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
3.6	Retaining Walls (other than MSE walls)	Maintain retaining walls to be structurally sound, and free of vertical, lateral or rotational movement with no material Defects compromising the intended performance.	48 hrs	12 mo.	<p>Condition of exposed surfaces showing cracking, spalling, leaking, build-up of efflorescence and rust staining.</p> <p>Area of cracks measured as the length of the crack and six inches on either side of the centerline of the crack.</p> <p>Measurement of settlement of spread footing foundations in deviation from constructed elevation.</p> <p>Measurement of rotational movement resulting in deviation from constructed alignment using a 10 foot straight edge.</p> <p>Visual Inspection</p>	<p>No more than 5% of a combined retaining wall area of each wall showing cracking with leaking, build-up of efflorescence, delamination's, spalls, and rust staining.</p> <p>No concrete surfaces with spalls greater than 1" deep or to reinforcement level.</p> <p>No more than 5% of retaining wall area showing cracking of &gt;1/8".</p> <p>None greater than 1.5" total or 1/2" in a 5 year period</p> <p>None greater than 1/2" horizontal movement within 10' vertical.</p> <p>Free from vegetation and overgrowth of trees.</p> <p>At least 90% of drain holes are free of build up (for any walls).</p>

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
3.7	MSE Retaining Walls	Maintain retaining walls to be structurally sound, and free of vertical, lateral or rotational movement with no material Defects compromising the intended performance.	48 hrs	12 mo.	<p>Panel condition</p> <p>Joint condition</p> <p>Measured erosion</p> <p>Measurement of bowed wall: variance from constructed alignment. Change from as built records measured using 10' straight edge.</p> <p>Visual Inspection</p>	<p>No more than 5% showing cracking, delamination's, spalls, or scaling per panel or each MSE wall.</p> <p>No instances cracks &gt;1/4", on more than one panel per wall.</p> <p>No concrete surfaces with spalls greater than 1" deep or to reinforcement level.</p> <p>No instances of joints with exposed fabric, MSE backfill material below joint or vegetation growing between joints</p> <p>Panel offset at joints shall not exceed 3/4 inch. Joint opening shall not exceed 1/4 inch greater or 1/2 inch less than the design width along adjoining panels.</p> <p>No instances of erosion &gt;1 feet deep along wall coping, erosion exposing the top of the leveling pad (where pad is not on rock), or exposed straps or mesh</p> <p>No instances of variance from constructed alignment greater than 3/4 inch horizontal movement within 10' vertical</p> <p>Free from vegetation and overgrowth of trees.</p>

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
3.8	Sign structures	Sign gantries and foundations are structurally sound and free of: loose nuts and bolts, Defects in surface protection systems	24 hrs	6 mo.	Inspection and assessment in accordance with the requirements of CDOT Recording and Coding Guide for the Inventory and Inspection of Colorado's Overhead Signs, Signals and High Mast Lights and CDOT M&S Standard Plans.	All condition states to be one or two for all structural members.  None with loose assemblies.  None with Defects in surface protection.
3.9	Load ratings  (Includes the Cover's structural components)	All structures shall have adequate capacity for the design load, legal loads (including Specialized Hauling Vehicles and Notional Rating Load, as referenced in AASHTO Manual for Bridge Evaluation, and Colorado Permit Vehicle, as referenced in CDOT Bridge Rating Manual)	24 hrs	6 mo.	Load rating calculations in accordance with the AASHTO Manual for Bridge Evaluation, the current version of the CDOT Pontis Bridge Inspection Coding, and CDOT Bridge Rating Manual.  Load restriction requirements as per AASHTO Manual for Bridge Evaluation, the current version of the CDOT Pontis Bridge Inspection Coding, and CDOT Bridge Rating Manual.	Comply with load restrictions on new structures for Colorado legal loads (including legally permitted vehicles).
<b>4. ROADWAY MARKING</b>						
4.1	Pavement markings – General  (includes temporary marking in the event of future	Pavement markings are: <ul style="list-style-type: none"> <li>• clean and visible during the day and at night</li> <li>• whole and complete and of the correct color, type, width and length</li> <li>• correctly placed to meet the MUTCD</li> </ul>	24 hrs	1 mo.	Compliance with regulations    Using a calibrated retro-reflectometer, in conformance with	100% in accordance with the Manual of Uniform Traffic Control Devices (MUTCD) and the MUTCD -Colorado Supplement  Retro-reflectivity reading in test section (mcd/m <sup>2</sup> /lux): Longitudinal Lines – White 150 Longitudinal Lines – Yellow 100

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
	<p>Construction work done by Developer, and permanent marking)</p> <p>(excludes crosswalk and stop bar pavement markings at signalized ramp intersections, which such markings are maintained by Local Agency)</p>	<p>and the Colorado Supplement to MUTCD and CDOT M&amp;S Standard Plans.</p> <p>Non applicable pavement markings are removed.</p>			<p>ASTM E 1710 or AASHTO TP111 procedures, collect the following readings for each day striping work has been conducted or when reading collected:</p> <ul style="list-style-type: none"> <li>• within a mile test section, collect 10 readings for each longitudinal line stripe, at no less than 40 feet intervals.</li> <li>• where striping is less than 500 feet in length, collect reading at 50 foot intervals</li> <li>• readings collected shall be averaged. Excess beads to be removed prior to reading</li> </ul> <p>Bridge decks longitudinal lines, words and symbols shall be measured by presence and reflectivity on pavement surface</p> <p>Removal of non-applicable pavement markings or conflicting pavement markings</p>	<p>Measured minimum presence:                      Longitudinal Lines 80%                      Words and Symbols 85%</p> <p>Visual inspection</p>

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
4.2	Reflective markers	Reflective pavement markers (RPM's), are: <ul style="list-style-type: none"> <li>• clean and clearly visible</li> <li>• of the correct color and type</li> <li>• reflective or retroreflective as required in the MUTCD and CDOT M&amp;S Standards</li> <li>• correctly located, aligned and at the correct level</li> <li>• are firmly fixed</li> <li>• are installed in a way that will ensure that they remain at the correct level.</li> </ul>	24 hrs	6 mo.	Number of pavement markers that are ineffective. (Ineffective includes missing, nonreflective, broken, damaged, settled or sunk)  Number of pavement marker casting securely fastened (Category 1 Defect)  Uniformity; percentage (replacement RPM's having equivalent physical and performance characteristics to adjacent markers.)	Less than 10-percent ineffective in a centerline mile, with no more than two (2) consecutive RPMs missing or non-reflective.  100%  100%
4.3	Delineators & Markers	Object markers and delineators are: <ul style="list-style-type: none"> <li>• clean and visible</li> <li>• of the correct color and type</li> <li>• legible and reflective</li> <li>• straight and vertical</li> <li>• placement per MUTCD, and CDOT M&amp;S Standards</li> </ul>	1 hr	28 days	Number of object markers or delineators defective or missing.  Sign sheeting material for object markers and delineator shall meet manufacturers minimum reflective requirements.	No more than 10% of delineators or markings will be missing or not easily visible in any 1 mile section.  100%

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
<b>5. GUARD RAILS, BARRIERS, IMPACT ATTENUATORS</b>						
5.1	Guard rails and barrier walls	All guardrails, traffic barriers and other concrete barriers are maintained free of Defects. They are placed per MUTCD, CDOT's M&S Standards and Roadway Design Manual and FHWA Roadside Design Guide.	1 hr	1 mo.	Length free from Defects (loose nuts/bolts)  Surface condition  Guardrail installed and maintained at correct height and distance from roadway and obstacle  Alignment  Vegetation  Posts  Spacer Blocks	All nuts, bolts and connections to be properly tightened  90% of surfaces to be free from Defects (spalling of concrete, failure of corrosion protection) within a 12.5 foot section. No Defect greater than 1 foot square or 1 cubic foot of missing material within a 12.5 foot section. No exposed rebar.  100% within 3 inches vertical of correct system height.  No misalignment of more than 4 inches.  Vegetation maintained and mowed and chemically controlled in front and under and at least 5 feet behind guardrail.  No missing posts. No post shall have section loss greater than 25%, No two adjacent post shall have a combined section loss greater than 25%.  No missing spacer or rotated blocks. No section loss greater than 10%.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
5.2	Impact attenuators, anchor assembly, and end assembly	All impact attenuators, anchor assemblies, and end assemblies are appropriately placed and correctly installed per MUTCD, CDOT's M&S Standards, and maintained free of damage.	1 hr	1 mo.	Percentage of impact attenuators, anchor assemblies, and end assemblies correctly placed and installed and free of damage  Integrity of the system	100%  100% cell replacement (unit replacement) following impact.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
<b>6. SIGNS</b>						
6.1	General – all sign panels	<p>Signs are clean, correctly located, clearly visible, legible, reflective, at the correct height and free from structural and electrical Defects</p> <p>Identification markers are provided, correctly located, visible, clean and legible</p> <p>Sign mounting posts are vertical, structurally sound and rust free</p> <p>Visibility distances meet those stated in the MUTCD and CDOT M&amp;S Standards</p> <p>Sign information is of the correct size, location, type and wording to meet its intended purpose</p>	24 hrs	6 mo.	<p>Compliance with regulations</p> <p>Retroreflectivity measured in accordance with the requirements of MUTCD</p> <p>Face Damage or Blockage</p> <p>Placement</p> <p>Sign information is of the correct size, location, type and wording to meet its intended purpose and requirements of MUTCD, M&amp;S Standards, Guide Signing Policies and Procedures Manual, CDOT Sign Design Manual, and Colorado Supplement Signs</p> <p>Visual Inspection</p>	<p>No missing signs and 100% in accordance with the current edition of the (MUTCD)</p> <p>Retroreflectivity is no less than that required by MUTCD and the Colorado Supplement for retroreflectivity.</p> <p>No signs with face damage greater than 5% of area or 0% if text is damaged or fading. No vegetation is impeding sign visibility.</p> <p>Signs are placed in accordance with Requirements of the MUTCD and the Colorado Supplement</p> <p>100%</p> <p>Post shall be plum</p>

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
6.2	Safety critical signs	Requirements as 6.1, Plus:  "Stop," "Yield," "Do Not Enter," "One Way" and "Wrong Way" and all Turn-Prohibition signs are clean, legible and undamaged.	1 hr	7 days	Safety critical signs functionally legible when viewed from a vehicle travelling at posted speed  Sign mounting posts and multi-Post breakaway installed and maintained per CDOT requirements.	No instances of signs functionally illegible, no twisting or leaning.  All connections shall be free from Defects and free from debris or material that would impede function.
6.3	Obsolete, illegal or obscene signs, banners, flags, or posters	Removed from the Project	2 hrs	N/A	Time for obsolete, illegal or obscene signs, banners, flags, or posters to be removed	100% compliance
<b>7. Traffic Signals</b>						
7.1	Traffic Signals - General	Traffic Signals shall meet the following:  <ul style="list-style-type: none"> <li>.Be clean and visible, heads and buttons correctly aligned and operational</li> <li>. All traffic signal elements including cabinets, foundations, signing, vehicle detection (cameras or loops), electrical power and boxes: are aligned correctly, structurally sound, full operational</li> </ul>	24 hrs	NA	Traffic signal issue reporting log listing the following as a minimum:  <ol style="list-style-type: none"> <li>1. Issue (e.g. inefficiencies, malfunction, cleanliness, etc.)</li> <li>2. date and time of issue occurrence</li> <li>3. date and time of report</li> <li>4. reporting person</li> <li>5. date and time of issue resolution</li> </ol>	Written notification of issue to CCD and Department, and reporting on a log 100% of time.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
		and free from damage caused by accident or vandalism				
<b>8. Lighting</b>						
8.1	Roadway Lighting – General	All lighting is free from Defects and provides acceptable uniform lighting quality.  Lanterns are clean and correctly positioned.	24 hrs	NA	Visual inspection and reporting log listing the following as a minimum:  1. Issue (e.g. inefficiencies, malfunction, cleanliness, etc.) 2. date and time of issue occurrence 3. date and time of report 4. reporting person 5. date and time of issue resolution	Written notification of outdoor lightning outage or repair requirement to Xcel Energy and Department, and reporting on a log 100% of time.
8.2	Lighting Structures	Columns are upright correctly founded and structurally sound.	24 hrs	NA	Visual inspection and reporting log as per Ref. 8.1 in this Appendix A-2.  Structure is plumb.	Written notification of outdoor lightning repair requirement to Xcel Energy and Department, and reporting on a log 100% of time.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
8.3	Lighting Fixtures	All luminaries functioning on each pole.	24 hrs	NA	Visual inspection and reporting log as per Ref. 8.1 in this Appendix A-2.	Written notification of outdoor lightning outage or repair requirement to Xcel Energy and Department, and reporting on a log 100% of time.
<b>9. FENCES AND WALLS</b>						
9.1	Fences and Walls - Design and Location	Fences and walls act as designed and serve the purpose for which they were intended	1 hr	6 mo.	Visual Inspection based on design of fences and walls	Inspection records showing compliance with design  No unintended opening in fences or walls.
9.2	Fences and Walls - Construction (includes existing)	Integrity and structural condition of the fence is maintained	< 1 hr	6 mo.	Structural assessment if visual inspection warrants	Inspection records showing compliance with design, and no structural safety issues.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
<b>10. ROADSIDE</b>						
10.1	Vegetated Areas - Except landscaped areas - General	Vegetation is maintained so that: i. Height of grass and weeds is kept within the limits described for urban and rural areas. Mowing begins before vegetation reaches the maximum height. ii. Spot mowing at intersections, ramps or other areas maintains visibility of appurtenances and sight distance. iii. Grass or vegetation does not encroach into or on paved shoulders, main lanes, sidewalks, fences and walls, slope pavement, islands, riprap, traffic barrier or curbs.	24 hrs	28 days	<b>Urban areas</b> Physical measurement of height of grass and weeds  <b>Encroachment</b> Visual inspection of instances of encroachment of vegetation  <b>Wildflowers</b> Visual Inspection with audit of process.  <b>Sight lines</b> Visual inspection	Individual measurement areas to have 95% of height of grass and weeds between 8" to 10", and not shorter than 6".  No occurrences of vegetation encroachment.  Adherence to CDOT Roadside Vegetation Management (Final Guideline Document).  No instances of impairment of sight lines or sight distance to signs, including control of weeds in pavement and barrier. No blocked view of roadside reflectors.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
10.1 (cont.)		iv. A herbicide program is undertaken to control noxious weeds in accordance with the EO D 006 99.  v. Development and implementation of noxious weed management program to control noxious weeds and to eliminate grass in pavement or concrete.  Avoid mowing zone 2 and 3 between April 15 <sup>th</sup> and August 15, as required in Manual of Maintenance Procedures.			<b>Noxious weeds</b> Visual inspection and/or notification	Not more than 15% (aggregate) of a 1 mile section of roadway contains noxious weeds.  Not more than 15% (aggregate) of a 1/10 mile section of ramp contains noxious weeds.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
10.2	<p>Landscaped Areas</p> <p>(refer to General Requirement i. to iv. for any landscaped areas other than top of Cover; and v. for landscaped areas on top of Cover)</p> <p>(applicable after the issuance of the Notice of Substantial Landscape Completion pursuant to <u>Section 14.9</u> of <u>Schedule 10</u> (<i>Design and Construction Requirements</i>))</p>	<p>i. All landscaped areas are maintained to their originally constructed condition and in accordance with <u>Section 14</u> of <u>Schedule 10</u> (<i>Design and Construction Requirements</i>). Landscaped areas are as designated in the plans.</p> <p>ii. Mowing, litter pickup, irrigation system maintenance and operation, plant maintenance, pruning, insect, disease and pest control, fertilization, mulching, bed maintenance, watering is undertaken as per MMP.</p>	24 hrs	28 days	<p>Visual inspection</p> <p>Appearance is excellent, characterized by well-tended landscaping and vegetation.</p>	<p>The percent of landscaping area meeting the General Requirement is more than 90%.</p>

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
10.2 (cont)	Landscaped Areas	iii. The height of grass and weeds is kept between 8” to 10”, and not shorter than 6”. Mowing begins before vegetation reaches a hazardous condition, such as sight distance, blocking reflectors, hiding animals or causing drifting snow. iv. Damaged or dead vegetation is replaced. v. Landscaping on top of the Cover is to be carried out by Developer until the end of the Landscape Warranty period, (as described in Section 14.11 of <u>Schedule 10 (Design and Construction Requirements)</u> ) in accordance with <u>Section 14 of Schedule 10 (Design and Construction Requirements)</u>				
10.3	Fire hazards	Fire hazards are controlled	12 hrs	14 days	Instances of dry brush or vegetation forming a fire hazard	No instances of plant material that is a fire hazard

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
10.4	Trees, brush and ornamentals  (Other than landscaped areas, where REF 10.2 would apply)	i) Trees, brush and ornamentals on the right of way, except in established no mow areas, are trimmed in accordance with CDOT standards.  ii) Trees, brush and ornamentals are trimmed to insure they do not interfere with vehicles or sight distance, or inhibit the visibility of signs or shading on the road.  iii) Dead trees, brush, ornamentals and branches are removed. Potentially dangerous trees or limbs are removed.  iv)  v) All undesirable and unplanned trees and vegetation are removed. Diseased trees or limbs are treated or removed by licensed persons.	24 hrs	28 days	Visual inspection and/or notification	Inspection records showing 100% compliance

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
10.4 (cont.)		iv) All undesirable and unplanned trees and vegetation are removed. Diseased trees or limbs are treated or removed by licensed personnel.				
10.5	Wetlands	Wetlands are properly managed, and in accordance with applicable permit requirements.	24 hrs	28 days	In accordance with applicable permit requirements	No Instances of permit requirements not met.
10.6	Water Quality Ponds	Maintenance of all vegetation within the pond area.	24 hrs	28 days	Visual inspection of ponds	Maintained as required per the design
<b>11. EARTHWORKS &amp; EMBANKMENTS</b>						
11.1	Slope - Stability	All structural or natural failures of the embankment, cut slopes, and slope and ditch pavement Defects on the Site are repaired.	1 hr	6 mo.	Visual inspection by geotechnical specialist and further tests as recommended by the specialist	No instances of slope failure, and no unsealed cracks or joints on paved slopes. No vegetation on paved slopes.  No rut, washout, or deviation greater than 6 inches and more than 2 foot wide.
11.2	Slopes - General	Slopes are maintained in general conformance to the original graded cross-sections	24 hrs	6 mo.	Areas where replacement fill and of landscaping materials, reseeding and re-vegetation for erosion control purposes and removal and proper disposal of all eroded materials from the roadway	No slope failures. Inspection records showing compliance.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
					and shoulders are required.	
<b>12. GRAFFITI</b>						
12.1	Graffiti	Graffiti removal on all Elements including but not limited to: • Signs, walls, barriers, guardrail, lighting, traffic signals, structural elements, fence, water quality and drainage features.	24 hrs	28 days	Removed in a manner and using materials that restore the surface to a like appearance similar to adjoining surfaces.	Inspection records showing 100% compliance
12.2	Offensive Graffiti	Offensive graffiti (i.e. graffiti that is insulting or causes offense to the public) is removed	6 hr	N/A	Removed in a manner and using materials that restore the surface to a like appearance similar to adjoining surfaces. All offensive graffiti is considered a Category 1 Defect.	Inspection records showing 100% compliance
<b>13. INCIDENT RESPONSE</b>						
13.1	General	Respond to Incidents in accordance with the Incident Response Plan.	1 hr	N/A	Incident Response Plan. No complaints from Emergency Services.	Response times met for 98% of Incidents measured on a 1 year rolling basis.
13.2	Spillage of Hazardous Materials	For any hazardous materials spills, comply with the requirements of <u>Schedule 17</u> .	1 hr	1 day	Incident Response Plan details the process and procedures in place and followed.	Inspection records showing compliance
13.3	Elements damaged as a result of Incident - Structural Assessment	Evaluate damage to structures and liaise with emergency services to ensure safe working in clearing the Incident.	2 hr	1 day	Inspections and surveys of relevant Elements as required. (Note. CDOT staff bridge office shall be notified immediately to complete an inspection.)	Inspection records showing 100% compliance

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
13.4	Elements damaged as a result of Incident - Temporary and permanent remedy	Propose and implement temporary measures or permanent repairs to Defects arising from the Incident.  Ensure the structural safety of any structures affected by the Incident.	24 hrs	6 mo.	Review and inspection of the relevant Elements.	Inspection records showing 100% compliance.
<b>14. MAINTENANCE YARD<sup>3</sup></b>						
14.1	Developer Identification Signs	Signs installed at the entrance(s)/exit(s) to/from the Maintenance Yard	7 days	12 mo.	Signs installed depicting the name and contact information for Developer	Signs functioning as designed.
14.2	Environmental contamination	No increase in contamination.	2 hrs	6 mo.	Environmental site assessment or other inspections, as necessary.	No increase in contamination during the Operating Period.
14.3	Maintenance of grounds and buildings	Kept in a neat and tidy order. Kept structurally safe.	24 hr	6 mo.	Good housekeeping practice used to maintain buildings and land in a well maintained and neat condition, free from environmental damage. Regular inspection performed.	100% compliance

<sup>3</sup> Section 14 only to be included if Preferred Proposer elects to use the Maintenance Yard.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
<b>15. SNOW AND ICE REMOVAL</b>						
15.1	Response Time, material application vehicle	The manning and loading of material application vehicles for a Precipitation Event	½ hr	N/A	All spreading vehicles on any route ready to load anti-icing or de-icing materials within ½ hour as measured by winter operation records and AVL system monitoring.	The required maximum time to complete the manning and loading of all material application vehicles for an event is 0.5 hours from the time precipitation has started.
15.2	Response Time, plowing vehicle	The manning of a snowplow vehicle for a Precipitation Event	½ hr	N/A	All snowplow vehicles on any route have left the yard and ready to begin work within ½ hour as measured by winter operation records and AVL system monitoring.	The required maximum time to complete the manning of all snowplow vehicles for an event is 0.5 hours from the time precipitation has started to the time the unit has left its yard to begin work.
15.3	Plowing and material application	Continuous plowing and material application	½ hr	N/A	All units operating as measured by winter operation records and AVL monitoring systems.	Once operations have begun, all units as identified in the Snow and Ice Control Service Plan shall operate continuously on all routes so that bare and wet pavement is maintained.
15.4	Circuit time	Complete one entire route within 1 hour	1 hr	N/A	AVL systems monitoring and/or winter operation record	Circuit time shall be 1 hour from the time a winter unit begins its plowing and/or material application route until the time it is complete.
15.5	All lanes and ramps (including paved shoulders)	Bare and wet pavement during the Precipitation Event	1 hr  24 hrs (paved shoulder)	N/A	Visual inspection and AVL system monitoring	Maintain Bare and Wet pavement during the Precipitation Event, or immediately at the End of Precipitation Event (as defined in REF 15.5 in <a href="#">Appendix A-1</a> ) if all equipment listed in the most recently Accepted Snow and Ice Services Plan are continuously deployed.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
15.6	Hazards	Address any snow and ice hazard immediately upon detection or notification	1 hr	N/A	Visual inspection, AVL system monitoring, or notification	100% compliance
15.7	Isolated slippery conditions	Address isolated slippery conditions.	1 hr	N/A	Visual inspection, AVL system monitoring, or notification	All isolated slippery conditions as identified by Developer, or notified by Emergency Services, the Department, and/or User are addressed.
15.8	Winter Snow and Ice Materials storage	Winter snow and Ice materials stored in tanks or covered buildings at all times.	½ hr	N/A	Visual inspection.	No instances of uncovered storage of winter de-icing/anti-icing materials or winter maintenance liquids.
15.9	Reporting requirements	All reporting requirements identified in <u>Schedule 11</u> are accurate, complete, and timely 100% of the time.	1 day	N/A	Audit records and AVL system monitoring.	100% accuracy.
15.10	Automated Vehicle Locator system	All identified vehicles equipped with on board AVL at all times, as required in <u>Section 12</u> of this <u>Schedule 11</u>	24 hrs	1 mo.	Random audit, AVL system monitoring.	95% of all AVL units operational 100% of the time.  No loss of data due to network service loss.
15.11	Material Spreader calibration	Spreader controller (including winter liquids) calibration is operational.	24 hrs	N/A	Random audit, AVL system monitoring	95% units operational 100% of the time
15.12	Winter Drainage	Melting snow and ice causing flooding.	1 hr	6 hrs	Visual inspection, AVL system monitoring	No flooding on roadway caused by snow and/or ice impeding drainage through or to drains, culverts and ditches at the End of Precipitation Event (as defined in REF 15.5 in <u>Appendix A-1</u> ).

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
<b>16. Courtesy Patrol</b>						
16.1	Courtesy Patrol	Respond to any calls on the General Purpose Lanes or Tolloed Express Lanes 15 min after being dispatched.	1/4 hr	N/A	Measured by patrol records, and AVL system.	Response times met for 98% of dispatches measured on a 1 year rolling basis.
<b>17. Sweeping and Cleaning</b>						
17.1	Sweeping	i) Keep all channels, lanes, hard shoulders, gore areas, ramps, intersections, islands and frontage roads, and curb and gutter swept clean. ii) Clear and remove debris from all paved areas other than as required in <u>Section 1.1</u> of this <u>Appendix A-2</u> . iii) Remove all sweepings without stockpiling in the right of way and dispose of at approved site.	1 hr	28 days	Visual Inspection of buildup dirt, ice, rock, debris (from accidents and/or otherwise).	Inspection records showing 100% compliance
17.2	Litter	i) Keep the Site in a neat condition, remove litter regularly ii) Pick up large litter items before mowing and sweeping operations. iii) Dispose of all litter and debris collected at	24 hrs	28 days	Visual Inspection of pieces of litter.	Inspection records showing 100% compliance

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
		an approved solid waste site. iv) Remove dead animals from the Site.				
17.3	Sweeping	Clear and remove granular and sand material used as deicer or tractive material at the End of Precipitation Event (as defined in item 15.5).	1 hr	48 hrs	Visual Inspection.	Inspection records showing 100% compliance.
<b>18. Cover (Note. The TOMIE Manual referred to in the Measurement Criteria is the Accepted Tunnel Operation, Maintenance, Inspection and Evaluation Manual (TOMIE) as described in Section 12 (Cover MEP System) of Schedule 10 (Design and Construction Requirements).)</b>						
18.1	Snow and ice removal	Snow and ice removal in the Cover section and at access and egress points	1 hr	3 hr	Visual observation and/or AVL system monitoring.	No snow or ice along the Cover structure wall and soffit. No snow or ice along the right shoulder at the access and egress points.
18.2	Subsurface structures	All subsurface structures, including passive fire protection, shall be free of Defects.	1 hr	N/A	All subsurface structures maintained and inspected in accordance with National Tunnel Inspection Standards, Highway and Rail Transit Tunnel Maintenance and Rehabilitation Manual, and the Tunnel, Operations, Maintenance, Inspection, Evaluation (TOMIE) Manual and the Specifications for the National Tunnel Inventory (SNTI).	Elements maintained free of Defects

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
18.3	Structural supports and Connections for all miscellaneous structural attachments or supports	Structural Supports & Connections for all miscellaneous structural attachments or supports shall be free of Defects.	1 hr	6 mo.	All structural supports maintained and inspected in accordance with National Tunnel Inspection Standards, Highway and Rail Transit Tunnel Maintenance and Rehabilitation Manual, and the Tunnel, Operations, Maintenance, Inspection, Evaluation (TOMIE) Manual and the Specifications for the National Tunnel Inventory (SNTI).	All Elements with full capacity connections in accordance with the design and manufacturer's requirements  Sections free of loss of connection material due to impact, corrosion, or wear. Free of loose connections or bolts. Free of deterioration or damage of base structure material. Free of movement of supported item. Free of excessive vibration of supported item.
18.4	Retaining Walls	As a minimum free of the Defects as identified in <u>Section 3 Structures</u> of this <u>Appendix A-2</u> .	1 hr	6 mo.	Compliance with Maintenance Management Plan (MMP). The plan shall be based on the Tunnel, Operations, Maintenance, Inspection, Evaluation (TOMIE) Manual, Highway and Rail Transit Tunnel Maintenance and Rehabilitation Manual, and in accordance with <u>Section 3 Structures</u> of this <u>Appendix A-2</u> .	All Elements maintained free of Defects.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
18.5	Monolithic waterproofing membrane, reinforcing, flashing, protection course / root barrier protection – at landscape areas, protection course – at vehicular and pedestrian traffic areas	Subsurface structures shall be free of leaks.  Elements shall be free of Defects and function as designed.	24 hrs	6 mo.	Visual Inspection and in accordance with the Tunnel, Operations, Maintenance, Inspection, Evaluation (TOMIE) Manual.  <u>Section 519 (Garden Roof Assembly) of Section 14 (Landscaping and Aesthetics) of Appendix A (Project Special Provisions) of Schedule 10 (Design and Construction Requirements)</u>	The subsurface structures shall be free of leaks.  Elements shall be free of Defects and function as designed.
18.6	Finishes	All finishes shall be free of Defects and clean.	24 hrs	6 mo.	Visual inspection and in accordance with the Tunnel, Operations, Maintenance, Inspection, Evaluation (TOMIE) Manual, Highway and Rail Transit Tunnel Maintenance and Rehabilitation Manual, and the Specifications for the National Tunnel Inventory (SNTI).	Maintaining level of reflectivity and brightness consistent with lighting level criteria, free of loose or damaged finish materials with fully functional emergency equipment such as exit signage, lights, emergency panels, fire alarm boxes, signage and communications equipment and maintain colors and design characteristics consistent with aesthetic requirements.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
18.7	Drainage	Subsurface drainage and pumping systems fully operational and clear of debris.	2 hrs	1 mo.	Regular inspection in accordance with the Highway and Rail Transit Tunnel Maintenance and Rehabilitation Manual, and the Tunnel, Operations, Maintenance, Inspection, Evaluation (TOMIE) Manual and the Specifications for the National Tunnel Inventory (SNTI).	Maintenance performed and documented per the Maintenance Management Plan (MMP) with flow rates established per design, free from blockage due to sedimentation or calcification and, fully functional pumping components and systems, screeds, and control and monitoring equipment.
18.8	Fire Protection	Fire protection systems such as but not limited to fire detection, alarm, notification and suppression systems fully functional and operational.	1 hr	3 mo.	Compliance with Maintenance Management Plan MMP. The plan shall be based on the Highway and Rail Transit Tunnel Maintenance and Rehabilitation Manual, Tunnel, Operations, Maintenance, Inspection, Evaluation (TOMIE) Manual, the Specifications for the National Tunnel Inventory (SNTI), and applicable NFPA standards. Life Safety preventative maintenance performed and reported bi-annually.	Fire protection systems functioning correctly 100% of the time and in full compliance with the MMP

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
18.9	Electrical Systems, regular & Emergency Lighting	Lighting system fixtures, lamps and control functioning to provide the intended illumination level, light output, lighting quality, duration and energy efficiency, for the location.	1 hr	3 mo.	Compliance with Maintenance Management Plan (MMP). The plan shall be based on the Highway and Rail Transit Tunnel Maintenance and Rehabilitation Manual, Tunnel, Operations, Maintenance, Inspection, Evaluation (TOMIE) Manual and the Specifications for the National Tunnel Inventory (SNTI).	Electrical and emergency lighting systems functioning correctly 100% of the time and in full compliance with the MMP
18.10	Electrical Systems, Fire / vehicle Detection and Alarm and emergency way-finding signage	Fire / vehicle detection and alarm systems provide the intended detection and notification functions including emergency way-finding signage.	1 hr	3 mo.	Compliance with Maintenance Management Plan (MMP). The plan shall be based on the Highway and Rail Transit Tunnel Maintenance and Rehabilitation Manual, Tunnel, Operations, Maintenance, Inspection, Evaluation (TOMIE) Manual, the Specifications for the National Tunnel Inventory (SNTI), manufacturer's recommendations, and NFPA 70B and 72.  Preventative maintenance of fire alarm sources and testing per NFPA 70B, 72, 101, 110 & 111. Follow manufacturer's recommendations for maintenance and testing where requirements are more demanding. Continuous monitoring through self-system diagnostics and failure detection.	All fire alarm systems perform as designed and provide the intended level of protection with all detectors operating within manufacturer's tolerance for sensitivity and cleanliness. All inspections conducted and documented. All preventative maintenance performed and documented in accordance with the referenced standards.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
18.11	Electrical Systems, Communications including Radio Rebroadcast, 2-way Radio, public emergency message rebroadcast, voice alarm and public address, Telephone and CCTV, and all communication Elements identified in Section 12 (Cover MEP System) of Schedule 10	Communications systems serving their intended functions.	1 hr	3 mo.	<p>Compliance with Maintenance Management Plan (MMP). The plan shall be based on the Highway and Rail Transit Tunnel Maintenance and Rehabilitation Manual, Tunnel, Operations, Maintenance, Inspection, Evaluation (TOMIE) Manual, the Specifications for the National Tunnel Inventory (SNTI), and manufacturer's recommendations.</p> <p>Operational tests using 2- way radio equipment and frequencies to match outside agencies served, weekly.</p> <p>Continuous monitoring through self-system diagnostics and failure detection. CCTV system compliance with NFPA 72 inspection and maintenance requirements for fire detection, where used.</p>	<p>All equipment operating in accordance with manufacturer's recommendations for actual conditions of use.</p> <p>2-way radio system performance conforming with up-to-date Department specifications.</p> <p>Public emergency message rebroadcast performance conforming with relevant standards.</p> <p>Voice alarm and public address performance conforming with relevant standards.</p> <p>CCTV system complying with all requirements required to function as second means of fire detection.</p> <p>All inspections conducted and documented.</p> <p>All preventative maintenance performed and documented in accordance with the referenced standards and MMP.</p> <p>Free from database and communication system security breaches.</p> <p>Electronic retention of database files, back-ups and other stored media.</p>

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
18.12	Electrical Systems, Distribution – Normal, Essential & Emergency	Electrical system serving connected loads with intended capacity, voltage regulation, protection, control and monitoring.	1 hr	3 mo.	Compliance with Maintenance Management Plan (MMP). The plan shall be based on the Highway and Rail Transit Tunnel Maintenance and Rehabilitation Manual, Tunnel, Operations, Maintenance, Inspection, Evaluation (TOMIE) Manual, and the Specifications for the National Tunnel Inventory (SNTI), and manufacturer's recommendations. Preventative maintenance and testing of essential and Emergency sources per NFPA 110 and 111. Exercising of back-up generators under load where used as essential and Emergency sources, monthly. Exercising of ATS switches, semi-annually. Load testing of UPS systems where used as essential and Emergency source, monthly. Monitoring and Testing of individual battery cell condition, annually.	All elements of electrical systems distribution normal, essential and emergency functioning as designed 100% of the time.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
18.13	Command, Control and Monitoring System	Command, Control and Monitoring System provides intended function of control, monitoring, communication and visual display of all connected systems including integration with other systems.	1 hr	3 mo.	Compliance with Maintenance Management Plan (MMP). The plan shall be based on the Highway and Rail Transit Tunnel Maintenance and Rehabilitation Manual, Tunnel, Operations, Maintenance, Inspection, Evaluation (TOMIE) Manual, and the Specifications for the National Tunnel Inventory (SNTI). Follow manufacturer's recommendations for maintenance and testing where requirements are more demanding. Continuous monitoring through self-system diagnostics and failure detection.	All elements of Command, Control and Monitoring System functioning as designed 100% of the time.

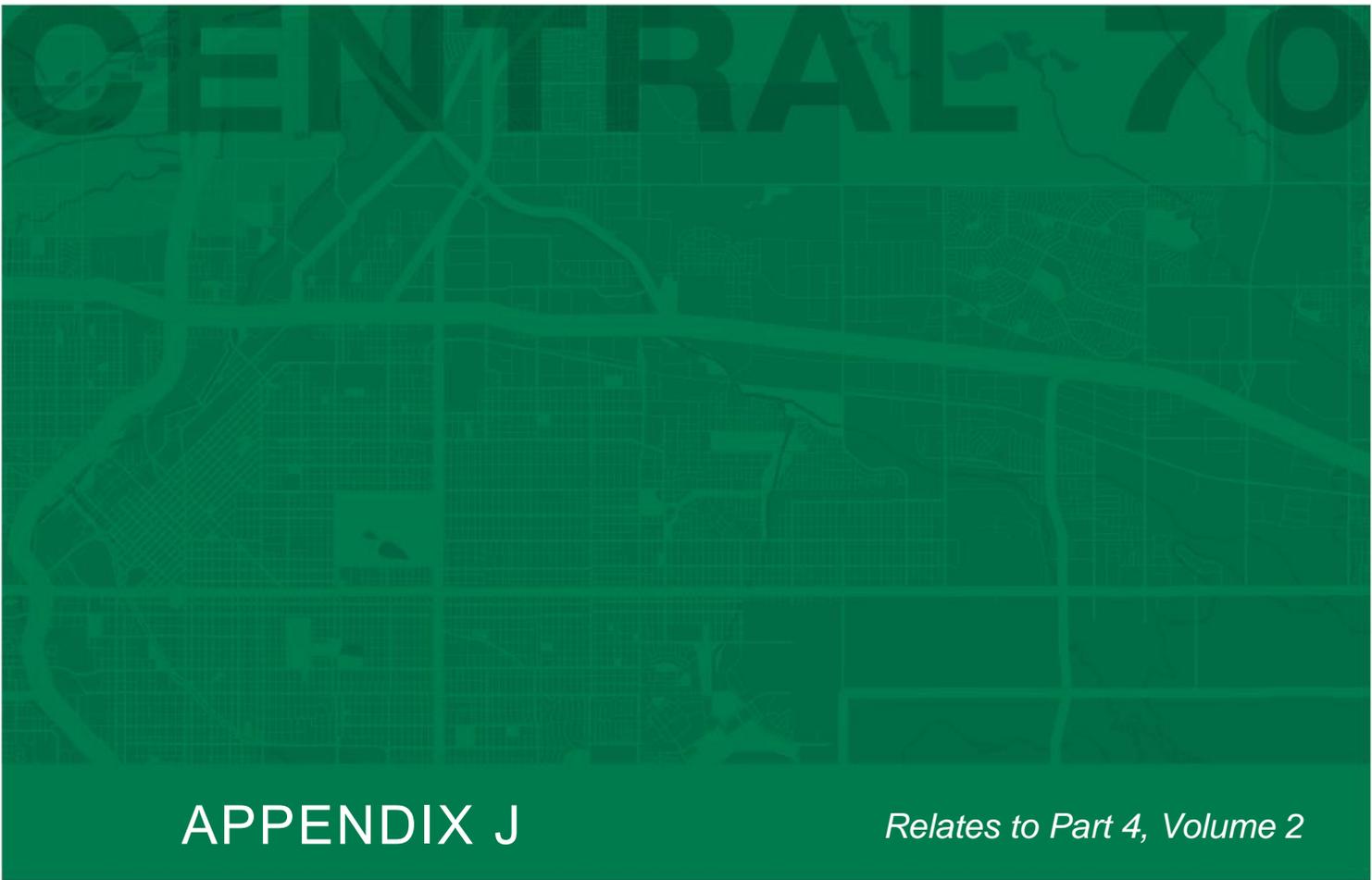
REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
18.14	Electrical Systems, Grounding & LP	Grounding and lightning protection systems provide intended function and level of protection for equipment, structure and personnel protection.	2 hrs	3 mo.	<p>Compliance with Maintenance Management Plan (MMP). The plan shall be based on the Highway and Rail Transit Tunnel Maintenance and Rehabilitation Manual, Tunnel, Operations, Maintenance, Inspection, Evaluation (TOMIE) Manual, the Specifications for the National Tunnel Inventory (SNTI), manufacturer's recommendations and NFPA 780.</p> <p>The fall of potential method shall be used to test the resistance to earth of all grounding electrode systems serving electrical services, lightning protection and alternate energy sources, every 5 years.</p> <p>The continuity of ground connections to remote earth shall be tested during replacement of equipment served or any major change of system configuration.</p>	All elements of Grounding and lightning protection systems functioning as designed 100% of the time.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
18.15	Ventilation System	Ventilation system fully maintained, functional and operational.	2 hrs	3 mo.	<p>Compliance with Maintenance Management Plan (MMP). The plan shall be based on the Highway and Rail Transit Tunnel Maintenance and Rehabilitation Manual, Tunnel, Operations, Maintenance, Inspection, Evaluation (TOMIE) Manual, the Specifications for the National Tunnel Inventory (SNTI), and manufacturer's recommendations.</p> <p>Life Safety preventative maintenance performed and reported bi-annually.</p> <p>Life safety components of the tunnel ventilation system tested annually, Verification of OCC activation and separately, local activation of tunnel ventilation life safety response, annually.</p>	All elements of the ventilation system functioning as designed 100% of the time.
18.16	Cover electrical Supplies	Electricity supplies, feeder panels, transformers, cabinets, switches and fittings are electrically, mechanically and structurally sound and functioning	1 hr	1 mo.	<p>Availability of supply of power and electricity to the cover systems, and in accordance with the Tunnel, Operations, Maintenance, Inspection, Evaluation (TOMIE) Manual.</p>	<p>A continuous availability level of 100% from metered source to all O&amp;M equipment and facilities.</p> <p>Securely in place and free from damages or exposed wiring.</p>

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
18.17	Cover firefighting Water Supplies	Firefighting water supplies, plumbing, pipework and valves mechanically and structurally sound and functioning	1 hr	1 mo.	Availability of supply of firefighting water to the cover systems, and in accordance with the Tunnel, Operations, Maintenance, Inspection, Evaluation (TOMIE) Manual.	A continuous availability level of 100% to all firefighting equipment and facilities.
18.18	Plant rooms	Electricity supplies, panels, cabinets, switches, heating/cooling/air conditioning and fittings are electrically, mechanically and structurally sound and functioning	1 hr	3 mo.	Availability of equipment and systems to the cover systems, and in accordance with the Tunnel, Operations, Maintenance, Inspection, Evaluation (TOMIE) Manual.	A continuous availability level of 100% to all O&M equipment and facilities.  Securely in place and free from damages or exposed wiring.
<b>19. ITS AND ETC FACILITIES</b>						
19.1*	ITS and ETC elements installed by Developer	Fully functional and operational without damages.	24 hrs	48 hr	Operation records; Visual Inspection and/or as identified by Department	No instances of malfunction or damages to devices or equipment, other than planned outages that have prior written approval by the Department.
19.2*	Backbone communication and VTMS	Fully functional and operational without damages.	4 hrs	24 hr	Operation records; Visual Inspection and/or as identified by Department. Follow manufacturer's recommendations for maintenance and testing. Continuous monitoring through self-system diagnostics and failure detection.	No instances of communication or VTMS failures, other than planned outages that have prior written approval by the Department.

REF	ELEMENT	GENERAL REQUIREMENT	DEFECT REMEDY PERIOD		PERFORMANCE REQUIREMENTS	
			Cat 1 Immediate Action	Cat 2 Permanent Repair	MEASUREMENT CRITERIA	TARGET
19.3	ITS and ETC Equipment installed by Developer and Backbone communication	Developer to provide reporting on inefficiencies or malfunction of ITS and ETC equipment, including ramp meters, and backbone communication.	4 hrs	24 hr	ITS and ETC reporting log or records.  Visual inspection and/or as identified by Department.	100% reporting and follow up reporting on equipment corrections, repairs and connections to communication lines to ETC System Integrator and CTMC.
19.4	ITS and ETC civil infrastructure, such as pullboxes, manholes, cabinets, foundations, ITS sign structures, poles.	Fully functional and operational without damages.	24 hrs.	1 mo.	Maintenance records.  Visual Inspection.	100% of time.

\*For the period commencing the operations of the ITS and/or Tolling Equipment installed by the Developer, up to two Calendar Years after Final Acceptance.



# APPENDIX J

*Relates to Part 4, Volume 2*



# Draft Strategic Communications Plan



**SUBMITTED TO:**  
Colorado Bridge Enterprise  
High Performance Transportation Enterprise  
c/o Colorado Department of Transportation



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## SIGNATURE PAGE: APPENDIX J

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PROJECT MANAGER

DATE

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DESIGN-BUILD MANAGER

DATE

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SEGMENT 1 MANAGER

DATE

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SEGMENT 2 MANAGER

DATE



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## RECORD OF REVISIONS

Revision number	Date issued	Pages affected	Comments
0	5/18/2017	All	Proposal Draft Submittal



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## ATTACHMENTS

- **Attachment 1:** Draft Construction Period Communications Plan (CPCP)
- **Attachment 2:** Draft Maintenance and Operations Communications Plan (MOCP)
- **Attachment 3:** Draft Crisis Communications Plan (CCP)
- **Attachment 4:** Communications Team Resumes
- **Attachment 5:** Preliminary Public Involvement Contact Sheet



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## EVALUATION CRITERIA: APPENDIX J, VOLUME 2

The following Evaluation Criteria Matrix aligns the requirements for the Draft Strategic Communications Plan in the Project Agreement with the sections of this plan.

Sch. 14 Section	Item	SCP Section	Section Name	Check
4.1.1	The Developer shall prepare and maintain an overall Strategic Communications Plan consisting of the following individual plans to ensure well-coordinated, two-way communications during each phase of the project:	2.1	Draft Strategic Communications Plan	<input type="checkbox"/>
	<ul style="list-style-type: none"> <li>Construction Period Communications Plan (CPCP)</li> </ul>	Att. 1	These Plans are attached as separate document to the Draft Strategic Communication Plan.	<input type="checkbox"/>
	<ul style="list-style-type: none"> <li>Maintenance and Operations Communications Plan (MOCP)</li> </ul>	Att. 2		<input type="checkbox"/>
	<ul style="list-style-type: none"> <li>Crisis Communications Plan (CCP)</li> </ul>	Att. 3		<input type="checkbox"/>
4.1.2	<b>Each plan shall include:</b>			
	<ul style="list-style-type: none"> <li>Planned communications strategies</li> </ul>	11.0	Communication Strategies	<input type="checkbox"/>
	<ul style="list-style-type: none"> <li>Primary stakeholder communications lists</li> </ul>	Att. 5	Preliminary Public Involvement Contact Sheet	<input type="checkbox"/>
	<ul style="list-style-type: none"> <li>Identification of any PI issues and proposed outreach</li> </ul>	10.0	Identifying Key Issues	<input type="checkbox"/>
	Each plan shall be submitted to the Department for Approval according to the timelines provided in this Schedule. The Developer shall monitor and improve the effectiveness of each plan and resubmit for Acceptance annually upon the anniversary of the initial Approval by the Department or whenever the following conditions exist:			
<ul style="list-style-type: none"> <li>A plan or procedure no longer adequately addresses the matters it was originally intended to address</li> <li>A plan or procedure does not conform to the requirements of this Agreement</li> <li>An audit by the Developer or the Department identifies a deficiency requiring an update</li> <li>Organizational structure changes require revision to a plan</li> </ul>	2.2	Plan Contents and Timeline	<input type="checkbox"/>	

## EVALUATION CRITERIA: APPENDIX J, VOLUME 2

Sch. 14 Section	Item	SCP Section	Section Name	Check
4.1.3	The Developer shall clearly identify in a cover sheet what changes were made in each update to expedite the Department's review. Also, a red line and a final copy shall be provided.	2.3	Plan Modifications	<input type="checkbox"/>
<b>Each plan shall describe the basic roles and responsibilities between the Department and the Developer. In general:</b>				
4.1.4	<ul style="list-style-type: none"> <li>• <b>Department Responsibilities:</b> The Department is responsible for communicating overall vision on the Project including why the Project is needed, what Work will be done, how the Project will benefit customers, how the Project fits into the community, and how the Project fits into broader transportation plans. The Department will communicate the overall purpose of, implementation of, and education on how to use, the Tolloed Express Lanes.</li> </ul>	5.0	Department Responsibilities	<input type="checkbox"/>
	<ul style="list-style-type: none"> <li>• <b>Developer Responsibilities:</b> The Developer is responsible for communicating overall coping information during the Construction Period and the Operating Period including details about the TMP, and other activities that affect residents and businesses.</li> </ul>	6.0	KMP Responsibilities	<input type="checkbox"/>
	<ul style="list-style-type: none"> <li>• <b>Joint Department/Developer Responsibilities:</b> The Developer shall collaborate with the Department to develop key messages related to Construction Work and O&amp;M Work activities. The Department will have final Approval before the messages are disseminated.</li> </ul>	7.0	Joint Department/KMP Responsibilities	<input type="checkbox"/>
	<ul style="list-style-type: none"> <li>○ <b>Government Relations:</b> Throughout the Term, all communication requests received by the Developer from Governmental Authorities shall be immediately referred to the Department (not including those requests related to Project management or coordination for Local Agency Permits). The Developer shall assist in giving timely information to the Department regarding construction activities, and shall participate in meetings as requested.</li> </ul>	7.0	Joint Department/KMP Responsibilities	<input type="checkbox"/>

## EVALUATION CRITERIA: APPENDIX J, VOLUME 2

Sch. 14 Section	Item	SCP Section	Section Name	Check
	<ul style="list-style-type: none"><li>○ <b>Media Requests:</b> The Developer shall make project managers, supervisors, and other area experts available to the Department for assistance in media requests. The Developer shall also assist in media site visits and adhere to media deadlines when possible.</li></ul>	7.0	Joint Department/KMP Responsibilities	<input type="checkbox"/>

**EVALUATION CRITERIA: APPENDIX J, VOLUME 2**

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# 1. Project Summary

## 1.1 KIEWIT-MERIDIAM PARTNERS CORE VALUES

Kiewit-Meridiam Partners (KMP) is committed to delivering the Central 70 Project (Project) with a focus on client relations, achieving the Project goals, and maintaining transparency with the Department. To achieve these objectives, the KMP Team has adopted the following core values:

### KMP Core Values

Every day we strive to fulfill our role as stewards in our communities—after all, we work in our own backyards.

#### STEWARDSHIP



#### PEOPLE

We are relentless in our ongoing focus that *Nobody Gets Hurt*. We hire bright minds that are hungry for the best training available and committed to Team success.



**KMP's four core values form the cornerstone of our company and the sum of our business ethics conduct. We train on these values so that they are constantly on the minds of our leaders and workforce.**



#### INTEGRITY

We conduct ourselves with the highest levels of integrity. We are responsible, accountable, honest, straightforward, and deal fairly with everyone.



#### EXCELLENCE

We focus on quality production, commit to excellence, and encourage new and innovative ideas. We build our work *Right First Time*.



### 1.2 PLAN MANAGEMENT

This Project summary is presented at the start of each Appendix to serve as a quick reference to our core values, the Project overview, our Team’s composition, and our Key Personnel and Critical Staff. We developed each Appendix to demonstrate our understanding of the Project requirements and facilitate timely Approval by the Department after award.

This document describes KMP’s approach for the Work. KMP resubmits this Plan, including an updated Project summary, to the Department as required per the Project Agreement.

All Project plans, including this document, are stored electronically per KMP’s Document Control System (DCS) Plan. Revisions to these documents may be required as the Project progresses, and annual updates are completed in accordance with Section 4.2 of the Project Management Plan (PMP). The latest revision of all Management Plans are stored per KMP’s DCS and submitted to the Department through Aconex.

### 1.3 OVERVIEW

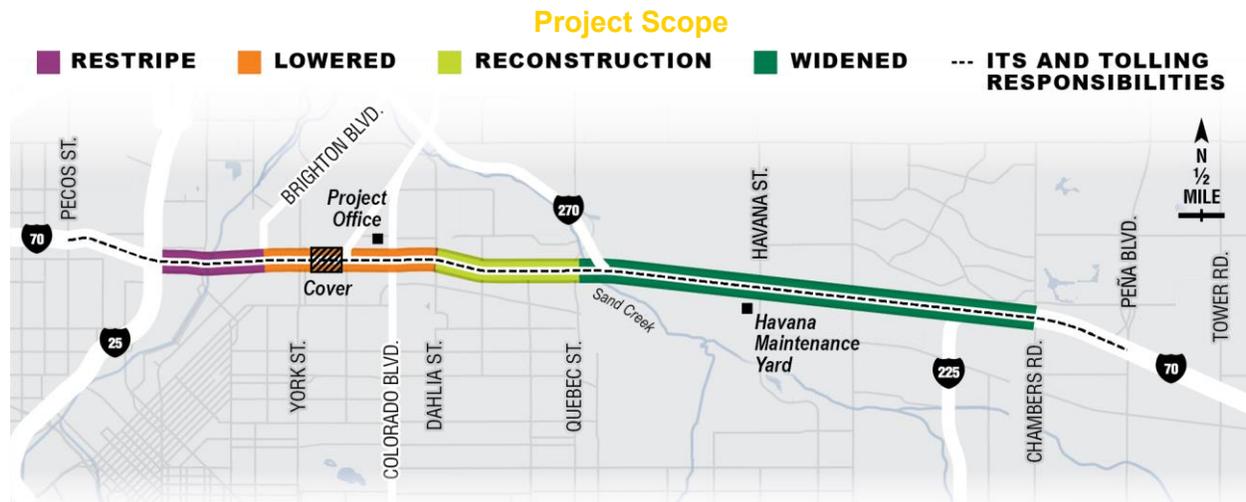
The Project is a Public-Private Partnership to design, build, finance, operate, and maintain planned improvements to the I-70 corridor between I-25 and Tower Road.

The Project’s scope is broken down into the following timeframes:

#### Project Time Frames

Time Frame	Period	Description	Estimated Duration
Notice of Award to NTP1	Submittals	Plan development, submittals, and mobilization of Quality Management staff	3 months
NTP1 to NTP2	Construction	Financial Close and Design	6 months
NTP2 to Substantial Completion	Construction	Construction and O&M During Construction (other than snow and ice control services)	45 months
Pre-Substantial Completion to Substantial Completion	Transition	Transition from Construction to Operating Period, and O&M submittals	8 months
Substantial Completion to Final Acceptance	Operating	Final submissions and inspections	4 months
Substantial Completion to Expiry Date	Operating	Operations and Maintenance (including Renewal Work)	30 years
NTP3 to Term	Construction, Operating	KMP snow and ice control services	33-34 years
62-68 months prior to Expiry Date	Operating	Handback Inspections, Handback Work, and Department training to facilitate seamless handover at Expiry Date	62-68 months

Improvements made by KMP during the Construction Period, highlighted in the figure, are described below.



**1.3.1 RESTRIPE: I-25 TO BRIGHTON BOULEVARD**

Restriping I-70 from I-25 to Brighton Boulevard to accommodate one managed lane in each direction, including:

- Design and Construction for improvements to associated drainage infrastructure

**1.3.2 LOWERED: BRIGHTON BOULEVARD TO DAHLIA STREET**

Full reconstruction of I-70 between Brighton Boulevard and Dahlia Street, including:

- Removing the viaduct between Brighton Boulevard and Colorado Boulevard, and reconstructing the Interstate below grade to accommodate the Ultimate Project roadway configuration and associated elements
- Adding one managed lane in each direction with supporting infrastructure to accommodate a second managed lane in the Ultimate Project roadway configuration
- Removing and replacing the Interstate structures over Brighton Boulevard
- Constructing the Cover and associated elements over the Interstate between Columbine Street and Clayton Street
- Constructing cross-street structures at York Street, Josephine Street, Columbine Street, Clayton Street, Fillmore Street, Steele Street/Vasquez Boulevard, Cook Street, Monroe Street, and Colorado Boulevard
- Constructing I-70 Mainline structures at Dahlia Street
- Removing one Railroad structure, and Constructing two Railroad structures at Union Pacific Railroad (UPRR) and BNSF Railway (BNSF)

**1.3.3 RECONSTRUCTION: DAHLIA STREET TO SAND CREEK**

Full reconstruction of I-70 Mainline between Dahlia Street and Sand Creek, including:



- Adding one managed lane in each direction with supporting infrastructure to accommodate a second managed lane in the Ultimate Project roadway configuration
- Removing and replacing Interstate structures over Holly Street, Monaco Street, Denver Rock Island Railroad, and Quebec Street

#### 1.3.4 WIDENED: SAND CREEK TO CHAMBERS ROAD

Widening I-70 from Sand Creek to Chambers Road with associated elements, including:

- Adding one managed lane in each direction with supporting infrastructure to accommodate a second managed lane in the Ultimate Project roadway configuration
- Removing and replacing the I-270 flyover structure to I-70 eastbound
- Removing and replacing Interstate structures over Peoria Street

#### 1.3.5 INTELLIGENT TRANSPORTATION SYSTEMS (ITS) AND TOLLING RESPONSIBILITIES

Additional ITS and tolling responsibilities, including:

- Closed circuit television (CCTV) camera coverage for I-70 corridor, including interchanges between Pecos Street and Airport Boulevard
- Microwave vehicle radar detection between Pecos Street and Tower Road
- Travel time indicators between Pecos Street and Tower Road
- Lane use signals between Pecos Street and Chambers Road
- Dedicated short range communications radios between Pecos Street and Tower Road

#### 1.3.6 OPERATIONS AND MAINTENANCE (O&M) WORK DURING CONSTRUCTION

Operations and maintenance of existing infrastructure within the O&M Limits During Construction as defined by the Project Agreement, including:

- I-70 Mainline and associated infrastructure
- Local Agency infrastructure
- Drainage
- Water quality
- ITS and electronic toll collection facilities
- Utility services
- Traffic signals and lighting
- Railway structures
- Fencing
- Snow and ice control services (following NTP3)

#### 1.3.7 OPERATIONS AND MAINTENANCE WORK DURING THE OPERATING PERIOD

Operations and maintenance of I-70 within the limits defined by Schedule 11 of the Project Agreement for the Operating Period (dashed line in figure above), including:

- Providing resources to safely maintain the roadway throughout the Term

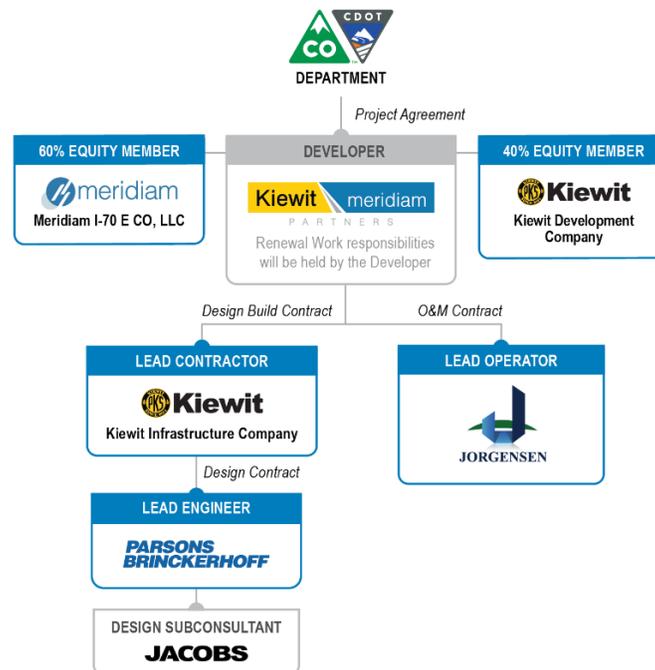
- Asset preservation including repair and Renewal
- Snow and ice control services
- Courtesy patrols
- Incident response
- Meet Handback requirements

### 1.4 KIEWIT-MERIDIAM PARTNERS COMPOSITION

KMP organized a streamlined Team to successfully deliver the Central 70 Project. The Core Proposer Team Members of Meridiam, Kiewit, Parsons Brinckerhoff, and Jorgenson are united by a commitment to Project success under a common project management system. KMP’s lean approach has been cultivated from a history of working together, and by our shared cultures of safety, quality, environmental stewardship, and community service. The KMP Team needs no learning curve to start working together, and is positioned to execute on our joint Project delivery commitments from day one.

KMP’s equity members—Meridiam and Kiewit Development Company—formed KMP for the sole purpose of developing this Project. KMP’s Core Proposer Team Members, shown below, include Kiewit Infrastructure Company (KIC) as the Lead Contractor, Roy Jorgensen Associates (Jorgensen) as Lead Operator, and Parsons Brinckerhoff (PB) as Lead Engineer. Our Team is supported by the expertise of subconsultants and subcontractors who possess additional local knowledge and experience, including Jacobs as PB’s main Design subconsultant. KMP is committed to identifying opportunities to maximize the involvement of small and disadvantaged businesses. Throughout the Project, KMP remains the single point of responsibility for meeting all Project Agreement requirements.

KMP co-locates with the Department in both the Project Office and the Colorado Transportation Management Center (CTMC) to foster a collaborative approach that ensures we meet the Department’s Project goals throughout the Project.





### 1.5 KEY PERSONNEL AND CRITICAL STAFF

The table below shows KMP’s Key Personnel overseeing the Project. KMP has also identified positions, and individuals, as Critical Staff who are instrumental in the successful delivery of the Project.

#### Key Personnel and Critical Staff

Staff Type	Title	Name	Employed by	Seconded to
KEY PERSONNEL	Project Manager	Chris Hodgkins	Meridiam	KMP
	Design-Build Manager	Tom Howell	KIC	
	Construction Manager	Barry Thoendel	KIC	
	Design Manager	Doug Andrew, PE	PB	
	O&M Manager	Abraham Henningsgaard, PE	Jorgensen	
	Project Quality Manager	Gordon Peterson, PE	KIC	KMP
	Independent Design Quality Manager	James Rozek, PE	PB*	
	Construction Process Control Manager	Sean McAfee	KIC	
	Independent Quality Control Manager	Tracy Martin, PE	KIC*	
	Environmental Manager	Jenn Bradtmueller, PE	KIC	KMP
	Utilities Manager	Kevin Custy	Jacobs	KIC
Project Communications Manager	Hunter Sydnor	KIC	KMP	
CRITICAL STAFF	Technical Manager	Martin Currie	KDC	KMP
	Financial Manager	Christopher Couallier	Meridiam	KMP
	Safety Manager	Ben Snow	KIC	KMP
	Construction Safety Manager	Kenyon Manley	KIC	
	Civil Rights Program Manager	Matt Christensen	KIC	
	DBE/ESB Program Manager and Outreach Training Manager	Colean Bemby	KIC	
	Lead Scheduler	Mauricio Solano	KIC	
	Design Integration Manager	Tim Nelson	KIC	
	Deputy Design Manager	Mark Talvite, PE	Jacobs	
	Cover Design Manager	Heath Therrien, PE	PB	
	Commercial Manager	Jamie Harvey, PE	KIC	

*\*Per Approved ATC 9.1 (see Attachment to the Quality Management Plan), KMP shall use in-house personnel in lieu of employees from an Independent Quality Control Firm*

## 2. Introduction

The Department has led an energetic and imaginative community outreach program over the last 14 years to reach the I-70 Record of Decision (ROD), which has invited the participation of thousands of stakeholders in the Project. This investment of time and energy has strengthened relationships with community leaders and businesses, built public trust in the program, and created enthusiasm for potential corridor-wide economic improvement and community revitalization.

KMP is also cognizant of the concerns (“Ditch the Ditch,” Sierra Club) that remain. Our Team is prepared to augment the Department’s messages and follow your direction as we jointly reach out to all groups, whether for or against the Project.

The Department’s concerted effort to reach out to the public resulted in a substantial change to the Conceptual Design of the Project, including lowering the profile, incorporating a community park, and other elements that create neighborhood connectivity. KMP capitalizes on this investment by structuring our approach to provide a collaborative, coordinated Strategic Communications Plan (SCP) that builds on and extends this momentum.

### 2.1 STRATEGIC COMMUNICATIONS PLAN

The KMP Communications Team recognizes the importance of establishing and maintaining two-way communications with residents, businesses, institutions, organizations, commuters, and others who are likely to experience impacts from Construction and long term O&M activities on the Project. We also understand the importance of developing coping strategies that minimize disruption during an inherently disruptive process. Our Team continuously looks to identify and use new and effective ways of communicating with stakeholders and the community throughout the Project.

To encourage well-coordinated, two-way communications during each phase of the Project, our comprehensive SCP comprises several individual plans:

- **Construction Period Communications Plan (CPCP):** We use the CPCP throughout the Construction Period to manage and implement the Public Information (PI) process. A draft copy is attached (Attachment 1). KMP submits the final CPCP to the Department for Approval prior to the issuance of NTP1.
- **Maintenance and Operations Communications Plan (MOCP):** The MOCP continues the two-way communication of Project Information and dialogue with the public that began during the Construction Period, and adapts those tools for use during the Operating Period to manage and continue the PI process. A draft copy is attached (Attachment 2). We send the MOCP to the Department for Approval prior to Substantial Completion.
- **Crisis Communications Plan (CCP):** The CCP describes our response strategy for crisis events and other emergency situations that may occur at any time during the Term, and is coordinated with our overall Incident Management Plan (Appendix I). A draft copy of the CCP is attached (Attachment 3). We submit the final CCP to the Department for Approval prior to issuance of NTP1.



Together, these plans demonstrate KMP's comprehensive and multi-dimensional approach to communications during the Project. We refine the processes and initiatives in the SCP to reflect documented successes and challenges, and changes in technology and communications, allowing our Team to effectively exchange information with the public throughout the Term.

Overall, our approach is to:

- Build and maintain long term, positive relationships in the community
- Encourage a consistent and credible message
- Ensure communication with all relevant parties
- Use communication tools appropriate for the recipients
- Adapt to changing technology and community trends

## 2.2 PLAN CONTENTS AND TIMELINE

Each component of our SCP identifies planned communications strategies, PI issues, proposed outreach techniques, and primary stakeholders.

As a best management practice, we revise our SCP more frequently than Schedule 14 of the Project Agreement requires so that we remain responsive to the Department and the public:

- **CPCP and MOCP:** We develop quarterly communications sub-plans during the Construction Period and the Operating Period that address the Construction or O&M activities occurring in a specific quarter. As each quarter begins, we review best practices from the previous quarter, consider new tools and methods, and make appropriate adjustments to our CPCP/MOCP, and to our SCP documentation and PI process.
- **CCP:** We review the CCP each quarter to reflect the different Construction activities and types of crisis events, and other emergency situations, that have or could occur. We use this information to update the CCP and SCP documentation as appropriate.

In addition to quarterly reviews, we monitor and improve the compliance of each plan with the Project Agreement. We resubmit our plans to the Department whenever they are updated, at a minimum annually, or when:

- The plan no longer adequately addresses its original intent
- The plan does not comply with the Project Agreement
- An audit identifies a deficiency or required update
- The organizational structure requires revisions to the plan
- When the Department requests an update

## 2.3 PLAN MODIFICATIONS

After we update individual communications plans, we provide a written summary of the changes in a cover sheet, a red-line copy, and a final clean copy of the document. We review the plan modifications with the Department's Communication Team to confirm that the revised plans reflect their input.

### 3. KMP Communications Principles

Our Communications Team commits to the following principles, which are fundamental to our communications approach during the Construction Period and the Operating Period:

- Two-way communication with all those involved with the Project, listening and incorporating ideas
- Early and continuous communication with stakeholders and the public using a variety of outreach techniques
- Transparent activities that clearly communicate Project information to stakeholders and the public
- Clear presentation of information that tells the story of the Project and maintains the credibility of the Department and KMP
- Timely response to public input with adaptations to Project approach, if possible
- Proactive communication on key issues—anticipating and answering questions before they are asked

### 4. Communications Team

KMP has structured our Communications Team and PI approach to support the Department in conveying the overall vision, purpose, need, Design, impacts, and benefits of the Project. The following figure identifies the members of our Communications Team. Attachment 4, located at the end of this document, contains the resumes for the leadership of the Communications Team.

Our thoughtful composition of the Communications Team is a direct result of close coordination with the Department and our successful experience on Denver's Transportation Expansion (T-REX) project, the I-255 project, and other similar projects. Since KMP recognizes that the PI effort reflects a dynamic approach, we supplement the Communications Team with additional Communication staff as the Project requires. Project Managers, Construction Managers, and technical staff are available to assist Communication staff, as needed.

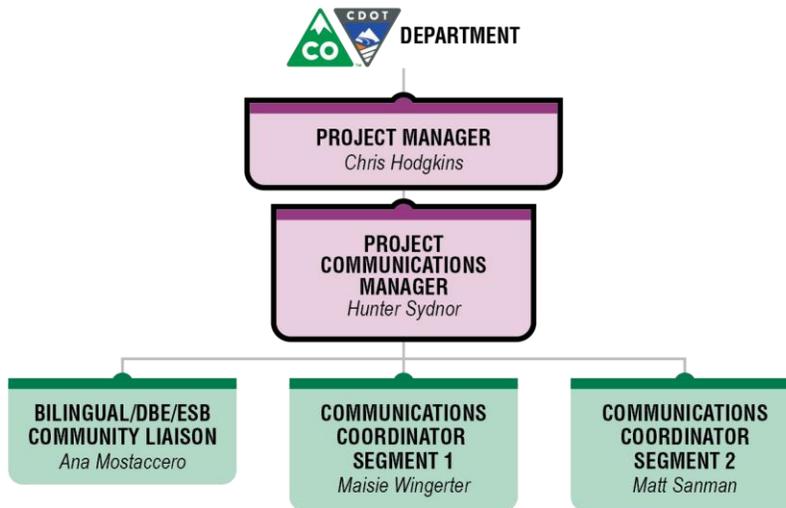


### 4.1 COMMUNICATIONS TEAM STRUCTURE

The following figures identify the structure of our Communications Team, which assigns two dedicated advocates for residents, businesses, and other stakeholders along the Project corridor. The large number of stakeholders, and complexity of issues in the corridor, requires each member of our Communications Team to have a detailed understanding of area-specific Construction activities, and their potential impacts, on each stakeholder group.

#### Communications Team Organizational Chart

■ Key Personnel   ■ Developer   ■ Commercial



## Communications Team Structure

### PROJECT COMMUNICATIONS MANAGER

Hunter Sydnor



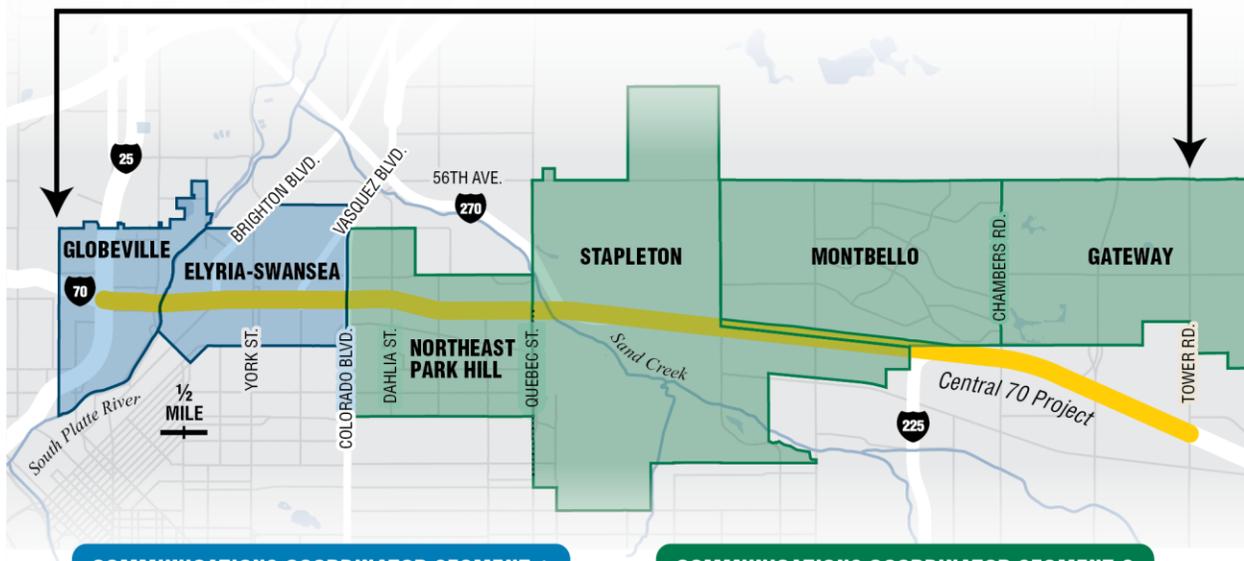
- KMP spokesperson
- Oversees entire KMP communication team
- Strategic Oversight
- PI Taskforce leader

### BILINGUAL/DBE/ESB COMMUNITY LIAISON

Ana Mostaccero



- Translation and cultural services
- One-on-one interaction with stakeholders
- Present at community meetings
- Strategic partnership and community engagement
- DBE/ESB/WFD outreach



### COMMUNICATIONS COORDINATOR SEGMENT 1

Maisie Wingerter

*Globeville, Elyria-Swansea, Northeast Park Hill*



- Residential and small business outreach
- One-on-one interactions with stakeholders
- Present at community meetings
- Staff project information office and hotline

### COMMUNICATIONS COORDINATOR SEGMENT 2

Matt Sanman

*Stapleton, Montbello, Gateway*



- Large business/industrial and through-traveler outreach
- One-on-one interactions with stakeholders
- Present at community meetings
- Staff project information office and hotline



## 4.2 ROLES AND RESPONSIBILITIES

### Communications Team Roles and Responsibilities

Title	Roles	Responsibilities
<b>Project Communications Manager (PCM)</b>	<ul style="list-style-type: none"> <li>• Reports to the Project Manager</li> <li>• Oversees the entire Communications Team</li> <li>• Communicates directly with the Department, Design-Build Manager, Environmental Manager, and Construction Managers</li> <li>• Maintains compliance with the SCP, Construction Period Communications Plan (CPCP), Maintenance and Operations Communications Plan (MOCP), Environmental Compliance Work Plan (ECWP), and Crisis Communications Plan (CCP)</li> <li>• Serves as KMP spokesman</li> <li>• Coordinates with the Department and other stakeholders' communications teams</li> </ul>	<ul style="list-style-type: none"> <li>• Responds to public inquiries, maintains public satisfaction, develops strategic messaging, and participates in community outreach activities</li> <li>• Develops and updates the SCP, CPCP, MOCP, and CCP</li> <li>• Schedules and conducts public meetings, and organizes special events at Project milestones (for example, the removal of the viaduct, or final traffic shifts)</li> <li>• Coordinates with the Department to promptly resolve stakeholder inquiries and complaints</li> <li>• Implements stakeholder surveys, to evaluate message effectiveness</li> <li>• Attends local group and neighborhood meetings, support the Department briefings for elected officials, and participates in Chamber of Commerce meetings</li> <li>• Evaluates and maintains communications tools for maximum effectiveness and transparency</li> <li>• Confirms completion of all Communications requirements under the Project Agreement</li> </ul>
<b>Bilingual/DBE/ESB Community Liaison</b>	<ul style="list-style-type: none"> <li>• Reports to the PCM</li> <li>• Translates Project documents</li> <li>• Provides Spanish language literature and materials for dissemination to the communities</li> <li>• Communicates directly with the local communities and schools</li> <li>• Communicates with the Disadvantaged Business Enterprise/Emerging Small Business Enterprise (DBE/ESB) Program Manager, and the Workforce/Community Development Manager</li> <li>• Works closely with the Communications Coordinators</li> <li>• Maintains compliance of the SCP, CPCP, and CCP</li> </ul>	<ul style="list-style-type: none"> <li>• Develops and leads community outreach for the Elyria-Swansea Neighborhoods</li> <li>• Coordinates with the Department to inform local residents, businesses, nonprofit groups, elected officials, other community leaders about the Project</li> <li>• Provides a single point-of-contact for questions and concerns expressed by stakeholders in Spanish-speaking or LEP communities</li> <li>• Coordinates volunteer community service projects and workforce development programs to benefit Public Information outreach efforts</li> <li>• Assists the Small Business and Workforce Development Team in communicating with the LEP communities</li> </ul>

Title	Roles	Responsibilities
<p><b>Communications Coordinators for Segment 1 and Segment 2</b></p>	<ul style="list-style-type: none"> <li>• Reports to the PCM</li> <li>• Communicates directly with the local communities</li> <li>• Communicates with the Construction Managers and Commercial Manager</li> <li>• Maintains compliance with the SCP, CPCP, and CCP</li> </ul>	<ul style="list-style-type: none"> <li>• Communications Coordinator— Segment 1: Monitors issues within the Globeville, Elyria-Swansea (GES) neighborhoods of RiNo, Cole, Clayton, and Northeast Park Hill for residents, small and large businesses, and the National Western Stock Show Event Center</li> <li>• Communications Coordinator— Segment 2: Monitors issues within the industrial area between Quebec and the end of the Project corridor—including the neighborhoods of Stapleton, Montbello, Gateway, and Aurora</li> <li>• Communicates Construction impacts and coping strategies</li> <li>• Serves as primary point-of-contact for residents and businesses</li> <li>• Develops business access maps, and other written information, for stakeholders and other interested parties</li> <li>• Provides advance notification of changes in access, utility disruptions, and right-of-way (ROW) impacts</li> <li>• Delivers Project updates to neighborhood associations, writes articles for school newsletters, and develops other communications tools to assist residents and businesses</li> <li>• Coordinates with the Project Team to clearly communicate the impacts of various Construction activities on affected stakeholders and travelers through the Project corridor, using the Project hotline, website, mobile app, social media, community presentations, and e-alert system</li> <li>• Supports the DBE/ESB Team (Appendix K) and the Denver small business community by maintaining an integrated Public Communications Strategy for highlighting contracting and employment opportunities for DBE/ESB firms</li> <li>• Hosts periodic Business Owners Forums to inform the business community of potential Construction impacts and upcoming Project milestones</li> </ul>



The Communications Team, the Construction Team, and the Department’s Communication Team co-locate throughout the Construction Period. This assembly of personnel in one office encourages efficient communication among Project staff, ensuring timely and accurate information to the public.

KMP’s extensive PI experience through past projects with the Department allows us to offer a preliminary Public Involvement Contact Sheet (Attachment 5). KMP works with the Department to develop appropriate communications strategies, and finalize the Public Involvement Contact Sheet, to promote unified messaging.

The figure below illustrates our integrated communications strategy for Public Involvement and outreach. The Department’s Communication Team and our Communications Team discuss current concerns and anticipated issues to determine which party—KMP or the Department—leads when communicating with stakeholders and the public regarding specific Project activities. This process establishes unified messaging in one voice and provides consistent, deliberate, and accurate information.

Throughout the entire Project, the KMP Communications Team acts as the coordination point, directing public input and queries to the relevant department within the KMP structure, and conveying responses back to the public, as appropriate. As shown in the figure below, Public Input flows smoothly into KMP and relevant outreach is provided to the appropriate stakeholders in a transparent, clear, and comprehensive fashion.

## Integrated Team Develops Communications Strategy



### 4.3 PROJECT OFFICE

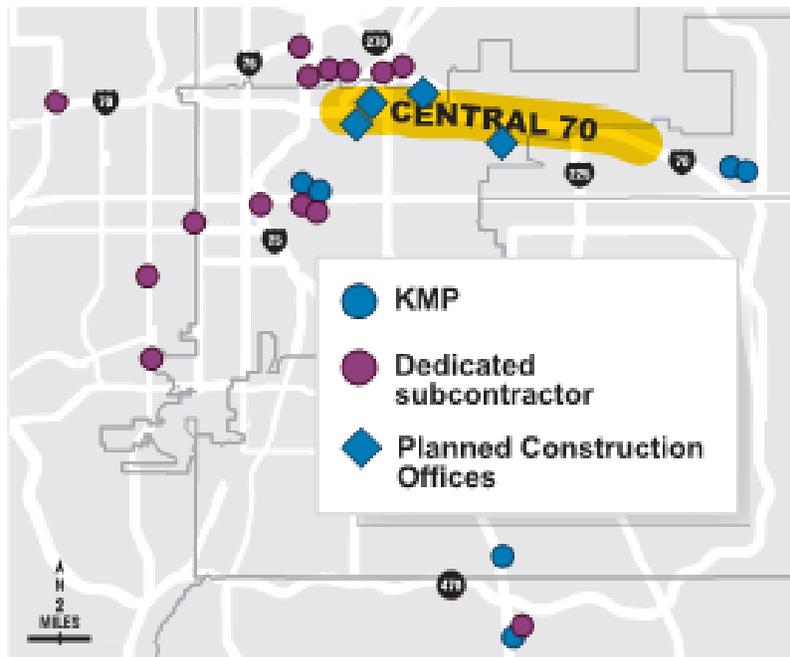
KMP's Project Office is located in the heart of the Project corridor to serve as a gathering place where residents can speak with our Communications Team; learn about Construction activities; and find information about traffic changes, employment opportunities, public transit, community meetings, and small business coping strategies. We invite community members to stop by, meet our Communications Team, and discuss their concerns.

Ana Mostaccero, our Bilingual/DBE/ESB Community Liaison, provides a single point-of-contact for questions and concerns expressed by stakeholders in the Spanish-speaking and Limited English Proficiency (LEP) communities. The Community Office has literature and materials both in English and Spanish for use by the public. Ana is readily available to serve as an interpreter and assist with individual inquiries in Spanish.

KMP's Project Office accommodates small group meetings, Public Information meetings, and open houses, and features a video kiosk; printed information, maps and other displays, and computer and iPad for use by the public.

The Communication Team also has access to other office locations (for example, individual Team member business offices for meetings that must occur downtown). The following figure shows the location of available office spaces. The downtown office locations are accessible by public transit. The KMP Team has offices in the greater Denver area that allow flexible and efficient travel and meeting opportunities.

Office Locations



## 4.4 COORDINATION MEETINGS

### 4.4.1 WEEKLY STRATEGIC COMMUNICATIONS MEETINGS

Our Communications Team holds weekly Strategic Communications meetings with the Department's Communication Team and relevant stakeholders as conditions suggest. We discuss upcoming media advisories/press releases, community meetings, and Construction-specific or O&M-specific communications Work plans developed by KMP's Communications Team. These Work plans cover important events, including major traffic shifts, road closures, bridge or viaduct demolition, or Construction adjacent to sensitive areas (for example, Swansea Elementary School). These communications Work plans follow a detailed schedule to address individual impacts and communicate accurate information to stakeholders and the public regarding upcoming Construction or O&M activities. Our maintenance of traffic (MOT) checklist, stakeholder outreach, and potential issues are also discussed during the weekly meetings. The figure below shows the Communication Team's approach to communicating details for major construction activities.



## Consistency between KMP’s Communications Work Plans and the Department’s Work Plans



### CENTRAL 70 PROJECT

#### Construction Start: Traffic Switch for Viaduct Removal

DATE	Construction to begin summer 2019
ACTIVITY	<ul style="list-style-type: none"> <li>Move current traffic off viaduct</li> <li>Move viaduct traffic to new/completed westbound lanes between Colorado and Brighton boulevards</li> </ul>
GOALS	<ul style="list-style-type: none"> <li>To communicate change in traffic patterns</li> <li>Inform public about upcoming viaduct removal (separate communication work plan)</li> <li>Minimize impacts to commuters and residents</li> <li>Build trust between the public and Kiewit/CDOT by staying in constant communication about construction activities</li> <li>To communicate any changes in construction phasing and schedule</li> <li>Coordinate Communications with CDOT PI team</li> </ul>
FACTS	<ul style="list-style-type: none"> <li>Traffic switch for westbound and eastbound lanes between Colorado and Brighton boulevards</li> <li>I-70 travelers will have different traffic pattern</li> <li>Access to and from I-70 will be shifted to accommodate new traffic patterns</li> <li>Overnight traffic switches</li> <li>Westbound and eastbound traffic switches to happen on different nights</li> </ul>
LIKELY ISSUES	<ul style="list-style-type: none"> <li>Traffic delays during traffic switch</li> <li>Driver confusion with new travel lanes</li> <li>Traffic impacts and possible delays with traffic switch</li> <li>Noise, vibration and lights from equipment—especially at night with adjacent neighborhoods</li> <li>Traffic switches impacting emergency services and bus routes</li> </ul>
MESSAGES	<ul style="list-style-type: none"> <li>Speed limits reduced through work zone for worker and public safety</li> <li>Traffic impacts expected; watch for message boards/signage re-aligning traffic</li> <li>Possible overnight work</li> <li>Construction schedule is weather dependent and subject to change</li> <li>Check website for “know before you go” video for the latest travel pattern</li> <li>Moving traffic onto the new lanes and demolishing the viaduct take construction into the final phase</li> </ul>
COMMUNICATION TOOLS TO PREPARE	<ul style="list-style-type: none"> <li>Develop traffic shift demonstration video for website and social media</li> <li>Develop maps for traffic shifts (visuals for static communication)</li> <li>Meeting with surrounding businesses and neighborhoods most impacted by traffic switch prior to starting work</li> <li>Milestone event to celebrate completion of lowered interstate section</li> <li>Press release/Earned media – emphasis on traffic reporters</li> <li>Newsletter to include construction updates</li> <li>Website – updated weekly</li> <li>Weekly construction update and information line update</li> <li>Traffic shift factsheet – distributed to stakeholders</li> <li>Signage</li> </ul>

Stakeholder	Tasks/Tools/Activity	Timing
<b>I-70 Travelers</b>	<ul style="list-style-type: none"> <li>MOT and signage</li> <li>Construction Hotline Update</li> <li>Website update</li> </ul>	<ul style="list-style-type: none"> <li>MOT and signage at least 7 days prior</li> <li>Weekly Updates</li> <li>At least once a week</li> </ul>
<b>Businesses</b>	<ul style="list-style-type: none"> <li>Business Meeting</li> <li>Identify business that will be impacted and contact information</li> <li>Update contact info</li> <li>Email newsletter</li> <li>Email construction updates</li> <li>Traffic Alert prior to full closure</li> <li>Follow up phone calls as necessary</li> <li>Signage to showcase specific business access</li> </ul>	<ul style="list-style-type: none"> <li>Prior to start of work</li> <li>Prior to construction</li> <li>Prior to start of work – Ongoing</li> <li>Monthly – prior to start of work</li> <li>Weekly</li> <li>At least one week prior</li> <li>At least one week prior to construction activity</li> <li>Prior to construction</li> <li>Notification as per each specific agreement</li> </ul>
<b>Neighborhoods/Residents</b>	<ul style="list-style-type: none"> <li>Email construction alert and fact sheet</li> <li>Verify contacts in database</li> <li>Email newsletter</li> <li>Email construction updates</li> <li>Email traffic alert prior to full closure</li> </ul>	<ul style="list-style-type: none"> <li>7 days Prior to construction activity</li> <li>Prior to construction</li> <li>Monthly – prior to start of work</li> <li>Weekly</li> <li>At 14 calendar days prior to full closures</li> </ul>
<b>Emergency Service Providers:</b> <i>Police, Fire Dept., Ambulance</i>	<ul style="list-style-type: none"> <li>Email newsletter</li> <li>Email construction updates</li> <li>Traffic Alert prior to full closure</li> <li>Call prior to closures</li> </ul>	<ul style="list-style-type: none"> <li>Monthly – prior to start of work</li> <li>Weekly</li> <li>As necessary</li> <li>As necessary</li> </ul>
<b>Elected Officials:</b> <i>City Council, CDOT Board of Directors</i>	<ul style="list-style-type: none"> <li>Email newsletter</li> <li>Email construction updates</li> <li>Weekly construction updates</li> </ul>	<ul style="list-style-type: none"> <li>Quarterly</li> <li>Monthly – Prior to start of work</li> <li>Weekly</li> </ul>
<b>Media:</b> <i>Traffic Reporters and PIOs for CDOT, City and County of Denver, Schools, Churches, Hospitals, Police, Fire</i>	<ul style="list-style-type: none"> <li>Email newsletter</li> <li>Email construction updates</li> <li>Press release for full closures</li> <li>EMS detour alert</li> <li>Story pitches to local reporters</li> <li>Flyover shots with reporters</li> <li>Special story pitches to traffic reporters – radio/T.V.</li> </ul>	<ul style="list-style-type: none"> <li>Monthly – Prior to start of work</li> <li>Weekly</li> <li>At least a week prior to full lane closures</li> </ul>

Throughout all work efforts (Design, Construction, and O&M services), our Team consistently evaluates the effectiveness of its actions, communication tools, meeting formats, and work plans. As appropriate, KMP makes adjustments to future work plans and provides relevant updates.



## 5. Department Responsibilities

Our Communications Team and the Department work together to present consistent messaging throughout the Project. The Department maintains responsibility for communicating with elected officials and leading communications regarding the Project’s overall vision, history, benefits, and role within the state’s broader transportation plans. This includes details for the managed lanes, pricing, implementation, and other relevant information. Our Communications Team supports the Department throughout the Construction and Operating periods with timely responses and providing detailed information on Project schedules and activities.

The next table and subsequent pages illustrate the shared roles and responsibilities for KMP’s Communications Team and the Department during the Construction and Operating periods.

In the rare event of a crisis, the Department leads all communications with elected officials, the media, Department staff, major stakeholders, and the general public.

## Communication Roles

 <p><b>After Award</b></p>	<p>Review, Approve and Accept Communication Plans</p> <p>Strengthen community trust by identifying concerns, developing expectations, and disseminate mitigations measures prior to Construction.</p>	<p><b>TOGETHER</b></p> <p>Foster open, two-way communication through public meetings, phone calls, email, and other outreach efforts;</p> <p>Strengthen community trust by identifying concerns prior to construction;</p> <p>Work together to develop outreach tools that effectively communicate and have a consistent look and feel, such as the Project website and communications collateral.</p>	 <p>KMP will support the Department in communicating overall Project information and generating positive perceptions about community enhancements and improved connectivity;</p> <p>Educate stakeholders about the execution of the work and KMP's plans to minimize impacts such as noise, dust and traffic congestions;</p> <p>Work closely with community groups to talk about KMP processes and learn how to best meet their needs.</p>
<p><b>During Construction</b></p>	<p>Department will communicate to the general public the Project Work Plan, Schedule and benefits derived from a P3 delivery model.</p>	<p>Maintain a strong, visible presence in the community and demonstrate commitment to accessibility, transparency, and community enhancement;</p> <p>Develop energetic and imaginative communications initiatives to engage with the community and sustain positive public perceptions about the Project.</p> <p>Provide accurate and timely details on KMP's environmental mitigation plans.</p> <p>Assure the local community that our construction and operating procedures do not cause new or added harm from existing groundwater.</p> <p>Establish a series of relevant messages to support traffic shifts or major construction events (i.e. viaduct removal)</p>	<p>KMP will lead communicating overall coping information during the Construction Period;</p> <p>Advocate for communities along the Project corridor and work with the Project Team to adjust construction and traffic control plans, where feasible, to minimize impacts and disruptions;</p> <p>Respond to inquiries and provide solutions to community concerns about air quality, noise, fugitive dust and travel impacts;</p> <p>Develop communications strategies and adjust or develop new, more effective communications methods as they become available, keeping the public informed of potential impacts caused by constructions, lane closures, alternate routes.</p>
<p><b>Operating Period</b></p>	<p>Department will communicate description and implementation of Toll Lanes.</p>	<p>Collaborate with Department to develop key messages related to O&amp;M work activities;</p> <p>Clarify unfamiliar, complex, or often misunderstood concepts related the Project's long-term O&amp;M, allowing the public to make informed decisions;</p> <p>Demonstrate our continued commitment to two-way communication and effective public outreach by engaging with the public and determining, with the Department, which O&amp;M activities are warranted.</p> <p>Establish a series of messages to support a seamless transition between the construction and operating periods.</p>	<p>KMP will refine communications processes begun during Construction Period and develop new tools based on changes in technology and communication preferences;</p> <p>Continue excellent customer service by providing timely response to public concerns and inquiries.</p>



## 6. KMP Responsibilities

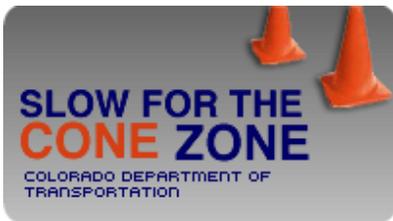
The Department leads PI activities with support from KMP’s Project Communications Team during the Construction Period and the Operating Period. We proactively plan our PI activities from the perspective of the stakeholders to “get ahead” of issues likely to affect the surrounding communities

We develop and implement strategies to maintain positive community and business relationships during Construction activities and required maintenance. We strive to provide stakeholders and the general public with the appropriate type and amount of information that they require to make short term and long term decisions throughout the Term.

Our weekly construction updates and schedules provide notice of pending activities and special messages are developed for key events such as traffic shifts, ramp closures, viaduct removal, normal maintenance services, pavement rehabilitation, or Renewal Work.

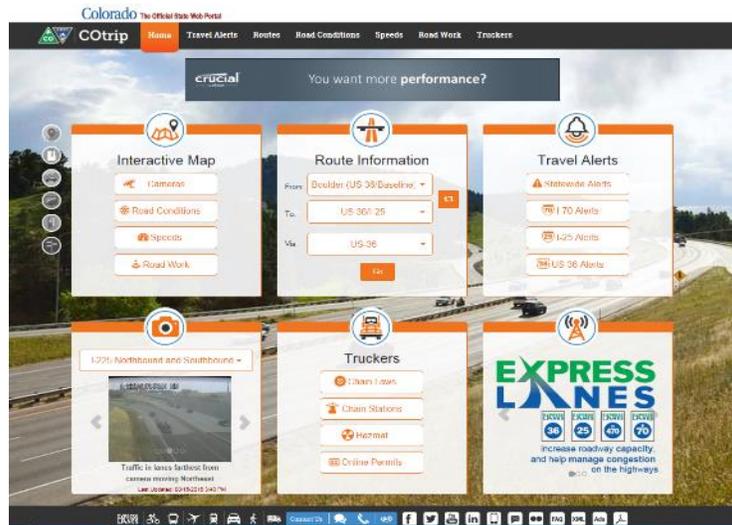
## 7. Joint Department/KMP Responsibilities

Our Communications Team collaborates with the Department to develop key messaging about the Project, Construction and O&M activities, crisis events, and other emergency situations. The Department has final Approval before KMP disseminates Project information to the public. We forward requests for information from elected officials and the media to the Department for response. KMP provides the necessary expertise and staff to answer questions and explain technical information; provide access for Site visits; and prepare presentations, as needed, to fully inform stakeholders and the general public of Project activities.



Campaigns such as “Slow for the Cone Zone” and CDOT’s CoTrip provide commuters and other travelers with awareness, real-time information about traffic conditions, alternative routes, closures, and traffic pattern changes. KMP encourages drivers to use websites and mobile apps to plan travel routes based on real-time traffic information. Text and email message travel alerts are sent to registered users for upcoming major events.

## Real-Time Traffic Information



Our past projects with the Department have highlighted the importance of having strong relationships with elected officials and the media, which helps to establish positive public perceptions of the Project. Quickly answering questions from elected officials and the media promotes greater understanding of the Project and strengthens communication with the public. We also work with the Department to proactively provide elected officials with Project updates on a regular basis. In addition, we participate in meetings as requested. KMP has Project Managers, supervisors, and other technical experts available to assist the Department during Site visits and presentations to elected officials and media organizations.

## 8. Messaging

Our Communications Team promotes a positive image of the Project and the Department. Project messaging focuses on:

- The City and County of Denver, Aurora, and the State of Colorado support businesses and communities in the Project corridor
- The Project improves and reconnects communities and neighborhoods
- The Project promotes safety and reduces travel impacts as much as possible
- The Project promotes economic vitality
- Once complete, the Project provides more reliable travel times along I-70

Our messaging also works to gather input, identifying stakeholders, potential impacts, and community concerns.



## 9. Identifying Stakeholders

Our first step in developing the SCP is to identify stakeholders and key issues. Our Communications Team updates the contact information from the I-70 EIS, FEIS, and ROD to build upon the existing relationships with stakeholder groups. We have started preparing a Public Involvement Contact Sheet (Attachment 5) as required by Schedule 14, Section 3.1.3 of the Project Agreement.

Through KMP’s existing work in Denver and the development of this proposal, our Team has worked closely with all major stakeholders associated with this Project. Whether it is the City and County of Denver, National Western Center, Railroads, utilities, or the local community businesses and schools, our staff have long-standing and positive relationships with key leaders of these groups. These relationships enable our Team to be proactive and timely when responding to their needs, and also to integrate them into the Project’s communication flow.

To further our outreach, we work with Communications Collaborators—individuals, associations, and businesses who distribute emails, newsletters, or social media updates to a wide audience. We provide short, pre-written articles or photography for the Communications Collaborators to use in their electronic communications.

The information we provide includes detailed information on closures or detours, general updates/personal interest items, and an invitation to visit the Project’s website for Construction information. The Communications Collaborators encourage their audiences to send constructive comments and concerns during any stage of the Project.

The next table identifies potential Communications Collaborators.

### Communications Collaborators

Communications Collaborator	Website or Contract Information
Aurora Chamber of Commerce	<a href="http://www.aurorachamber.org">www.aurorachamber.org</a>
Colorado Department of Transportation—Commuter Choices Program	<a href="http://www.codot.gov/programs/commuterchoices">www.codot.gov/programs/commuterchoices</a>
Colorado Tourism	<a href="http://www.colorado.com">www.colorado.com</a>
Comunidades Unidas Globeville, Elyria & Swansea	<a href="mailto:lorenacomunidadesunidas@gmail.com">lorenacomunidadesunidas@gmail.com</a>
Denver Convention and Visitor’s Bureau	<a href="http://www.denver.org">www.denver.org</a>
Denver Hispanic Chamber of Commerce	<a href="http://www.hispanicchamberdenver.com">www.hispanicchamberdenver.com</a>
Denver International Airport	<a href="http://www.flydenver.com">www.flydenver.com</a>
Denver Metro Chamber of Commerce	<a href="http://www.denverchamber.org">www.denverchamber.org</a>
Denver Regional Council of Governments (DRCOG)—RideArrangers Program	<a href="http://www.drcog.org">www.drcog.org</a>
Downtown Denver Business Partnership	<a href="http://www.downtowndenver.com/">www.downtowndenver.com/</a>
Elyria-Swansea—Globeville Business Association	<a href="http://www.esgba.org/members.html">www.esgba.org/members.html</a>
Globeville Civic Partners	<a href="http://www.globevillecivicpartners.org/">www.globevillecivicpartners.org/</a>
Globeville K.A.R.E.S.	<a href="mailto:GlobevilleKares@gmail.com">GlobevilleKares@gmail.com</a>

Communications Collaborator	Website or Contract Information
GoDenver	<a href="http://www.godenverapp.com">www.godenverapp.com</a>
Green Valley Ranch Homeowner Association	<a href="http://www.gvrhoa.com">www.gvrhoa.com</a>
Metro North Chamber of Commerce	<a href="http://www.mtronorthchamber.com">www.mtronorthchamber.com</a>
Mile High Connects	<a href="http://www.milehighconnects.org">www.milehighconnects.org</a>
North Neighborhoods Democratic Council	<a href="mailto:puuden@aol.com">puuden@aol.com</a>
Northeast Transportation Connections	<a href="http://www.netransportation.org">www.netransportation.org</a>
Regional Transportation District	<a href="http://www.rtd-denver.com/">www.rtd-denver.com/</a>
Stapleton Master Community Association	<a href="http://www.stapletondenver.com">www.stapletondenver.com</a>
Traffic.com—Live traffic map	<a href="http://www.thedenverchannel.com/traffic">www.thedenverchannel.com/traffic</a>
VanGo Mobile—Transportation options in Northern Colorado	<a href="http://www.smarttrips.org">www.smarttrips.org</a>
The West Chamber (serving Jefferson County, CO)	<a href="http://www.westchamber.org">www.westchamber.org</a>

## 10. Identifying Key Issues

Our Communications Team supports the Department with a Public Communications Strategy focused on the key issues described in the sections below.

### 10.1 FULFILLING COMMUNICATION AND COMMUNITY OUTREACH COMMITMENTS MADE IN THE I-70 EIS, FEIS, AND APPROVED ROD

KMP supports the Department in honoring Project commitments from the I-70 EIS, FEIS, and Approved ROD by proactively communicating the results of the design build process, and identifying incremental progress towards meeting Project commitments.

#### 10.1.1 PROPOSED OUTREACH ACTIVITIES TO SUPPORT ENVIRONMENTAL COMMITMENTS

KMP’s Communications Team and Environmental Team collaborates to address Preferred Alternative Mitigation Commitments from the I-70 ROD and implement effective strategies to communicate that information to the public. We:

- Meet with Department representatives and stakeholders prior to NTP1, to introduce the Construction Team and establish communications protocols
- Develop effective communications materials in both English and Spanish (for example, clear graphics and short videos) to convey complex environmental topics in a clear and engaging way
- Facilitate responses to inquiries from stakeholders and the public
- Coordinate participation by the Environmental Team in public meetings related to the Project



- Distribute the Environmental Compliance Work Plan (ECWP) to the Department for posting on the Project website
- Communicate with the principal of Swansea Elementary School and appropriate Denver Public School District personnel regarding Construction activities near the school
- Coordinate PI to support education, including science, technology, engineering and math (STEM) programs, and outreach activities regarding sustainability policies and procedures (for example, No Idling Policy, recycling, reuse of materials, energy, water, and other resource conservation initiatives)

The Department implemented many best practices that removed barriers to public participation during the National Environmental Policy Act (NEPA) process. We continue many of these practices, including snacks and translators at the public meetings, and personalized outreach activities, such as door-to-door canvassing or telephone calls.

In addition, we work diligently to provide information and alleviate concerns about air quality, noise, and potentially hazardous materials during Construction. Our Team uses Public Information and outreach activities to address the MOT and access issues that arise, including sidewalk access for children walking to Swansea Elementary School.

Our Communications Team works closely with the Environmental Manager and the Department to coordinate environmental mitigation measures and inform stakeholders of the following items:

- **Air quality:** Our Communications Team works closely with the Environmental Team to explain daily air quality monitoring protocols and dust control measures, such as the use of wind barriers, and covering, wetting, or compacting excavated materials.
- **Noise:** Our Communications Team takes an active role in educating the general public about the rigorous noise monitoring and mitigation program for the Project. Specifically, we:
  - Communicate with individual property owners and communities regarding the schedule for high-noise Construction activities, installation of temporary noise barriers, and Construction of permanent noise walls
  - Support the Benefited Receptor Preference Survey, including developing exhibits, flyers, door hangers, ballots, and return mail envelopes, and conducting the public meeting on the proposed Noise Abatement Design as part of our noise abatement program
  - Communicate with residents in neighborhoods where changes to the permanent noise wall final vertical or horizontal alignment, or any new Type I action, triggers eligibility for new noise abatement measures
  - Offer educational presentations on noise, dust, air quality, and wildlife protection programs

- Support the attainment of a Denver nighttime construction noise permit
- **Access to schools:** Communicate with Denver Public Schools and schools near the Project corridor, including Swansea Elementary School, Garden Place Elementary School, and Bruce Randolph School. These schools are important Project stakeholders that played an active role in the I-70 NEPA processes.
  - Our Communications Team works closely with the Construction leadership, including the MOT Supervisor, to provide specific details on the Safe Routes to School routes for this Project. See Appendix F, Transportation Management Plan for further details.

## The Department’s Safe Routes to School Program for Pedestrians and Bicyclists in K-8

**Quick Links**

- Safe Routes to School
- Training & Curriculum
- Funding & Evaluation
- Events
- Resources

**Overview**

Colorado Safe Routes to School (SRTS) uses a comprehensive approach to make school routes safe for children when walking and bicycling to school. The Colorado Department of Transportation (CDOT) administers Colorado's SRTS program. In Colorado, many communities, parents and schools are fostering a safe environment for their students by using SRTS programs to not only fund education and safe infrastructure, but also to encourage healthy options for our children that are safe for both walking and bicycling.

SRTS programs can improve safety, not just for children, but for the entire community. It provides opportunities for people to increase their physical activity and improve their health. It reduces congestion and pollution around our schools and encourages partnerships.

In 1969, roughly half of all 5-to-18 year olds walked or biked to school. Nearly 90% are driven by auto or bus to school today. SRTS is a Federal-Aid and state-funded program to enable children to walk and bike safely.

Starting a SRTS program presents your school, school district, or community with an opportunity to make walking and bicycling to school safer and more accessible for children, including those with disabilities. Because the needs of every community are unique, each community or individual school may choose to emphasize different components to make its program work. Some schools have worked with engineering to build side-walks or painted crosswalks to enhance safety; while others have focused on education or encouragement by starting programs such as a Walking School Bus to motivate children to be active. Regardless of the focus, safety is the first concern.

Many resources are available to help you build a SRTS in your school or community.

In Colorado, when funds are available, they are distributed to eligible applicants through a competitive process to develop programs for grades K-8. The members of the SRTS Advisory Committee that reviews and selects projects for funding include educators, parents, bicyclists, pedestrians, law enforcement, and transportation planners. School districts, schools, cities, counties, state entities and tribal entities are eligible to apply. Nonprofits need to partner with a state subdivision to apply for funding.

**Contact Us**  
Leslie Feuerborn

**SafeRoutes**  
Colorado Safe Routes to School

<https://www.codot.gov/programs/bikeped/safe-routes>

- Our Communications Team works with the local schools, providing speakers at Back-to-School Nights, information for school websites, information posters, and developing “Do you Know...?” campaign fact sheets on selected means or methods that are needed to construct and operate the Project. These items are available in English and Spanish.

- In addition, we engage with the Department's Safe Routes to School Coordinator to verify walking and biking maps to the schools are current and reflect changes in access during Construction. In conjunction with our MOT Team, we consult with school operations personnel to share Construction schedules, and develop alternate travel routes. For Construction adjacent to Swansea Elementary School, the KMP Team provides fencing to separate the school from Construction activities, conducts safety training for appropriate personnel, and develops educational construction safety programs for students.
- **Access to transit, pedestrian, and bike routes:**
  - We work closely with the Regional Transportation District (RTD) to develop a communications plan if Construction activities impact bus or train routes/stops or bike, pedestrian, and handicap mobility. The communications plan leverages the RTD's existing outreach tools including bus stop signage, onboard announcements, and emails to riders. We explore options for advertising Project information on transit vehicles. We also implement various measures to continuously refresh communication opportunities such as a more grassroots approach of sending a Team member to ride along impacted transit routes and distribute flyers to riders prior to implementing changes to transit service.
  - We collect information on commuting habits in our initial canvassing and meetings with stakeholders and residents. We record the data in the Public Involvement Contact Sheet and use it in targeted email alerts or automated calls.
  - The KMP Team clearly delineates bike access routes within Work Zones, provides access/detour maps on the Project website, and coordinates with Bike Denver and other advocacy groups to publicize the Project and update online maps for their members.
  - We use strategically placed signage to communicate impacts to transit, bicycle, and pedestrian routes. Since some bicyclists, pedestrians, and handicapped individuals on the Sand Creek Greenway Trail may live beyond the Project corridor, we use Onsite signage to highlight important messages.

## 10.2 OVERCOMING LANGUAGE BARRIERS AND EMBRACING ENVIRONMENTAL JUSTICE

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations, directs federal agencies to promote nondiscrimination in federal programs substantially affecting human health and the environment, and provide minority and low-income communities access to Public Information on, and an opportunity for public participation in, matters relating to human health or the environment. Environmental Justice (EJ) requires full and fair access to meaningful involvement by low-income and minority populations during Project planning and development.

The Project corridor contains communities with low-income, minority, Limited English Proficiency (LEP), and other socioeconomically-challenged populations. Our Communications Team understands the need to use a variety of communications methods and multiple languages to reach stakeholders. Although many people own a smartphone, some do not. We use web- and text-based communications, combined with personalized outreach tools, to reach the maximum number of stakeholders, and residents, in the Project corridor.

We use a multi-faceted approach to reach EJ and LEP communities:

- Our Communications Coordinators are onsite at the Project Office to answer questions from the public. They present Project information at community meetings and have one-on-one or small group interactions with EJ or LEP communities, as needed.
- Our Communications Coordinators spend time in the adjacent neighborhoods to provide information about the Project, and to customize an effective Public Involvement and outreach strategy for EJ and LEP communities in the Project corridor.
- Our Communications Team presents a unified and coordinated effort towards Public Involvement and outreach.

We use a multi-faceted approach to overcoming language barriers:

- Our Communications Team includes a Bilingual Community Liaison who is readily available to attend meetings, answer questions, and engage in one-on-one conversations with residents.
- We prepare communications materials and traffic alerts in English and Spanish.
- We supplement our liaison with other language interpreters, the Google Translate mobile app, and bilingual community liaisons to overcome additional language barriers.
- We use personalized methods, such as a friendly telephone call, to communicate with elderly, EJ, LEP, or other stakeholders, who need additional support.

We use high-tech and high-touch communications tools, as appropriate, to connect with stakeholders throughout the Project corridor:



- Before new KMP Team members begin working on the Project, we use the documentary, *Changing Lanes: Preserving Community in the I-70 East Corridor*, to increase the new employee's understanding of the history of I-70 East and its relationship to the Globeville, Elyria-Swansea (GES) neighborhoods.
- We use communications tools such as a fully responsive, Department's mobile-compatible Project website; short informational videos; opt-in text alerts; telephone town halls; virtual, online public meetings; and clear graphics to increase engagement and understanding. This is particularly important to reach members of the GES neighborhoods and specific segments of the traveling public.
- We use informational posters at schools, recreation centers, and libraries to promote knowledge about the Project
- Our Communications Team is visible in, and actively engaged with, the community. Our co-located Project Office serves as a community center and gathering place where individuals can speak to the Communications Team. This face-to-face contact enables residents to learn about Construction activities, and find information about traffic changes, employment opportunities, public transit, community meetings, and small business strategies during the Construction Period.
- We provide Internet access and printers at the co-located Project Office for public use during Construction.
- Our outreach programs and efforts include various education topics on the means and methods required to construct and operate the Project, including appropriate details on operation and maintenance components of the Lowered Section and Cover Park amenities.

### **10.3 COMBATING STAKEHOLDER PARTICIPATION FATIGUE FROM I-70 EIS, FEIS, AND APPROVED ROD PROCESSES**

KMP realizes that some stakeholders are experiencing participation fatigue following the extensive I-70 EIS, FEIS, and Approved ROD processes. Our Communications Team supports the Department in re-energizing stakeholders by using exciting, engaging, and fun outreach activities that build and maintain community support for the Project.

Our Communications Team attends as many regularly scheduled community meetings and events as feasible. We present fun activities that educate and engage the community. Here are some examples of interactive and fun activities:

- Inviting residents to draw their commute routes on an oversized map as an ice-breaker activity at public meetings
- Selecting members of the Construction Team to talk about their jobs, bring materials and equipment for show and tell, and answer questions
- Leading games that teach the types of construction equipment so participants can recognize the machinery they see as Construction progresses
- Distributing small promotional items to reward participation in the activities
- Providing Site tours

- Holding Lunch and Learns where construction experts talk about what they are building
- Displaying videos, high-quality renderings, and 3D or 4D models of the new facility and explaining, in easy-to-understand terms, the benefits of the Project
- Encouraging residents to record a video about what the Project means to them

To generate excitement about the Project, we work with the Department to organize celebration events for Project milestones, including groundbreaking activities, removal of the viaduct, and bridge openings and closings. We continue to engage the community with activities, as we did through participation in Painting the Viaduct and new activities such as constructing a temporary neighborhood playground or developing a temporary garden.

As part of re-energizing the community, community outreach events can include a workforce/construction or technical training session to educate the general public on the types of job skills that are needed during the Construction Period. This could include partnering with local community colleges and trade organizations, such as the Hispanic Contractors of Colorado (HCC), to co-host a series of technical training courses at different outreach events.

We also promote the Project through student activities—Girl/Boy Scout engineering badges, construction safety campaigns, and other fun programs designed to encourage children to think about safety issues, or future careers in the engineering and construction industries.



Source: [Swansea.dpsk12.org](http://Swansea.dpsk12.org)

## 10.4 MEETING A WIDE RANGE OF STAKEHOLDER NEEDS

The Project corridor accommodates a wide range of stakeholders—residents, business owners, the traveling public, community leaders, elected officials, reporters and bloggers, emergency responders, and major national and international corporations. Our Communications Team commits to working with the Department to reach stakeholders and meet their informational needs.



As discussed earlier, we have structured our Communications Team so that individual members serve as a consistent, knowledgeable resource for a specific set of stakeholders along the Project corridor. This allows us to build relationships, identify issues, and customize our communications approach to meet their needs. For example, we have assigned Communications Coordinators to encourage two-way communication with stakeholders near Swansea Elementary School. This Communications Coordinator provides timely, accurate information to the stakeholders regarding potential impacts of Construction activities near Swansea Elementary School, and conveys stakeholder concerns to the KMP Team.

Throughout the proposal development period (2+ years) and through Term, our Team strengthens its relationships with the community, constantly learning about the wide range of stakeholder needs, and refining our Public Involvement Contact Sheet. To encourage participation of as many stakeholders as possible, we identify and honor individual preferences for receiving Project information (telephone calls, email, social media, or text messages).

We develop specific communications strategies for communities, businesses, elected officials, and other stakeholder groups. Our Team has successfully developed, and implemented, Business Survival Guides that provide resources to merchants and other businesses that may be affected by Construction activities. While the Project seeks to avoid any adverse impacts to businesses, we know that some companies may be inconvenienced for a temporary period of time. We assist merchants with promotional strategies for maintaining business operations during Construction. For example, pending the Department's Approval, the Project website could include business specific detour maps, coupon programs, advertising, and safety tips.

## **10.5 ADDITIONAL INFRASTRUCTURE PROJECTS PLANNED NEAR THE PROJECT CORRIDOR**

The City and County of Denver has a long list of infrastructure-related improvements and development projects underway, or planned, near the Project corridor.

Our presence in the community, and our active outreach to the Department and other City/County agencies, allows us to proactively identify and coordinate with the representatives for active, or planned, infrastructure projects near the Project corridor. We understand that key projects such as the Brighton Boulevard Reconstruction and the National Western Center redevelopment are active during the same time as the Project.

KMP's coordination with the representatives for these key projects and other active, or planned, infrastructure projects near the Project corridor facilitates the preparation of Fact Sheets that identify each project. These joint project documents provide stakeholders and the general public with adequate information for understanding the different scopes of work for each project, and provide contact information for additional questions.

Our Communications Team attends periodic meetings at the National Western Center for current information regarding the anticipated redevelopment of the complex. We coordinate closely with our MOT Team to provide visitors with straightforward access to the facility, and update the Project website with detour maps and information related to lane closures and access impacts.

In addition, we work closely with the North Denver Cornerstone Collaborative and communicate with tourist and visitor agencies, such as VISITDENVER and the Chamber of Commerce, to minimize disruption and impacts.

## **10.6 USE OF A PUBLIC-PRIVATE PARTNERSHIP TO DELIVER THE PROJECT**

Stakeholders and the public sometimes misunderstand how public-private partnerships (P3) work and the benefits to the Department and public. With Core Team Members that maintain projects for extended periods, KMP supports the Department in its public outreach throughout the Term, to extend awareness of how P3 can provide cost-effective capital to expedite and accelerate Construction timelines, and ensure quality through solid inspection procedures, and by tying payments for Design, Construction, and O&M services to specific performance standards.

We anticipate the Department and the High Performance Transportation Enterprise (HPTE) will continue to lead P3-related communications, and we are pleased to support these messages in our PI process by emphasizing the benefits of the Project.

The KMP Team continues to support the state of Colorado, and the City and County of Denver, for the Term of the Project, and beyond. We build transportation infrastructure that lasts, and commit to maintaining exciting and reliable outreach activities that support the Department. Beyond strong communication, our Team lives and works within the Project corridors and we continually invest in local community development programs, seek employment and training opportunities for local hires, and provide educational outreach and tutoring for students and residents. We enjoy sharing information about our jobs and the Project.



## 11. Communications Strategies

After identifying stakeholders and their issues, we then identify the best communications strategies for each stakeholder group. The following table shows example strategies for various stakeholder groups.

### Communication Strategies

Stakeholder Group	Potential Concerns	Communication (Coping) Strategy	Communications Tools
<b>Area Residents</b>	<ul style="list-style-type: none"> <li>Nighttime noise</li> <li>Construction dust</li> <li>Air quality</li> <li>Traffic delays</li> <li>Neighborhood traffic (cut-through traffic trying to avoid Construction areas)</li> <li>Property access</li> <li>Pedestrian access</li> <li>Public transit impacts</li> </ul>	<ul style="list-style-type: none"> <li>Conduct community meetings about noise monitoring and develop mitigation plans</li> <li>Moisten soil to reduce dust</li> <li>Publish air quality tests on website</li> <li>Follow vehicle-idling policy and limit equipment storage near residential areas</li> <li>Utilize haul routes that minimize use of local streets</li> <li>Provide clear detour signage so motorists stay on designated roads</li> <li>Reduce ramp and lane closures</li> <li>Maintain pedestrian and driveway access</li> <li>Provide hotline number to call for information or complaints</li> </ul>	<ul style="list-style-type: none"> <li>Door-to-door canvassing</li> <li>Telephone town halls</li> <li>E-alerts and text messages</li> <li>Weekly Construction emails with type, location, and duration of Work</li> <li>Neighborhood meetings</li> <li>Website updates</li> <li>Construction information posters at churches, recreation centers, libraries, and other places where people gather</li> <li>Viewing areas with displays/ explanations of what is happening and why</li> <li>Media updates (with Department Approval)</li> </ul>
<b>Major National Corporations, Regional and Small Businesses</b>	<ul style="list-style-type: none"> <li>Business access for employees, customers, and suppliers due to increased traffic using alternate routes</li> <li>Pedestrian access to property</li> <li>Loss of revenue or sales</li> <li>Change in customer behaviors</li> </ul>	<ul style="list-style-type: none"> <li>Distribute access/detour maps to delivery companies, customers, and employees</li> <li>Maintain lane widths and a turning radius for trucks during Construction</li> <li>Maintain easy access for employees</li> <li>Reduce ramp and lane closures</li> <li>Maintain pedestrian and driveway access</li> <li>Develop new marketing and customer outreach strategies</li> </ul>	<ul style="list-style-type: none"> <li>One-on-one meetings</li> <li>Business Survival Guide</li> <li>Learn-It-Lunch presentations</li> <li>Weekly Construction emails with type, location, and duration of Work</li> <li>Detour/access maps</li> <li>Signage</li> </ul>

Stakeholder Group	Potential Concerns	Communication (Coping) Strategy	Communications Tools
<b>Local Schools</b>	<ul style="list-style-type: none"> <li>Safety of students near a Construction Site</li> <li>Bike/pedestrian access and safety</li> <li>School bus and parent drop-off/pick-up areas</li> <li>Bus route disruptions</li> <li>Neighborhood traffic (cut-through traffic trying to avoid Construction areas)</li> <li>Noise during school hours</li> <li>Dust due to Construction</li> </ul>	<ul style="list-style-type: none"> <li>Provide barriers between schools and Construction Site</li> <li>Provide clear signage for pedestrian and bike access</li> <li>Utilize flaggers along school access routes, where required, directing students/parents/bikes through congested areas</li> <li>Provide detour/access maps to school bus planning organizations</li> <li>Moisten soil to reduce dust</li> </ul>	<ul style="list-style-type: none"> <li>Presentations at PTA/PTO meetings</li> <li>Project information in school newsletters or Friday backpack notes</li> <li>Detour/access maps</li> <li>Project information on school website</li> <li>Weekly Construction emails with type, location, and duration of Work</li> <li>Student training programs on safety around construction</li> <li>Frequent meetings with school principals</li> <li>Weekly bus routing updates for Denver Public Schools</li> </ul>
<b>Commuters/ Commercial Vehicle Operators/ Delivery and Courier Services</b>	<ul style="list-style-type: none"> <li>Increased travel times</li> <li>Lack of predictability in travel times and conditions</li> <li>Detours/access hard to understand or inconvenient</li> <li>Impacts from short term lane closures</li> <li>Road conditions</li> </ul>	<ul style="list-style-type: none"> <li>Provide travel information to the Colorado Motor Carrier's Association and distribution centers</li> <li>Limit number of traffic switches or changes to travel patterns</li> <li>Provide efficient courtesy patrol and road maintenance</li> <li>Provide clear signage directing traffic to shortest detours</li> <li>Establish well signed and safe pull-out and traffic incident investigation sites</li> <li>Utilize "Minor Incident" signage to move vehicles quickly but safely out of traffic</li> </ul>	<ul style="list-style-type: none"> <li>Targeted radio advertising campaigns during drive times</li> <li>E-alerts and text messages</li> <li>Signage</li> <li>Detour/access maps</li> <li>Information to trade organizations</li> <li>Travel times/conditions posted on overhead VMS signage</li> <li>Local Traffic Reporters</li> </ul>
<b>Denver International Airport/ National Western Center/ Taxis, Shuttles, and Rental Car Companies/ Tourist Destinations</b>	<ul style="list-style-type: none"> <li>Road closures and traffic delays</li> <li>Visitors to area cannot find their way</li> <li>Delays getting to and from venues, flights, or events</li> </ul>	<ul style="list-style-type: none"> <li>Provide website links for up-to-the-minute travel information</li> <li>Coordinate Construction activities to avoid peak tourist seasons or major events</li> <li>Communicate that Denver is open for business and welcomes visitors</li> </ul>	<ul style="list-style-type: none"> <li>Targeted advertising campaigns</li> <li>E-alerts and text messages</li> <li>Signage</li> <li>Weekly emails with type, location, and duration of Construction activities</li> <li>Detour/access maps</li> </ul>



Stakeholder Group	Potential Concerns	Communication (Coping) Strategy	Communications Tools
<b>Emergency Response Agencies</b>	<ul style="list-style-type: none"> <li>Road closures and traffic delays</li> <li>Access to homes and businesses</li> <li>Access to, and quick removal of, traffic incidents</li> <li>Road conditions</li> </ul>	<ul style="list-style-type: none"> <li>Provide real-time information to facilitate emergency access through the Project corridor</li> <li>Provide efficient courtesy patrols and road maintenance</li> <li>Provide clear signage to direct traffic to shortest detours</li> <li>Provide emergency response agencies with contact information for Project staff during emergency situations</li> <li>Provide crisis management training to Project staff</li> <li>Establish well signed and safe pull-out and traffic incident investigation sites</li> <li>Utilize “Minor Incident” signage to move vehicles quickly but safely out of traffic (Move-It Law)</li> </ul>	<ul style="list-style-type: none"> <li>Weekly MOT Task Force meetings that include emergency response agencies</li> <li>Weekly Construction emails with type, location, and duration of Construction activities</li> <li>Detour/access maps</li> <li>Meetings to plan for crisis events and other emergency situations</li> <li>Meetings to review major changes in traffic patterns</li> <li>Tabletop debriefing exercises after major incidents</li> </ul>

## 12. Public Information and Outreach Tools

The next step involves identifying Public Information and outreach tools that are most efficient, and appropriate, for the various stakeholder groups and the public.

### 12.1 PHONE AND EMAIL

The Project hotline is an important tool for maintaining two-way communication with stakeholders. We answer hotline calls in real time. Since callers generally prefer to speak with a person, we commit to engaging a call center when the Project Office is closed to ensure all calls are answered in a friendly and timely fashion.

We provide each caller an option of leaving a voicemail or hearing a recorded message (updated at least weekly) with information on Construction activities and impacts. The recorded message system sends an email to the Communications Team when immediate response is needed. We respond to voicemail messages each day throughout the Construction Period and provide 24-hour staffing of the Project hotline during periods of highly impactful Construction activities or extended night Work.

We document all inquiries, including names, addresses, phone numbers, and follow-up actions required in response to inquiries. Inquiries and any follow-up action are entered into Dialog, the web-based contact and issue-tracking database which, in turn, forwards an automated report to the Department and KMP each week.

When caller inquiries require, the Communications Team proactively seeks Department guidance and support to develop a joint and timely response to phone calls and emails.

We encourage callers to sign up for Project updates. We record the date and time of call; contact information (name, phone number, street address, and email address); the location and description of the complaint or request; and the response provided, including date and manner of response. If our Communications Team must forward the request to the Department for a response, we record details of the call for later follow-up.

By tracking caller and email information requests or complaints, we can quickly determine patterns or trends to which we respond with different communications strategies or requests for adjustments to Construction activities.

KMP builds trust and conveys a strong sense of accountability by providing timely responses to public inquiries. Our interactions with stakeholders convey empathy, and focus on promoting understanding of various points of view. The next table presents our response protocol.

### Response Protocol

Type of Communication	Timing of Response
<b>In-person and Hotline</b>	Immediately during office hours (in-person) Same day (initial call) or within 24 hours (including weekends, if Work occurs)
<b>Email and Social Media</b>	Same day (within two Working Days for high volume situations)
<b>Department Staff</b>	As soon as possible (no later than 24 hours)
<b>Public Meetings</b>	Within one week of the meeting

## 12.2 PUBLIC MEETINGS

Although we understand that some stakeholders may be experiencing participation fatigue after the lengthy I-70 NEPA process, we make the PI process and outreach techniques as interesting and informative as possible during the Construction Period and Operating Period. To help re-energize the community, we use the following tools, as appropriate:

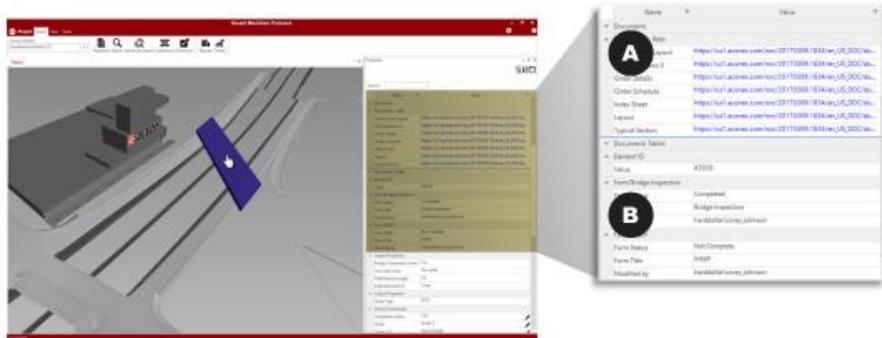
**Hold two public meetings.** We hold the initial set of meetings within one month after start of NTP2, and publicize the meetings through local media, paid advertisements in newspapers, email, inserts in local newsletters, door-to-door flyers, mailers, and other appropriate tools. We use a Department-provided stakeholder list and update it with current local elected officials, City/County staff, and surrounding local agencies, as the foundation for distributing meeting invitations. We use social media to communicate meeting information.

At the first two public meetings, we introduce our Team to the local community, outline ways to involve the general public throughout the Project, present the Project schedule, and review environmental performance commitments to minimize community and other impacts. We also promote the Project hotline/website and encourage attendees to sign up for Construction updates. We hold public meetings within the Project corridor, and, where relevant, try to locate meetings in the neighborhood location(s) closest to upcoming Construction or O&M activities. To increase access to public meetings, we present Project information in English and Spanish.

Our experience on the T-REX project highlighted a lesson learned—anticipate a large crowd and use a facility of sufficient size. We anticipate many new participants to attend these early public meetings, individuals who were not involved in the original NEPA processes. Our Communications Team supports the Department by explaining the elements of the Project to these new participants.

We implement an array of communications activities to reach the greatest number of residents and stakeholders, including:

- **Broadcast live events:** We use various social media tools to offer live viewing of key public outreach meetings.
- **Use social media:** To post meeting content and respond to questions from stakeholders and the general public.
- **Provide food and childcare:** This encourages more residents to attend, and participate in, the public meetings.
- **Hold additional public meetings:** At major milestones during the Project (for example, prior to removal of the viaduct), or as the Department directs.



← **Model Manager Screenshot**  
**A** Historical data including quality inspections, As-Built, and O&M inspections linked directly in Aconex.  
**B** Simple, single-point access to latest MMIS data.

- **Invite speakers and use dynamic displays:** We engage stakeholders with speakers and prepare and display 3D and 4D visualization models of the Project that provide vibrant and clear visual communications. The 3D and 4D models can illustrate Construction activities, including phasing, traffic impacts, and other Project elements to a non-technical audience. Videos of Construction activities and renderings of Final Design can further illustrate the Project. Meeting materials and displays are prepared in English and Spanish to aid LEP residents.

- **Attend regular community and stakeholder meetings:** or community events, as feasible. Non-profit organizations, community associations, and neighborhood groups often hold regularly scheduled meetings that are convenient forums for sharing Project information and updates. These entities can serve as Communications Collaborators by incorporating Project information into their newsletters and websites. We coordinate with the Department to determine meeting attendance, and provide technical staff as required.
- **Incorporate interactive activities:** We develop and present special interest topics and activities like “Meet our Staff,” “How Do You Build That?” or a hands-on building activity during regularly scheduled meetings at local venues. These events often include refreshments and allow participants to mingle with neighbors and Team members.

### 12.3 BUSINESS MEETINGS

During the period from two months prior to NTP2 to two months after NTP2, we organize and lead two additional public meetings specifically focused on local and regional business impacts. We invite members of the KMP Team to describe specific aspects of the Project. For the initial meeting, we recommend a brief presentation on Construction details, phasing, and timing, as well as an overview of the Business Survival Guide. Project representatives are stationed throughout the room to meet with businesses on a one-on-one basis to discuss their specific questions or concerns.

At Project milestones, we host additional meetings focused on local and regional business impacts (for example, major or extended road closures) and attend periodic meetings with business stakeholders during the Construction Period.

### 12.4 SOCIAL MEDIA

Social media, including both existing and future services, are useful tools for communicating Project information to a portion of the public. To build a following on social media, we have reserved a Project Construction Facebook account, Twitter handle, and other emerging social media platforms that are activated immediately upon award. While the Department currently maintains a strong social media presence, enhanced Project-specific sites like KMP’s provide capacity for posting corridor-specific messages that engage targeted audiences.

The Department’s Project website always serves as the primary electronic source for Project-related information; however, social media offers additional outreach for collecting and driving visitors to the website. We dedicate a member of the Communications Team to follow social media, repackage Project website content, and develop social media campaigns that support the Project. With many outreach tools focus on stakeholders within the Project corridor, social media helps us reach daily commuters or travelers who use I-70 less frequently.



Our social media posts are provided to the Department for Approval one Working Day prior to inclusion on social media. While all sites carry a disclaimer and easy-to-understand instructions, we recognize that social media has potential risks and needs to be managed to combat inappropriate comments. Our Communications Team closely monitors our social media sites using Adobe's real-time alerts.

## **12.5 PUBLIC INVOLVEMENT CONTACT SHEET**

Our Communications Team has prepared a Preliminary Public Involvement Contact Sheet with the names of key stakeholders as required by Schedule 14, Section 3.1.3 of the Project Agreement. See Attachment 5 at the end of this document. We use the Department's database, established through the I-70 EIS, and the Department's GovDelivery messaging system to augment our Public Involvement Contact Sheet. The full KMP contact sheet/database is submitted to the Department for Approval prior to issuance of NTP2 and is continually updated throughout the Term.

## **12.6 PROJECT TOURS AND OTHER EVENTS**

Project tours and other events are a great way to engage the community, show progress, and celebrate achievements during the Project. Our Communications Team helps with organizing events that highlight major milestones during the Project (for example, groundbreaking activities, removal of the viaduct, and opening of new travel lanes/ramps/sidewalks). These events play an important role in promoting transparency and educating stakeholders on the Construction process. We partner with the Department to participate in the coordination and delivery of these fun events.

We also develop specific Construction viewing areas throughout the Project limits that give neighbors, and other interested parties, an opportunity to watch the progress of Construction activities from a safe distance. The Construction viewing areas have weather-protected displays that explain what is currently happening during Construction. We supplement these Construction viewing areas with periodic Project tours and additional informational displays, as needed.

## **12.7 LANE CLOSURE REPORTS**

Our Communications Team works closely with the MOT Team to include easy-to-understand, accurate information for distribution in the weekly Lane Closure Reports. We submit reports each Thursday to the list of contacts provided by the Department, and outline activities for the following week (Saturday-Friday), as required by Schedule 10, Section 2 of the Project Agreement. We change technical information for social media, presentations, and other external communications, and for website updates and traffic alerts. We coordinate with the MOT Team to plan advance road closure notifications by reviewing upcoming road closures at the MOT Task Force meetings and confirming entries in the MOT checklist.

## 12.8 TRAFFIC ALERTS

The Department's existing tools, including GovDelivery and COTRIP, are valuable resources in disseminating traffic alerts to commuters and other travelers in the Project corridor. A weekly construction update email is submitted each Thursday and includes the I-70 Mainline, and state and local roadways that traverse the Project, and other Construction activities that might impact commuters and other travelers. We also provide traffic alerts regarding emergency road repairs to the Traffic Operations Center (TOC) for immediate distribution. The KMP weekly Strategic Communications meetings include discussions of upcoming traffic alerts.

## 12.9 WEBSITE UPDATES

The Department's Project website serves as the primary source for Project-related information. In many cases, our first opportunity to engage stakeholders includes encouraging them to access the Project website and sign-up for Project updates using email, text, and other tools.

The Department and KMP jointly develop content for the Project website and we use website content and Project updates to proactively answer questions from the general public. We also include links to/from other sites (for example, Cities, Counties, RTD, Northeast Transportation Connections, and other appropriate websites). Weekly website updates, or more frequent updates, should events dictate, provide pertinent schedule information, new photos, and current contact information.

Webcam videos or KMP-produced videos are available on the Project website to address community impacts, Construction challenges, and other important issues that explain complex engineering activities in layman's terms. KMP works with the Department to determine video topics as the Project progresses. Some video topics could include interviews with Key Personnel, updates about specific Project milestones, or other more technical aspects such as a "How is that Built?" series, showing, for example, the sequence of Construction, the complexity of the Project, or details of the design build delivery process.

In addition, the website includes detour maps, coupon programs for corridor businesses impacted by the Project, advertising, recycling locations, and safety tips. The website offers an opportunity to generate excitement—with video and photos that put a face on the Project and celebrate Project milestones. We forward for Approval all proposed video updates to the Department two Working Days prior to inclusion on the website.

## 12.10 PROJECT NEWSLETTERS

Throughout the Construction Period, our Communications Team prepares and distributes a monthly newsletter to inform stakeholders of Project purpose and Schedule, upcoming Construction impacts, job fairs, and subcontracting opportunities. The newsletter includes a Project Map; a business spotlight section; a Get to Know Your Team feature; interesting construction facts; a construction safety message, contact information, and other relevant items. We publish the newsletter in English and Spanish.



We design, and publish, the first newsletter within 30 days after NTP2. We forward the newsletter to the Department for Approval before distributing the newsletters through US Mail and email to stakeholders listed on the Public Involvement Contact Sheet. Newsletters will also be distributed in person at public meetings and community events.

### 12.11 LANGUAGE ASSISTANCE FOR PERSONS WITH LIMITED ENGLISH PROFICIENCY

Our Bilingual Community Liaison, Ana Mostaccero, is readily available to assist with individual inquiries, provide Spanish translations of communications materials, and serve as an interpreter at public meetings. The KMP Team’s bilingual managers and engineers also work with Ana to support and enhance our connection with the Spanish-speaking community—demonstrating the diversity of our Team.

In addition, we provide translations in other languages as needed. We develop communications tools and processes using visual illustrations for individuals who are unable to read or write, and audio tools for those who are visually impaired.

Our Communications Team documents our efforts to communicate with persons with LEP, and records all requests for language assistance in the quarterly Construction Period Communications Plan (CPCP) report.

### 12.12 PUBLIC COMMUNICATIONS COLLATERAL

We collaborate with the Department to determine which communications tools to use—newsletters, fact sheets, emails, flyers, or social media. We forward communications materials to the Department for Approval prior to distribution. The Department reviews all communications materials prior to distribution and follows *The Colorado Brand Guidelines*. We prepare all communications materials that are intended for broad distribution in both English and Spanish.

### 12.13 PHOTOS/VIDEO

Photos and videos provide a clear method of describing the Project—whether the goal is to show progress or explain an impact. Each member of our Communications Team has a mobile phone and captures photos or videos for use in social media or in printed materials.

Photos and videos may include traffic control, paving, slope repair, erosion control, bridge construction, drainage, and other conditions for use in reports to interested agencies, social media, flyers, and other communications materials. We hire a professional photographer at regular intervals to visually document progress during Project Construction, and coordinate with the Department to develop videos, such as a “How is that Built?” series. Videos can highlight important topics including safety around construction areas, or deliver human interest stories focusing on construction crews, neighborhoods, residents, or businesses owners in the Project corridor.

KMP installs a webcam to record live action Construction activities that are made available on the website to show viewers daily progress on the Project. Each month, KMP submits at least two of the best, most compelling photos or videos to the Department. We hold a community member photo of the month contest to build excitement for the Project and encourage community participation in the Project. We also provide professional aerial photographs annually to show progress of the Project throughout the Construction Period.

## 12.14 PROJECT IDENTIFICATION SIGNAGE

Following the standards in the *Manual on Uniform Traffic Control Devices*, the KMP Team installs one large Project identification sign in each direction of travel along the I-70 Mainline. The Department reviews the signs prior to installation and we install the signs within 14 days after NTP2. The signs include the Project logo, start and completion dates, hotline number, website, and other relevant information.

## 12.15 ADDITIONAL PUBLIC INFORMATION AND OUTREACH TOOLS

The following table shows an array of interactive and engaging communication and outreach tools that the KMP Team can provide. We tailor these communication and outreach tools to meet individual stakeholder needs and to reflect specific Construction impacts, while also remaining flexible to accommodate changing community dynamics and evolving electronic media outlets.

### Options for Public Information and Outreach Tools

**Automated phone calls and text alerts:** to help travelers *Know Before You Go* and update the status of Construction activities along the Project corridor.

**Proactive media relations:** in coordination with the Department, to develop stories of interest to the community and communicate important features (for example, how to travel through the Cone Zone).

**Door-to-door canvassing:** to promote the Project hotline/website and collect email addresses for future communications. Enlist the help of residents to do canvassing at a community canvassing day, give colorful t-shirts to canvassers, and distribute refrigerator magnets with Project contact information.

**Mobile Public Information Office:** to maintain a strong, visible presence in the community and bring the core function of the Project Office to residents and stakeholders.

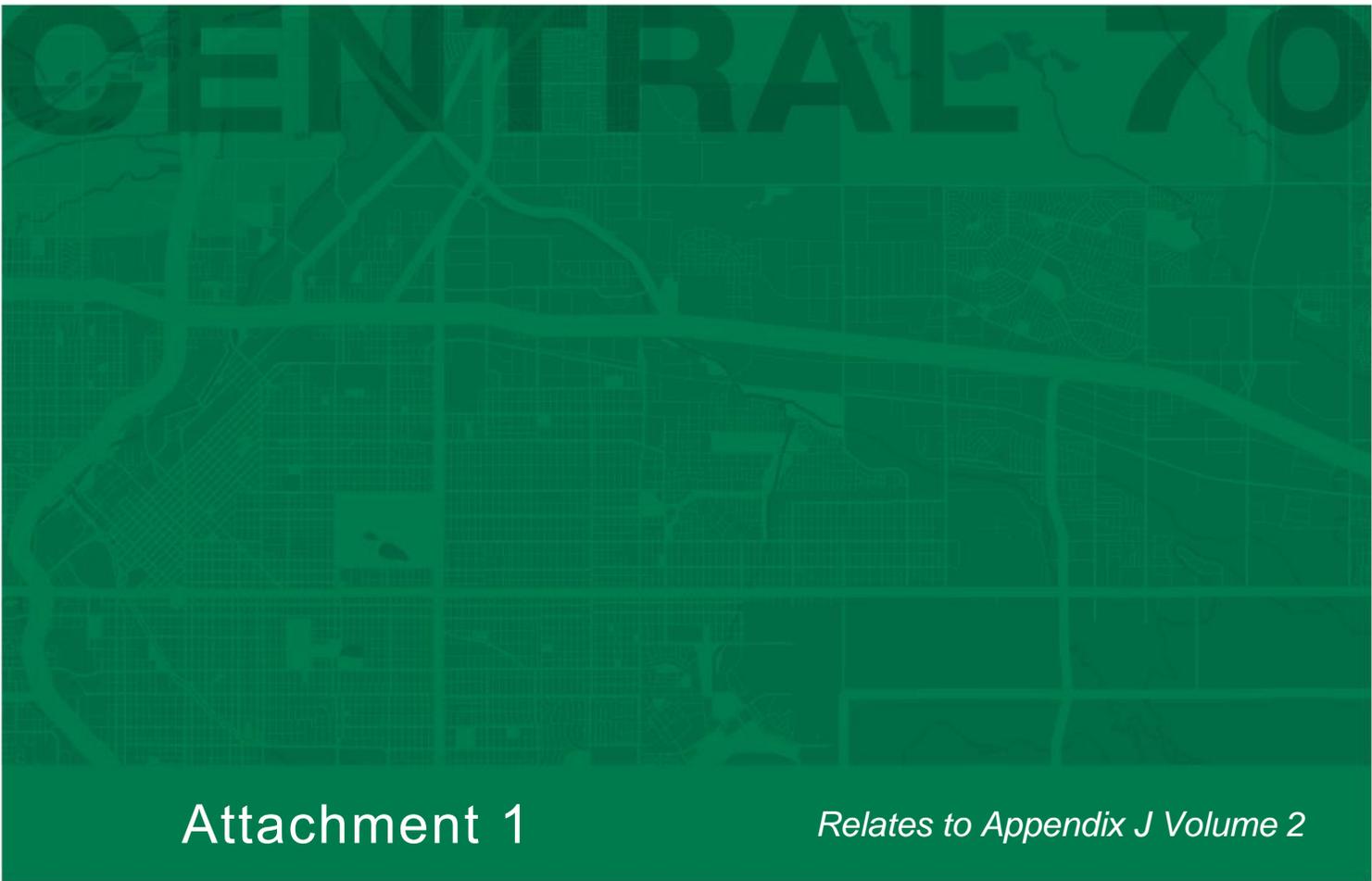
**Targeted advertising campaigns:** on radio and television, to inform residents/commuters about major traffic shifts, Construction activities, and employment opportunities.

**Food Truck:** located near schools, churches, recreation centers, or other community facilities to introduce our Team and discuss the Project with the community.

**Telephone Town Halls:** to communicate Project updates to large groups without having them leave home. These town halls do not require special technology and can be held in English and Spanish.

**Construction Safety Coloring Book:** to teach children in adjacent neighborhoods, and especially at the Swansea Elementary School, about safety around Construction areas, and how to walk and ride their bikes through the area safely.

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Attachment 1

*Relates to Appendix J Volume 2*



# Draft Construction Period Communications Plan



**SUBMITTED TO:**

Colorado Bridge Enterprise  
High Performance Transportation Enterprise  
c/o Colorado Department of Transportation



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## RECORD OF REVISIONS

Revision number	Date issued	Pages affected	Comments
0	5/18/2017	All	Proposal Draft Submittal



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## 1. General Requirements

The KMP Communications Team recognizes the importance of establishing and maintaining two-way communications with residents, businesses, institutions, organizations, and others likely to be impacted by Project construction and the long term Operation and Maintenance (O&M) of the Project. We also recognize the importance of developing strategies to minimize disruption during an inherently disruptive process. Our team will use new and effective ways of communicating with stakeholders and the community throughout the Project.

This Construction Period Communications Plan is part of the overall Strategic Communications Plan and is based on the same communication principles. KMP will use this plan throughout the construction period and for phasing into the Operations and Maintenance Communication Plan. We will submit this plan for approval prior to NTP1 and will review and update it quarterly with input from the Departments Communication team.

- KMP Communications Principles
- Our Communications Team commits to the following principles, which are fundamental to our communications approach during the Construction Period:
- Two-way communication with all project stakeholders—actively listening and incorporating ideas
- Early, ongoing communication with stakeholders and the public using a variety of outreach techniques
- Transparent operations and clear, trustworthy communication of Project information to stakeholders and the public
- Consistent maintenance of the credibility of the Department and KMP
- Timely response to public input and Project approach adjustments when possible
- Proactive communication on key issues—anticipating and answering questions before they are asked

## 2. Communications Team Structure

Our Communications Team will thoughtfully organize and execute this plan. Our team includes a dedicated Liaison for residents, businesses, and other stakeholders along the Project corridor. The large number of stakeholders, and complexity of issues in the Project corridor, requires each member of our Communications Team to have a detailed understanding of area-specific construction activities, and potential impacts, on each stakeholder group. The following chart shows our Communications Team structure:



## Communications Team Structure

### PROJECT COMMUNICATIONS MANAGER

## Hunter Sydnor



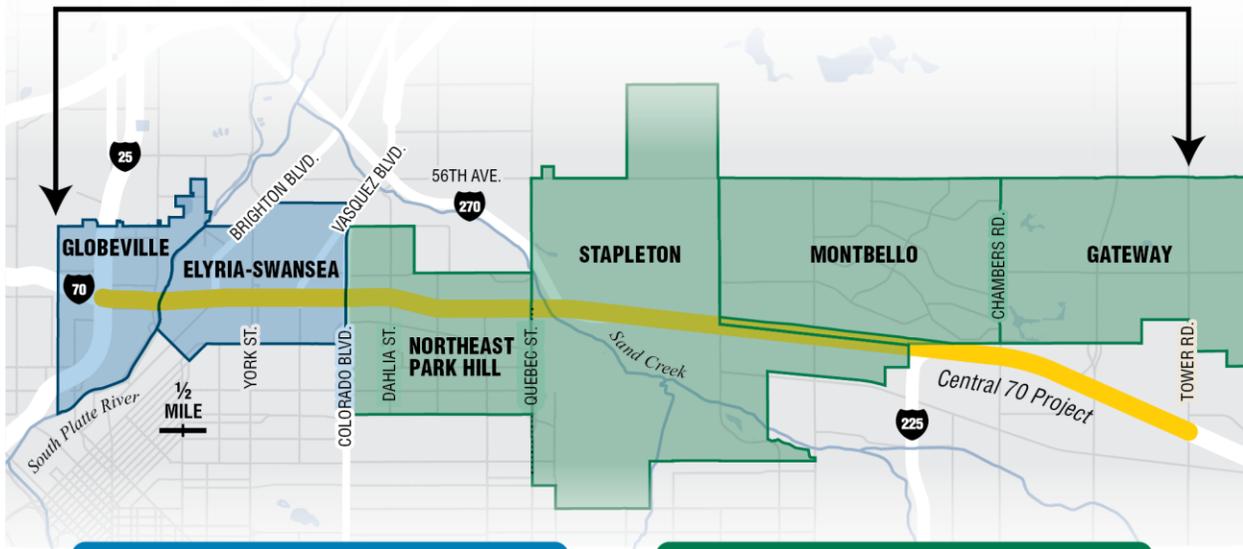
- KMP spokesperson
- Oversees entire KMP communication team
- Strategic Oversight
- PI Taskforce leader

### BILINGUAL/DBE/ESB COMMUNITY LIAISON

## Ana Mostaccero



- Translation and cultural services
- One-on-one interaction with stakeholders
- Present at community meetings
- Strategic partnership and community engagement
- DBE/ESB/WFD outreach



### COMMUNICATIONS COORDINATOR SEGMENT 1

## Maisie Wingerter

*Globeville, Elyria-Swansea, Northeast Park Hill*



- Residential and small business outreach
- One-on-one interactions with stakeholders
- Present at community meetings
- Staff project information office and hotline

### COMMUNICATIONS COORDINATOR SEGMENT 2

## Matt Sanman

*Stapleton, Montbello, Gateway*



- Large business/industrial and through-traveler outreach
- One-on-one interactions with stakeholders
- Present at community meetings
- Staff project information office and hotline

## 2.1 ROLES AND RESPONSIBILITIES

### Communications Team Roles and Responsibilities

Title	Roles	Responsibilities
<b>Project Communications Manager (PCM)</b>	<ul style="list-style-type: none"> <li>• Reports to the Project Manager</li> <li>• Oversees the entire Communications Team</li> <li>• Communicates directly with the Department, Design-Build Manager, Environmental Manager, and Construction Managers</li> <li>• Maintains compliance with the SCP, Construction Period Communications Plan (CPCP), Maintenance and Operations Communications Plan (MOCP), Environmental Compliance Work Plan (ECWP), and Crisis Communications Plan (CCP)</li> <li>• Serves as KMP spokesman</li> <li>• Coordinates with the Department and other stakeholders' communications teams</li> </ul>	<ul style="list-style-type: none"> <li>• Responds to public inquiries, maintains public satisfaction, develops strategic messaging, and participates in community outreach activities</li> <li>• Develops and updates the SCP, CPCP, MOCP, and CCP</li> <li>• Schedules and conducts public meetings, and organizes special events at Project milestones (for example, the removal of the viaduct, or final traffic shifts)</li> <li>• Coordinates with the Department to promptly resolve stakeholder inquiries and complaints</li> <li>• Implements stakeholder surveys, to evaluate message effectiveness</li> <li>• Attends local group and neighborhood meetings, support the Department briefings for elected officials, and participates in Chamber of Commerce meetings</li> <li>• Evaluates and maintains communications tools for maximum effectiveness and transparency</li> <li>• Confirms completion of all Communications requirements under the Project Agreement</li> </ul>
<b>Bilingual/DBE/ESB Community Liaison</b>	<ul style="list-style-type: none"> <li>• Reports to the PCM</li> <li>• Translates Project documents</li> <li>• Provides Spanish language literature and materials for dissemination to the communities</li> <li>• Communicates directly with the local communities and schools</li> <li>• Communicates with the Disadvantaged Business Enterprise/Emerging Small Business Enterprise (DBE/ESB) Program Manager, and the Workforce/Community Development Manager</li> <li>• Works closely with the Communications Coordinators</li> <li>• Maintains compliance of the SCP, CPCP, and CCP</li> </ul>	<ul style="list-style-type: none"> <li>• Develops and leads community outreach for the Elyria-Swansea Neighborhoods</li> <li>• Coordinates with the Department to inform local residents, businesses, nonprofit groups, elected officials, other community leaders about the Project</li> <li>• Provides a single point-of-contact for questions and concerns expressed by stakeholders in Spanish-speaking or LEP communities</li> <li>• Coordinates volunteer community service projects and workforce development programs to benefit Public Information outreach efforts</li> <li>• Assists the Small Business and Workforce Development Team in communicating with the LEP communities</li> </ul>



Title	Roles	Responsibilities
<p><b>Communications Coordinators for Segment 1 and Segment 2</b></p>	<ul style="list-style-type: none"> <li>• Reports to the PCM</li> <li>• Communicates directly with the local communities</li> <li>• Communicates with the Construction Managers and Commercial Manager</li> <li>• Maintains compliance with the SCP, CPCP, and CCP</li> </ul>	<ul style="list-style-type: none"> <li>• Communications Coordinator— Segment 1: Monitors issues within the Globeville, Elyria-Swansea (GES) neighborhoods of RiNo, Cole, Clayton, and Northeast Park Hill for residents, small and large businesses, and the National Western Stock Show Event Center</li> <li>• Communications Coordinator— Segment 2: Monitors issues within the industrial area between Quebec and the end of the Project corridor—including the neighborhoods of Stapleton, Montbello, Gateway, and Aurora</li> <li>• Communicates Construction impacts and coping strategies</li> <li>• Serves as primary point-of-contact for residents and businesses</li> <li>• Develops business access maps, and other written information, for stakeholders and other interested parties</li> <li>• Provides advance notification of changes in access, utility disruptions, and right-of-way (ROW) impacts</li> <li>• Delivers Project updates to neighborhood associations, writes articles for school newsletters, and develops other communications tools to assist residents and businesses</li> <li>• Coordinates with the Project Team to clearly communicate the impacts of various Construction activities on affected stakeholders and travelers through the Project corridor, using the Project hotline, website, mobile app, social media, community presentations, and e-alert system</li> <li>• Supports the DBE/ESB Team (Appendix K) and the Denver small business community by maintaining an integrated Public Communications Strategy for highlighting contracting and employment opportunities for DBE/ESB firms</li> <li>• Hosts periodic Business Owners Forums to inform the business community of potential Construction impacts and upcoming Project milestones</li> </ul>

## 2.2 HOW THE TEAM WILL WORK

KMP's Communication team will be in constant contact with the design, construction, Maintenance of Traffic (MOT), and environmental teams to: 1) Stay informed on all issues affecting stakeholders, and 2) Communicate stakeholder feedback. Our team has over 20 years of combined experience working with design and construction, and we are experts in facilitating productive communication—we use these assets to develop effective communications plans.

Our Communications Team will hold weekly Strategic Communications meetings with the Department's Communication's Team. We will discuss upcoming media advisories/press releases, community meetings (for example, viaduct removal near Swansea Elementary School), Lane Closure Reports, website updates, informational recordings, and associated issues. The team will review messaging for construction activities, necessary communications tools, and Maintenance of Traffic (MOT) checklists.

In the weekly MOT Task Force, we review our construction-specific Communications Work Plans for events including major traffic shifts, road closures, bridge demolition, or construction adjacent to sensitive areas (for example, Swansea Elementary School). These Work Plans will detail the construction activity, likely issues and their associated messaging, necessary communication tools, impacted stakeholder identification, communications timing. By approaching communications from the perspective of the entire operation, we will empower Project stakeholders to make their best decisions and react to events effectively. This is the same process as that for the Construction Period. The figure below shows the Communication Team's approach to communicating details for major construction activities.



## KMP's Communications Work Plan



### CENTRAL 70 PROJECT

#### Construction Start: Traffic Switch for Viaduct Removal

<b>DATE</b>	Construction to begin summer 2019
<b>ACTIVITY</b>	<ul style="list-style-type: none"> <li>Move current traffic off viaduct</li> <li>Move viaduct traffic to new/completed westbound lanes between Colorado and Brighton boulevards</li> </ul>
<b>GOALS</b>	<ul style="list-style-type: none"> <li>To communicate change in traffic patterns</li> <li>Inform public about upcoming viaduct removal (separate communication work plan)</li> <li>Minimize impacts to commuters and residents</li> <li>Build trust between the public and Kiewit/CDOT by staying in constant communication about construction activities</li> <li>To communicate any changes in construction phasing and schedule</li> <li>Coordinate Communications with CDOT PI team</li> </ul>
<b>FACTS</b>	<ul style="list-style-type: none"> <li>Traffic switch for westbound and eastbound lanes between Colorado and Brighton boulevards</li> <li>I-70 travelers will have different traffic pattern</li> <li>Access to and from I-70 will be shifted to accommodate new traffic patterns</li> <li>Overnight traffic switches</li> <li>Westbound and eastbound traffic switches to happen on different nights</li> </ul>
<b>LIKELY ISSUES</b>	<ul style="list-style-type: none"> <li>Traffic delays during traffic switch</li> <li>Driver confusion with new travel lanes</li> <li>Traffic impacts and possible delays with traffic switch</li> <li>Noise, vibration and lights from equipment—especially at night with adjacent neighborhoods</li> <li>Traffic switches impacting emergency services and bus routes</li> </ul>
<b>MESSAGES</b>	<ul style="list-style-type: none"> <li>Speed limits reduced through work zone for worker and public safety</li> <li>Traffic impacts expected; watch for message boards/signage re-aligning traffic</li> <li>Possible overnight work</li> <li>Construction schedule is weather dependent and subject to change</li> <li>Check website for “know before you go” video for the latest travel pattern</li> <li>Moving traffic onto the new lanes and demolishing the viaduct take construction into the final phase</li> </ul>
<b>COMMUNICATION TOOLS TO PREPARE</b>	<ul style="list-style-type: none"> <li>Develop traffic shift demonstration video for website and social media</li> <li>Develop maps for traffic shifts (visuals for static communication)</li> <li>Meeting with surrounding businesses and neighborhoods most impacted by traffic switch prior to starting work</li> <li>Milestone event to celebrate completion of lowered interstate section</li> <li>Press release/Earned media – emphasis on traffic reporters</li> <li>Newsletter to include construction updates</li> <li>Website – updated weekly</li> <li>Weekly construction update and information line update</li> <li>Traffic shift factsheet – distributed to stakeholders</li> <li>Signage</li> </ul>

Stakeholder	Tasks/Tools/Activity	Timing
<b>I-70 Travelers</b>	<ul style="list-style-type: none"> <li>MOT and signage</li> <li>Construction Hotline Update</li> <li>Website update</li> </ul>	<ul style="list-style-type: none"> <li>MOT and signage at least 7 days prior</li> <li>Weekly Updates</li> <li>At least once a week</li> </ul>
<b>Businesses</b>	<ul style="list-style-type: none"> <li>Business Meeting</li> <li>Identify business that will be impacted and contact information</li> <li>Update contact info in C</li> <li>Email newsletter</li> <li>Email construction updates</li> <li>Traffic Alert prior to full closure</li> <li>Follow up phone calls as necessary</li> <li>Signage to showcase specific business access</li> </ul>	<ul style="list-style-type: none"> <li>Prior to start of work</li> <li>Prior to construction</li> <li>Prior to start of work – Ongoing</li> <li>Monthly – prior to start of work</li> <li>Weekly</li> <li>At least one week prior</li> <li>At least one week prior to construction activity</li> <li>Prior to construction</li> <li>Notification as per each specific agreement</li> </ul>
<b>Neighborhoods/Residents</b>	<ul style="list-style-type: none"> <li>Email construction alert and fact sheet</li> <li>Verify contacts in database</li> <li>Email newsletter</li> <li>Email construction updates</li> <li>Email traffic alert prior to full closure</li> </ul>	<ul style="list-style-type: none"> <li>7 days Prior to construction activity</li> <li>Prior to construction</li> <li>Monthly – prior to start of work</li> <li>Weekly</li> <li>At 14 calendar days prior to full closures</li> </ul>
<b>Emergency Service Providers:</b> <i>Police, Fire Dept., Ambulance</i>	<ul style="list-style-type: none"> <li>Email newsletter</li> <li>Email construction updates</li> <li>Traffic Alert prior to full closure</li> <li>Call prior to closures</li> </ul>	<ul style="list-style-type: none"> <li>Monthly – prior to start of work</li> <li>Weekly</li> <li>As necessary</li> <li>As necessary</li> </ul>
<b>Elected Officials:</b> <i>City Council, CDOT Board of Directors</i>	<ul style="list-style-type: none"> <li>Email newsletter</li> <li>Email construction updates</li> <li>Weekly construction updates</li> </ul>	<ul style="list-style-type: none"> <li>Quarterly</li> <li>Monthly – Prior to start of work</li> <li>Weekly</li> </ul>
<b>Media:</b> <i>Traffic Reporters and PIOs for CDOT, City and County of Denver, Schools, Churches, Hospitals, Police, Fire</i>	<ul style="list-style-type: none"> <li>Email newsletter</li> <li>Email construction updates</li> <li>Press release for full closures</li> <li>EMS detour alert</li> <li>Story pitches to local reporters</li> <li>Flyover shots with reporters</li> <li>Special story pitches to traffic reporters – radio/T.V.</li> </ul>	<ul style="list-style-type: none"> <li>Monthly – Prior to start of work</li> <li>Weekly</li> <li>At least a week prior to full lane closures</li> </ul>

Throughout all work efforts (Design, Construction, and O&M services), our Team consistently evaluates the effectiveness of its actions, communication tools, meeting formats, and work plans. As appropriate, KMP makes adjustments to future work plans and provides relevant updates.



### 2.2.1 OTHER PLAN ELEMENTS

The joint team will develop Communications campaigns such as Know Before You Go and CoTrip encourage stakeholders to acquire information and plan accordingly before traveling. The Project hotline number will be widely available and the hotline will provide travelers with real-time information about traffic conditions, alternative routes, closures, and traffic pattern changes. KMP will encourage drivers to use websites and mobile apps to plan travel routes based on real-time traffic information. Social media messages will send travel alerts to registered users. The goal of this campaign is to offer efficient travel choices and discourage distracted driving.

Coordinating with Communications Collaborators is one of our best practices. They are individuals, associations, and businesses who widely distribute emails, newsletters, or social media updates based on short articles and photography provided by the KMP Communications Team. The information will include details on closures, detours, general updates, personal interest items, and encouragement to visit the Project’s website for construction information. Communications Collaborators help facilitate two-way communications by encouraging their audiences to send constructive comments, and concerns, throughout the Project.

The table below identifies potential Communications Collaborators.

#### Communications Collaborators

Communications Collaborator	Website or Contract Information
Aurora Chamber of Commerce	<a href="http://www.aurorachamber.org">www.aurorachamber.org</a>
Colorado Department of Transportation—Commuter Choices Program	<a href="http://www.codot.gov/programs/commuterchoices">www.codot.gov/programs/commuterchoices</a>
Colorado Tourism	<a href="http://www.colorado.com">www.colorado.com</a>
Comunidades Unidas Globeville, Elyria & Swansea	<a href="mailto:lorenacomunidadesunidas@gmail.com">lorenacomunidadesunidas@gmail.com</a>
Denver Convention and Visitor’s Bureau	<a href="http://www.denver.org">www.denver.org</a>
Denver Hispanic Chamber of Commerce	<a href="http://www.hispanicchamberdenver.com">www.hispanicchamberdenver.com</a>
Denver International Airport	<a href="http://www.flydenver.com">www.flydenver.com</a>
Denver Metro Chamber of Commerce	<a href="http://www.denverchamber.org">www.denverchamber.org</a>
Denver Regional Council of Governments (DRCOG)—RideArrangers Program	<a href="http://www.drcog.org">www.drcog.org</a>
Downtown Denver Business Partnership	<a href="http://www.downtowndenver.com/">www.downtowndenver.com/</a>
Elyria-Swansea—Globeville Business Association	<a href="http://www.esgba.org/members.html">www.esgba.org/members.html</a>
Globeville Civic Partners	<a href="http://www.globevillecivicpartners.org/">www.globevillecivicpartners.org/</a>
Globeville K.A.R.E.S.	<a href="mailto:GlobevilleKares@gmail.com">GlobevilleKares@gmail.com</a>
GoDenver	<a href="http://www.godenverapp.com">www.godenverapp.com</a>
Green Valley Ranch Homeowner Association	<a href="http://www.gvrhoa.com">www.gvrhoa.com</a>
Metro North Chamber of Commerce	<a href="http://www.mtronorthchamber.com">www.mtronorthchamber.com</a>

Communications Collaborator	Website or Contract Information
Mile High Connects	<a href="http://www.milehighconnects.org">www.milehighconnects.org</a>
North Neighborhoods Democratic Council	<a href="mailto:puuden@aol.com">puuden@aol.com</a>
Northeast Transportation Connections	<a href="http://www.nettransportation.org">www.nettransportation.org</a>
Regional Transportation District	<a href="http://www.rtd-denver.com/">www.rtd-denver.com/</a>
Stapleton Master Community Association	<a href="http://www.stapletondenver.com">www.stapletondenver.com</a>
Traffic.com—Live traffic map	<a href="http://www.thedenverchannel.com/traffic">www.thedenverchannel.com/traffic</a>
VanGo Mobile—Transportation options in Northern Colorado	<a href="http://www.smarttrips.org">www.smarttrips.org</a>
The West Chamber (serving Jefferson County, CO)	<a href="http://www.westchamber.org">www.westchamber.org</a>

## 2.3 STAKEHOLDERS COMMUNITY, GOVERNMENT, AND BUSINESS

### 2.3.1 IDENTIFYING STAKEHOLDERS

Our Communications Team will update the contact information from the I-70 FEIS and build on existing relationships with stakeholder groups. We have started, and will continually update, a Public Involvement Contact Sheet as Schedule 14, Section 3.1.3, compare list to 5.1.2. a of the Project Agreement requires. (See Attachment 5)

All of the stakeholders identified stakeholders will get accurate and timely information relevant to their needs. Different stakeholders have different information needs and like to get their information in different ways. We will use the right tool for the right audience with information at the right time. At the beginning of the project, we will give general information, and then provide more details as the design and schedule are more refined. We will provide information on what impacts will be as we know them and celebrate progress. Celebrating progress will keep the community engage and their eyes on the prize – a new neighborhood with easy access and park as well as improved travel on the highway.

## 2.4 KEY COMMUNICATIONS TOPICS

### 2.4.1 COMMUNICATION (COPING) STRATEGIES

KMP will educate stakeholders on how the Project may affect them and how to proactively mitigate impacts for the short and long terms. Our team will work to minimize the disruptions caused by construction. With information like construction hours, detours, access plans, and expected travel times, stakeholders can formulate effective strategies. Our Communication Work Plans will help us identify communication strategies for specific construction activities.



### 2.4.1.1 Communications Strategy

We will continually identify the best communications strategies for each stakeholder group. The following table shows example copying strategies and communication tools for various stakeholder groups as highlighted in 5.1.2 a.

#### Communication Strategies

Stakeholder Group	Potential Concerns	Communication (Coping) Strategy	Communications Tools
<b>Area Residents</b>	<ul style="list-style-type: none"> <li>Nighttime noise</li> <li>Construction dust</li> <li>Air quality</li> <li>Traffic delays</li> <li>Neighborhood traffic (cut-through traffic trying to avoid Construction areas)</li> <li>Property access</li> <li>Pedestrian access</li> <li>Public transit impacts</li> </ul>	<ul style="list-style-type: none"> <li>Conduct community meetings about noise monitoring and develop mitigation plans</li> <li>Moisten soil to reduce dust</li> <li>Publish air quality tests on website</li> <li>Follow vehicle-idling policy and limit equipment storage near residential areas</li> <li>Utilize haul routes that minimize use of local streets</li> <li>Provide clear detour signage so motorists stay on designated roads</li> <li>Reduce ramp and lane closures</li> <li>Maintain pedestrian and driveway access</li> <li>Provide hotline number to call for information or complaints</li> </ul>	<ul style="list-style-type: none"> <li>Door-to-door canvassing</li> <li>Telephone town halls</li> <li>E-alerts and text messages</li> <li>Weekly Construction emails with type, location, and duration of Work</li> <li>Neighborhood meetings</li> <li>Website updates</li> <li>Construction information posters at churches, recreation centers, libraries, and other places where people gather</li> <li>Viewing areas with displays/ explanations of what is happening and why</li> <li>Media updates (with Department Approval)</li> </ul>
<b>Major National Corporations, Regional and Small Businesses</b>	<ul style="list-style-type: none"> <li>Business access for employees, customers, and suppliers due to increased traffic using alternate routes</li> <li>Pedestrian access to property</li> <li>Loss of revenue or sales</li> <li>Change in customer behaviors</li> </ul>	<ul style="list-style-type: none"> <li>Distribute access/detour maps to delivery companies, customers, and employees</li> <li>Maintain lane widths and a turning radius for trucks during Construction</li> <li>Maintain easy access for employees</li> <li>Reduce ramp and lane closures</li> <li>Maintain pedestrian and driveway access</li> <li>Develop new marketing and customer outreach strategies</li> </ul>	<ul style="list-style-type: none"> <li>One-on-one meetings</li> <li>Business Survival Guide</li> <li>Learn-It-Lunch presentations</li> <li>Weekly Construction emails with type, location, and duration of Work</li> <li>Detour/access maps</li> <li>Signage</li> </ul>

Stakeholder Group	Potential Concerns	Communication (Coping) Strategy	Communications Tools
<b>Local Schools</b>	<ul style="list-style-type: none"> <li>Safety of students near a Construction Site</li> <li>Bike/pedestrian access and safety</li> <li>School bus and parent drop-off/pick-up areas</li> <li>Bus route disruptions</li> <li>Neighborhood traffic (cut-through traffic trying to avoid Construction areas)</li> <li>Noise during school hours</li> <li>Dust due to Construction</li> </ul>	<ul style="list-style-type: none"> <li>Provide barriers between schools and Construction Site</li> <li>Provide clear signage for pedestrian and bike access</li> <li>Utilize flaggers along school access routes, where required, directing students/parents/bikes through congested areas</li> <li>Provide detour/access maps to school bus planning organizations</li> <li>Moisten soil to reduce dust</li> </ul>	<ul style="list-style-type: none"> <li>Presentations at PTA/PTO meetings</li> <li>Project information in school newsletters or Friday backpack notes</li> <li>Detour/access maps</li> <li>Project information on school website</li> <li>Weekly Construction emails with type, location, and duration of Work</li> <li>Student training programs on safety around construction</li> <li>Frequent meetings with school principals</li> <li>Weekly bus routing updates for Denver Public Schools</li> </ul>
<b>Commuters/ Commercial Vehicle Operators/ Delivery and Courier Services</b>	<ul style="list-style-type: none"> <li>Increased travel times</li> <li>Lack of predictability in travel times and conditions</li> <li>Detours/access hard to understand or inconvenient</li> <li>Impacts from short term lane closures</li> <li>Road conditions</li> </ul>	<ul style="list-style-type: none"> <li>Provide travel information to the Colorado Motor Carrier's Association and distribution centers</li> <li>Limit number of traffic switches or changes to travel patterns</li> <li>Provide efficient courtesy patrol and road maintenance</li> <li>Provide clear signage directing traffic to shortest detours</li> <li>Establish well signed and safe pull-out and traffic incident investigation sites</li> <li>Utilize "Minor Incident" signage to move vehicles quickly but safely out of traffic</li> </ul>	<ul style="list-style-type: none"> <li>Targeted radio advertising campaigns during drive times</li> <li>E-alerts and text messages</li> <li>Signage</li> <li>Detour/access maps</li> <li>Information to trade organizations</li> <li>Travel times/conditions posted on overhead VMS signage</li> <li>Local Traffic Reporters</li> </ul>
<b>Denver International Airport/ National Western Center/ Taxis, Shuttles, and Rental Car Companies/ Tourist Destinations</b>	<ul style="list-style-type: none"> <li>Road closures and traffic delays</li> <li>Visitors to area cannot find their way</li> <li>Delays getting to and from venues, flights, or events</li> </ul>	<ul style="list-style-type: none"> <li>Provide website links for up-to-the-minute travel information</li> <li>Coordinate Construction activities to avoid peak tourist seasons or major events</li> <li>Communicate that Denver is open for business and welcomes visitors</li> </ul>	<ul style="list-style-type: none"> <li>Targeted advertising campaigns</li> <li>E-alerts and text messages</li> <li>Signage</li> <li>Weekly emails with type, location, and duration of Construction activities</li> <li>Detour/access maps</li> </ul>



Stakeholder Group	Potential Concerns	Communication (Coping) Strategy	Communications Tools
<b>Emergency Response Agencies</b>	<ul style="list-style-type: none"> <li>Road closures and traffic delays</li> <li>Access to homes and businesses</li> <li>Access to, and quick removal of, traffic incidents</li> <li>Road conditions</li> </ul>	<ul style="list-style-type: none"> <li>Provide real-time information to facilitate emergency access through the Project corridor</li> <li>Provide efficient courtesy patrols and road maintenance</li> <li>Provide clear signage to direct traffic to shortest detours</li> <li>Provide emergency response agencies with contact information for Project staff during emergency situations</li> <li>Provide crisis management training to Project staff</li> <li>Establish well signed and safe pull-out and traffic incident investigation sites</li> <li>Utilize “Minor Incident” signage to move vehicles quickly but safely out of traffic (Move-It Law)</li> </ul>	<ul style="list-style-type: none"> <li>Weekly MOT Task Force meetings that include emergency response agencies</li> <li>Weekly Construction emails with type, location, and duration of Construction activities</li> <li>Detour/access maps</li> <li>Meetings to plan for crisis events and other emergency situations</li> <li>Meetings to review major changes in traffic patterns</li> <li>Tabletop debriefing exercises after major incidents</li> </ul>

### 2.4.1.2 Environmental Information

Our Communications Team will work with the Environmental Team to address Preferred Alternative Mitigation Commitments from the Record of Decision (ROD) and implement effective strategies to communicate that information to the public. By offering educational presentations on noise, dust, air quality, and wildlife protection programs, we can help stakeholders understand the environmental protection measures used in the Project.

We will:

- Meet with stakeholders and Department representatives to introduce the Construction Team, establish communications protocols, and confirm the environmental commitments for the Project
- Develop effective communications materials (for example, clear graphics and short videos) to convey complex environmental topics in a clear and engaging way
- Facilitate responses to inquiries from stakeholders and the public
- Coordinate participation by the Environmental Team in public meetings related to the Project
- Distribute the Environmental Compliance Work Plan (ECWP) monthly to the Department for posting on the Project website (see Schedule 17 of the Project Agreement)
- Communicate with the Principal of Swansea Elementary School and appropriate Denver Public School District personnel regarding construction activities near the school

- Coordinate public information to support education and outreach activities regarding sustainability policies and procedures (for example, No Idling policy, recycling, reuse of materials, energy, water, and other resource conservation initiatives)

Throughout the process to reach the ROD, the Department implemented a number of best practices that removed barriers to public participation within the Project corridor. We will continue these practices—providing childcare, snacks, and translators at the public meetings. We will also provide personalized outreach activities, including door-to-door canvassing and telephone calls.

To continue the Departments efforts to make environmental information accessible to the public, our team will work with the Environmental team to compile necessary information from the Environmental Compliance Work Plan (ECWP) and place it on the Project website monthly.

The results of particulate monitors (such as PM10) will also be available on the website. Our Communications Team will work closely with the Environmental Team to explain daily air quality monitoring protocols and dust control measures, such as the use of wind barriers, covering, wetting, or compacting excavated materials. We will summarize and clearly present monitoring results on the website.

#### **2.4.1.3 Noise**

Our Communications Team will take an active role in educating the public about the rigorous noise monitoring and mitigation program for the Project. We will:

Communicate with individual property owners and communities regarding the schedule for high-noise construction activities, installation of temporary barriers, and construction of permanent noise walls

Support the Benefited Receptor Preference Survey, including developing exhibits, flyers, door hangers, ballots with return mail envelopes, and conducting the public meeting on the proposed noise abatement design as part of our noise abatement program

Communicate with residents in neighborhoods where changes to the final vertical or horizontal alignment, or any new Type I action, triggers eligibility for new noise abatement measures

#### **2.4.1.4 Coordination with Local Schools**

Communication with Denver Public Schools and specifically schools near the Project corridor, including Swansea Elementary School, Garden Place Academy, and Bruce Randolph School is critical as they played an active role in the I-70 environmental process, and the Project will dramatically impact their school communities.



Our Communications Team will develop a communications plan for engaging children and families with the Project including speaking at Back-to-School Nights, providing information for school websites, and developing Do you Know...? campaign fact sheets. We will prepare communications materials in English and Spanish.

In addition, we will coordinate stakeholders to maintain pedestrian, bus, and vehicle access to these schools during the Construction Period. We will coordinate with the Department's Safe Routes to School Coordinator to verify walking and biking maps to the schools are up-to-date and reflect changes in access during construction. We will also work closely with our MOT Team to consult with school operations personnel, share construction schedules, and develop alternative travel routes. Because construction will occur adjacent to Swansea Elementary School, the KMP Team will provide fencing to separate the two activities, conduct safety training for appropriate personnel, and educate students about safety near construction areas.

#### **2.4.1.5 Access to Transit, Pedestrian, and Bike Routes**

We will work closely with the Regional Transportation District (RTD) to develop a communications process for construction impact to bus or train routes. We will notify RTD 30 days in advance and coordinate relocation and/or closure of stops if needed. We will collaborate with RTD's existing outreach tools including bus stop signage, onboard announcements, and emails to riders. We will explore options for advertising the Project on transit vehicles as well as a more grassroots approach of sending a team member to ride along impacted transit routes and distributing flyers to riders prior to implementing changes to transit service.

We will make a concerted effort to collect information on commuting habits in our initial canvassing and meetings with stakeholders and residents. We will record the data in the Public Involvement Contact Sheet and use it in targeted email alerts or automated calls to communicate changes to transit, pedestrian and bike routes. The KMP Team will clearly delineate pedestrian access and bike access routes within work zones with signage. We will provide access/detour maps on the Project website, and coordinate distribution to other communication collaborators like the local schools, recreations centers, Bike Denver, and other advocacy groups, to publicize the Project and update online maps for their members. Finally, we will use strategically placed signage to communicate detour routes. Because some bicyclists, pedestrians, and handicapped individuals on the Sand Creek Greenway Trail may live beyond the Project corridor, we will use onsite signage to highlight important messages.

#### 2.4.1.6 National Western Center Coordination

The National Western Center (NWC) is the site of the yearly National Western Stock Show, which brought in 684,580 visitors over the 16 days of the event in 2017. KMP will provide NWC with information on access well in advance so they can communicate it on their website, advertisements, and communications with sponsors and exhibitors. NWC is planning many improvement and expansion construction projects on their site and we will coordinate activities so closures will not coincide.

We will include NWC in weekly construction updates, and coordinate with them on all of their various events throughout the year.

#### 2.4.1.7 Cover Coordination and Outreach

KMP will build on the Department's extensive public involvement in developing the Cover design. As the design is completed, we will solicit additional community input. Finish colors, pavers and even plantings can benefit from local resident participation. As we have done on past projects, KMP will develop an array of choices for a particular feature and offer those choices to the public to decide. All items on our menu of options will follow the vision and intent of the Cover Park as depicted in the Project Agreement.

A significant aspect of the park on the Cover is how it will be named. KMP will work closely with the Department and City and County of Denver to coordinate this activity. Two of the parks in proximity to the Cover are named for the neighborhood (Swansea and Elyria Parks) and a third named for Lee G Dunham, a Union Pacific trainman who died in 1892 attempting to save a local schoolchild from being struck by a locomotive. Park naming will follow the Denver Parks and Recreation Policy for Naming of Parks and Recreational Facilities following the three main categories used to name City Parks; exceptional individuals; historic events, places and persons; and those who have made a significant contribution to the community as a gift of time skills and resources.

We propose to embark on the naming process before construction starts to allow ample time for the community to choose a proper and fitting name for their community space. We start by teaming with the local Registered Neighborhood Organizations like the Elyria and Swansea Neighborhood Association and the United Community Action Network to solicit input from the community and to develop the method for selecting the name for the park to be put forth to Denver Parks and Recreation following the naming policy. By starting on this process early on, the formal naming of the Cover Park can be included in the park opening festivities at the conclusion of construction.



## 2.5 PUBLIC INFORMATION OUTREACH TOOLS

KMP has experience using a variety of communication tools and we will determine the most efficient, and appropriate, for the various stakeholder groups and the public. Different stakeholders benefit from different communication methods and the right tool will change as construction changes and the availability of new tools are developed. KMP will adjust accordingly and leverage communication methods to benefit stakeholders and the Project.

### 2.5.1 PHONE AND EMAIL

KMP will continue to use the Department's established, familiar hotline number. The Project hotline is an important tool for maintaining two-way communication with stakeholders. As much as possible, we will answer hotline calls in real-time. Voicemail greetings will be in both English and Spanish, and we will update them weekly (more frequently when necessary) with current information on construction activities and impacts. The voicemail system will email the Communications Team for immediate response. We will respond to voicemail messages each day throughout the Construction Period. When the Department identifies periods of highly impactful construction activities or extended night work, we will cover the hotline 24 hours a day. The KMP PI office will be equipped with telephones, voicemail and computers so the team can communicate with all Stakeholders, including the Department, as needed.

### 2.5.2 TRACKING

To track and monitor comments from the public, KMP will document all inquiries including names, addresses, phone numbers, and necessary follow-up actions. We will enter inquiries and follow-up actions into Dialog the web-based contact and issue-tracking database which, in turn, will forward an automated report to the Department and KMP each week. A member of the Communications Team will respond to phone calls and emails or, when necessary, forward the phone call or email to the Department for a response. We will encourage callers to sign-up for Project updates. We will record the date and time of call, contact information (name, phone number, street address, and email address), the location and description of the complaint or request, and the response provided, including date and manner of response. If our Communications Team must forward the request to the Department for a response, we will record details of the call for later follow-up.

By tracking caller and email information requests or complaints, we can quickly determine patterns or trends to which we will respond with different communications strategies or requests for adjustments to construction activities. This is part of our two-way communications, understanding stakeholder concerns and then determining the best ways to address them.

## 2.6 PUBLIC MEETINGS

Our PI process and outreach techniques will be as interesting and informative as possible during the Construction and Operating Periods so they can help re-energize the community for each Project phase, and help them envision the benefits when each is complete.

We will hold the initial set of meetings within one month after start of NTP2, and publicize the meetings through local media, paid advertisements in newspapers, email, inserts in local newsletters, door-to-door flyers, mailers, and other appropriate tools. We will invite stakeholders identified by both the Department and our own research (which has already begun), to public meetings. Invitees will include local elected official, city and county staff, and surrounding local agencies. We will use social media to communicate meeting information. We will determine with the Department the best location and format for meetings. Meetings will address the concerns of stakeholders resistant to the Project and offer current, useful information for everyone.

At the public meetings, we will introduce our team to the local community, outline ways to involve the public throughout the Project, present the Project schedule, and review environmental performance commitments to minimize community and other impacts. We will also promote the Project hotline/website and encourage attendees to sign-up for construction updates. We will hold the public meetings within the Project corridor and, where relevant, host meetings in the neighborhood location(s) closest to upcoming construction or Operations and Maintenance (O&M) activities. We will present Project information in English and Spanish. Other communications tools include:

- Live events Broadcasts
- Telephone town halls
- Social media to post meeting content and respond to questions from the public
- Snacks and childcare at meetings to encourage attendance and participation
- Additional public meetings at major milestones during the Project (for example, prior to removal of the viaduct when major elements of the project are complete), or as the Department directs

The meetings engage stakeholders with team members, Project leadership, and craft people to give their Project perspectives. We will use dynamic displays to inform Stakeholders of Project design, schedules, and updates. We will prepare and display 3D and 4D models of the Project for use at meetings and events, and on the website. The 3D and 4D models will illustrate construction activities including phasing, traffic impacts, and other Project elements to a non-technical audience. Videos of construction activities and renderings of final design will help illustrate the Project.

- **Incorporate interactive activities:** We will present special interest topics and activities like Meet our Staff, How Do You Build That? And hands-on building activities during regularly scheduled meetings at local venues.

To provide easy access to Project information, KMP will attend relevant community and stakeholder meetings and community events such as those for non-profit organizations, community associations, churches, and neighborhood groups. These entities can also serve as Communications Collaborators by incorporating Project information into their newsletters and websites. We will coordinate with the Department to determine meeting attendance and availability of technical staff, as required.

We will hold individual meetings with directly impacted residents, adjacent property owners, Swansea Elementary School, and businesses to coordinate work schedules and access with them.



## 2.7 BUSINESS MEETINGS

Within two months after start of NTP2, we will organize and lead at least two additional public meetings specifically focused on local and regional business impacts. We will invite members of the KMP Team to describe specific aspects of the Project. For the initial meeting, we will briefly present construction details, phasing, timing, and the Business Survival Guide. We will station Project representatives throughout the room to meet one-on-one with businesses to discuss their specific questions or concerns. Members of the MOT team will also attend these meeting so they fully understand business access needs.

KMP will hold regular meetings with the businesses. Near Project milestones, we will host additional meetings focused on local and regional business impacts (for example, major or extended road closures). We will also attend periodic meetings with business stakeholders during the Construction Period.

We will request that the Brighton Corridor Team's Coffee and Construction meetings include the Project Team. These meetings alert businesses to construction projects in the area, and coordinate construction and neighborhood activities, which reduce construction impacts.

Our Communications Coordinators will be responsible for coordinating and communicating with the businesses in their area. They will establish relationships, using our two-way communications, allowing them to preemptively address issues.

## 2.8 SOCIAL MEDIA

Social Media can be useful tools for communicating Project information to the public, but building a social media following requires a thoughtful, measured approach. We recommend establishing a Project Construction Facebook account, Twitter handle, and other emerging social media platforms--although the Department maintains a strong social media presence, Project-specific sites will engage targeted audiences.

While the Project website will serve as the primary source for Project-related information, social media forums can effectively direct visitors there, and we can repackage Project website content for social media distribution to extend its reach. KMP team members will follow social media and develop social media campaigns to support the Project. KMP supports the Department's commitment to reducing distracted driving, so all of our social media campaigns will be consistent with that goal.

There are potential risks associated with social media so we consider postings and manage responses carefully. We will forward proposed social media posts to the Department for approval one working day prior to posting. All sites will have appropriate disclaimers and easy-to-understand instructions. Our Communications Team will closely monitor social media sites using Google's real-time alerts

## 2.9 STAKEHOLDER DISTRIBUTION LIST

Our Communications Team has started preparing a Public Involvement Contact Sheet with the names of key stakeholders (Attachment 5). We will use the Department's database, established through the I-70 EIS, and the Department's preferred email messaging system to augment our Public Involvement Contact Sheet. We will submit our contact sheet and database to the Department for Approval prior to issuance of NTP2 and will continually update the contact sheet/database throughout the Project.

## 2.10 PROJECT TOURS AND OTHER EVENTS

Project tours and other events are a great way to engage the community, show progress, and celebrate achievements during the Project. Our Communications Team will help organize events to highlight major Project milestones (for example, groundbreaking activities, removal of the viaduct, and opening of new travel lanes/ramps/sidewalks). These events play an important role in promoting transparency and educating stakeholders on the construction process. We will collaborate with the Department to participate in the coordination and delivery of these fun events.

We will develop specific construction viewing areas and information displays throughout the Project limits to give neighbors, and other interested parties, an opportunity to safely watch construction progress. We will work with the Department to schedule tours for the media, elected officials, and key stakeholders to help them understand the project, its construction, and the long term benefits of the Project.

## 2.11 LANE CLOSURE REPORTS

Our Communications Team will work closely with the MOT Team to plan lane closures in advance by reviewing upcoming road closures at the MOT meetings and confirming entries in the MOT checklist. We will include easy-to-understand, accurate information for distribution in the weekly Lane Closure Reports. We will submit reports each Thursday to the list of contacts provided by the Department, and will outline activities for the following week (Saturday-Friday), as Schedule 10, Section 2, of the Project Agreement requires. We will repackage technical information for social media, presentations, and other external communications, and for website updates and traffic alerts.

## 2.12 TRAFFIC ALERTS

The Department's existing tools, including email and twitter alerts and COTRIP, are valuable resources in disseminating traffic alerts to commuters and other travelers in the Project corridor. We will submit a weekly traveler alert each Thursday that includes the I-70 mainline, state and local roadways, and other construction activities impacting travelers. We will also provide traffic alerts regarding emergency road repairs to the Traffic Operations Center (TOC) for immediate distribution. The weekly Strategic Communications meetings will include discussions of upcoming traffic alerts.



### 2.13 WEBSITE UPDATES

The Project website be the primary source for Project-related information. In many cases, our first opportunity to engage stakeholders includes encouraging them to access the Project website and sign-up for Project updates using email, social media, and other tools.

We will work with the Department to develop content for the Project website. We will design website content and Project updates to proactively answer questions from the public, and we will include links to other sites (for example, city, county, RTD, Northeast Transportation Connections, and other appropriate websites). We will provide update information for the website weekly, or as needed, with pertinent schedule information, new photos, and contact information.

We will include webcam videos and KMP-produced videos that address community impacts, construction challenges, and other important issues in easy-to-understand terms. KMP will work with the Department to determine relevant video topics as the Project progresses, including interviews with key personnel giving updates about particular Project milestones and technical topics such as a ‘How is that Built?’ Series showing the sequence of construction, Project complexities, or details of the design-build process.

The website will include detour maps, coupon programs, advertising, recycling locations, and safety tips. The website offers an opportunity to generate excitement—with video and photos that explain the Project and celebrate Project milestones. We will forward proposed updates regarding website content to the Department for approval two working days prior to inclusion on the website.

### 2.14 PROJECT NEWSLETTERS

Throughout the Construction Period, our Communications Team will prepare and distribute a monthly newsletter to inform stakeholders of Project purpose and schedule, project contact information - email, website, information phone line, email address, upcoming construction impacts, job fairs, and subcontracting opportunities. The newsletter will include a Project Map, a business spotlight section, a Get to Know Your Team feature, interesting construction facts, a construction safety message, contact information, and other relevant items. We will publish the newsletter in English and Spanish.

We will use the Department’s template with Project logo, the first newsletter within 30 days after start of NTP2. We will forward the newsletter to the Department for Approval before distributing the newsletters through email to stakeholders listed on the Public Involvement Contact Sheet monthly and quarterly door to door as well as in-person at public meetings and community events.

## **2.15 LANGUAGE ASSISTANCE FOR PERSONS WITH LIMITED ENGLISH PROFICIENCY**

Our Bilingual Community Liaison, Ana Mostaccero, will be available to assist with individual inquiries, provide Spanish translations of short communications materials, and support the Department as an interpreter at public meetings if needed. In addition, we will provide translations in other languages, as requested by the Department. We will develop communications tools and processes using visual illustrations for individuals who are unable to read or write, and audio tools for those who are visually impaired.

Our Communications Team will document our efforts to communicate with persons with Limited English Proficiency and record all requests for language assistance in the quarterly CPCP quarterly report and the MOCP quarterly report.

## **2.16 PUBLIC COMMUNICATIONS COLLATERAL**

The Communications Team and specifically the Communications Liaisons will collaborate with the Department to determine which communications tools to use—newsletters, factsheets, emails, flyers, or social media. The Department and KMP teams will review weekly at Strategic Communications meeting. Collateral materials will share information about current and upcoming construction activities and how to cope, impactful activities like changes in access, noise, utility Work and detours. We will develop the appropriate tools using the Department's Colorado Brand Guidelines and forward communications materials to the Department for Approval prior to distribution. We will prepare communications materials, for broad distribution, in English and Spanish.

## **2.17 PHOTOS/VIDEO**

Photos and videos are powerful tools for showing the progress and impacts of the Project. Each member of our Communications Team will regularly capture photos and videos, for use in social media or in printed materials.

Photos and videos may also include traffic control, paving, slope repair, erosion control, bridge construction, drainage, and other conditions for use in reports to interested agencies, social media, flyers, and other communications materials. We will hire a professional photographer at regular intervals to visually document progress during Project construction and coordinate with the Department to develop videos such as a How is that Built? series. Videos will highlight relevant topics including safety around construction areas and human-interest stories focusing on construction crews, neighborhoods, residents, or businesses owners in the Project corridor. KMP will install a webcam to record live action construction activities to be available on the website show the Project's daily progress.

KMP will submit the best, most compelling photos or videos to the Department and will provide professional aerial photographs, annually, to show progress of the Project throughout the Construction Period.



## 2.18 PROJECT IDENTIFICATION SIGNAGE

Following the standards in the Manual on Uniform Traffic Control Devices (MUTCD), the KMP Team will install one large Project identification sign in each direction of travel along the I-70 mainline. The Department will review the signs prior to installation and we will install the signs within 14 days after start of NTP2. The signs will include the Project logo, start and completion dates, hotline number, website, and other relevant information.

## 2.19 RESPONSE AND DELIVERABLES PROTOCOL

### Response Protocol

Type of Communication	Timing of Response
<b>In-person and Hotline</b>	Immediately during office hours (in-person) Same day (initial call) or within 24 hours (including weekends, if work occurs)
<b>Email</b>	Same day (within two working days for high volume situations)
<b>Department Staff</b>	As soon as possible (no later than 24 hours)
<b>Webpage and Social Media</b>	Same day (within two working days for high volume situations)
<b>Public Meetings Inquires</b>	Within one week of the meeting

## 2.20 ADDITIONAL PUBLIC INFORMATION AND OUTREACH TOOLS

The following table shows examples of an array of interactive, and engaging, PI and outreach tools that the KMP Team can provide. We will tailor these PI and outreach tools to meet individual stakeholder needs and specific construction impacts, while also remaining flexible to accommodate changing community dynamics.

## Public Information and Outreach Tools

### Options for Public Information and Outreach Tools

**Automated phone calls and text alerts:** to help travelers *Know Before You Go* and update the status of Construction activities along the Project corridor.

**Automated phone calls and text alerts:** to help travelers *Know Before You Go* and update the status of Construction activities along the Project corridor.

**Door-to-door canvassing:** to promote the Project hotline/website and collect email addresses for future communications. Enlist the help of residents to do canvassing at a community canvassing day, give colorful t-shirts to canvassers, and distribute refrigerator magnets with Project contact information.

**Door-to-door canvassing:** to promote the Project hotline/website and collect email addresses for future communications. Enlist the help of residents to do canvassing at a community canvassing day, give colorful t-shirts to canvassers, and distribute refrigerator magnets with Project contact information.

**Targeted advertising campaigns:** on radio and television, to inform residents/commuters about major traffic shifts, Construction activities, and employment opportunities.

**Targeted advertising campaigns:** on radio and television, to inform residents/commuters about major traffic shifts, Construction activities, and employment opportunities.

**Telephone Town Halls:** to communicate Project updates to large groups without having them leave home. These town halls do not require special technology and can be held in English and Spanish.

**Telephone Town Halls:** to communicate Project updates to large groups without having them leave home. These town halls do not require special technology and can be held in English and Spanish.

### 2.21 CPCP QUARTERLY REPORTING

The KMP Communications team will develop quarterly communications sub-plans during the Construction Period and the Operating Period that address the Construction or O&M activities occurring in a specific quarter. As each quarter begins, we review best practices from the previous quarter, consider new tools and methods, and make appropriate adjustments to our CPCP, and to our SCP documentation and PI process.

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ATTACHMENT 2

*Relates to Appendix J Volume 2*



# Draft Maintenance and Operations Communications Plan



**SUBMITTED TO:**

Colorado Bridge Enterprise  
High Performance Transportation Enterprise  
c/o Colorado Department of Transportation



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## RECORD OF REVISIONS

Revision number	Date issued	Pages affected	Comments
0	5/18/2017	All	Proposal Draft Submittal



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## 1. General Requirements

The KMP Communications Team recognizes the importance of maintaining two-way communications with residents, businesses, institutions, organizations, and other stakeholders established during the Construction Period, and we will proactively communicate maintenance and Renewal Work affecting these stakeholders throughout the Term. The Maintenance and Operations Communication Plan (MOCP) is a key part of our overall Strategic Communications Plan (Appendix J) and this document is intended to be worked in conjunction with the . We will implement the successful communication tools from the Construction Period to this portion of work and we will incorporate new tools and technologies as they are developed.

We have based this MOCP on the same communication principles founded in the Strategic Communications Plan (Appendix J), Construction Period Communications Plan (Appendix J, Attachment 1), and the Crisis Communications Plan (Appendix J, Attachment 3).

This plan will be submitted for approval prior to Substantial Completion and phased in after approval. The plan is used throughout the Operating Period with periodic reviews and updates completed in collaboration with the Department's Communication Team.

### 1.1 KMP COMMUNICATIONS PRINCIPLES

Our Communications Team commits to the following principles, which are fundamental to our communications approach during all phases of the Project:

- Two-way communication with all project stakeholders—actively listening and incorporating ideas
- Early, ongoing communication with stakeholders and the public using a variety of outreach techniques
- Transparent operations with clear, trustworthy communication of Project information to stakeholders and the public
- Timely response to public input and Project approach adjustments when possible
- Proactive communication on key issues—anticipating and answering questions before they are asked
- Maintaining the credibility of the Department and KMP

#### 1.1.1 PLANNED PROJECTS

Communication tools and strategies, stakeholders, and even the nature of Project impacts to the public will change over the 30 year Operations and Maintenance (O&M) Period. KMP's Communications Team and our communication plans remain flexible to accommodate future needs and allowing for incorporation of new techniques and technologies, while adhering to the High-Performance Transportation Enterprise (HPTE) Strategic Communications and Transparency Plan.



# CENTRAL 70

KMP works with the Department to determine which of the Department’s two defined Public Involvement Management (PIM) tiers (See Section 1.1.1.1 and 1.1.1.2 for details) is most appropriate prior to any O&M functions or performance of Renewal Work. KMP then develops Work-specific communications plans that detail the construction activity, likely issues and their associated messaging, necessary communication tools, impacted stakeholder identification, communications timing. A sample Tier II Communications Work Plan (*Traffic Switch for Viaduct Removal*) follows on the next page.

By approaching communications from the perspective of the entire operation, we empower Project stakeholders to make their best decisions and react to events effectively. This is the same process as that for the Construction Period.



## CENTRAL 70 PROJECT

### Construction Start: Traffic Switch for Viaduct Removal

<b>DATE</b>	<ul style="list-style-type: none"> <li>Construction to begin summer 2019</li> </ul>
<b>ACTIVITY</b>	<ul style="list-style-type: none"> <li>Move current traffic off viaduct</li> <li>Move viaduct traffic to new/completed westbound lanes between Colorado and Brighton boulevards</li> </ul>
<b>GOALS</b>	<ul style="list-style-type: none"> <li>To communicate change in traffic patterns</li> <li>Inform public about upcoming viaduct removal (separate communication work plan)</li> <li>Minimize impacts to commuters and residents</li> <li>Build trust between the public and Kiewit/CDOT by staying in constant communication about construction activities</li> <li>To communicate any changes in construction phasing and schedule</li> <li>Coordinate Communications with CDOT PI team</li> </ul>
<b>FACTS</b>	<ul style="list-style-type: none"> <li>Traffic switch for westbound and eastbound lanes between Colorado and Brighton boulevards</li> <li>I-70 travelers will have different traffic pattern</li> <li>Access to and from I-70 will be shifted to accommodate new traffic patterns</li> <li>Overnight traffic switches</li> <li>Westbound and eastbound traffic switches to happen on different nights</li> </ul>
<b>LIKELY ISSUES</b>	<ul style="list-style-type: none"> <li>Traffic delays during traffic switch</li> <li>Driver confusion with new travel lanes</li> <li>Traffic impacts and possible delays with traffic switch</li> <li>Noise, vibration and lights from equipment—especially at night with adjacent neighborhoods</li> <li>Traffic switches impacting emergency services and bus routes</li> </ul>
<b>MESSAGES</b>	<ul style="list-style-type: none"> <li>Speed limits reduced through work zone for worker and public safety</li> <li>Traffic impacts expected; watch for message boards/signage re-aligning traffic</li> <li>Possible overnight work</li> <li>Construction schedule is weather dependent and subject to change</li> <li>Check website for “know before you go” video for the latest travel pattern</li> <li>Moving traffic onto the new lanes and demolishing the viaduct take construction into the final phase</li> </ul>
<b>COMMUNICATION TOOLS TO PREPARE</b>	<ul style="list-style-type: none"> <li>Develop traffic shift demonstration video for website and social media</li> <li>Develop maps for traffic shifts (visuals for static communication)</li> <li>Meeting with surrounding businesses and neighborhoods most impacted by traffic switch prior to starting work</li> <li>Milestone event to celebrate completion of lowered interstate section</li> <li>Press release/Earned media – emphasis on traffic reporters</li> <li>Newsletter to include construction updates</li> <li>Website – updated weekly</li> <li>Weekly construction update and information line update</li> <li>Traffic shift factsheet – distributed to stakeholders</li> <li>Signage</li> </ul>

Stakeholder	Tasks/Tools/Activity	Timing
<b>I-70 Travelers</b>	<ul style="list-style-type: none"> <li>MOT and signage</li> <li>Construction Hotline Update</li> <li>Website update</li> </ul>	<ul style="list-style-type: none"> <li>MOT and signage at least 7 days prior</li> <li>Weekly Updates</li> <li>At least once a week</li> </ul>
<b>Businesses</b>	<ul style="list-style-type: none"> <li>Business Meeting</li> <li>Identify business that will be impacted and contact information</li> <li>Update contact info in CommentSense</li> <li>Email newsletter</li> <li>Email construction updates</li> <li>Traffic Alert prior to full closure</li> <li>Follow up phone calls as necessary</li> <li>Signage to showcase specific business access</li> </ul>	<ul style="list-style-type: none"> <li>Prior to start of work</li> <li>Prior to construction</li> <li>Prior to start of work – Ongoing</li> <li>Monthly – prior to start of work</li> <li>Weekly</li> <li>At least one week prior</li> <li>At least one week prior to construction activity</li> <li>Prior to construction</li> <li>Notification as per each specific agreement</li> </ul>
<b>Neighborhoods/Residents</b>	<ul style="list-style-type: none"> <li>Email construction alert and fact sheet</li> <li>Verify contacts in database</li> <li>Email newsletter</li> <li>Email construction updates</li> <li>Email traffic alert prior to full closure</li> </ul>	<ul style="list-style-type: none"> <li>7 days Prior to construction activity</li> <li>Prior to construction</li> <li>Monthly – prior to start of work</li> <li>Weekly</li> <li>At 14 calendar days prior to full closures</li> </ul>
<b>Emergency Service Providers:</b> <i>Police, Fire Dept., Ambulance</i>	<ul style="list-style-type: none"> <li>Email newsletter</li> <li>Email construction updates</li> <li>Traffic Alert prior to full closure</li> <li>Call prior to closures</li> </ul>	<ul style="list-style-type: none"> <li>Monthly – prior to start of work</li> <li>Weekly</li> <li>As necessary</li> <li>As necessary</li> </ul>
<b>Elected Officials:</b> <i>City Council, CDOT Board of Directors</i>	<ul style="list-style-type: none"> <li>Email newsletter</li> <li>Email construction updates</li> <li>Weekly construction updates</li> </ul>	<ul style="list-style-type: none"> <li>Quarterly</li> <li>Monthly – Prior to start of work</li> <li>Weekly</li> </ul>
<b>Media:</b> <i>Traffic Reporters and PIOs for CDOT, City and County of Denver, Schools, Churches, Hospitals, Police, Fire</i>	<ul style="list-style-type: none"> <li>Email newsletter</li> <li>Email construction updates</li> <li>Press release for full closures</li> <li>EMS detour alert</li> <li>Story pitches to local reporters</li> <li>Flyover shots with reporters</li> <li>Special story pitches to traffic reporters – radio/T.V.</li> </ul>	<ul style="list-style-type: none"> <li>Monthly – Prior to start of work</li> <li>Weekly</li> <li>At least a week prior to full lane closures</li> <li>Database email</li> </ul>

### 1.1.1.1 Tier II PIM Projects

These projects are medium to high impact, usually with medium to high public visibility, stakeholder involvement, and traveling public impacts. Tier II projects are usually:

- Construction activities on high-volume road(s) with many direct-access points
- Located in commercial areas
- Of impact to many commuters and pedestrians, cyclists, stakeholders



Tier II Communications may include:

- Public meetings prior to starting Work, and as necessary throughout construction
- Stakeholder Distribution lists which KMP uses and continually updates (with carryover information from the Construction Period)
- Project information hotline using the same number as used during the Construction Period and the EIS period
- A weekly Lane Closure Report
- Delivery of project information flyers (based on Department templates) to impacted residences, businesses, and other stakeholders.
- Meetings with affected property owners as appropriate to explain construction activity, impacts, duration, important dates, and KMP team contact information
- Useful Project website content including construction information, activity, impacts, duration, important dates, and detour maps
- Tracking of all communications through the hotline, email, and social media in Dialog (or other, as directed by the Department). Based on pertinent trends and technology advances, we will adjust communications and Work accordingly
- Support for the Department for media relations, including development of press releases and work site access as requested

#### 1.1.1.2 Tier III Projects

These projects are of medium or lesser impact, usually with limited media or public visibility, stakeholder involvement, and traveling public impacts. Tier III projects are for:

- Construction activities on a mid-volume road
- Limited direct-access points, near commercial areas with traffic
- Changing work zones, or
- Work scope determined by the Department to need enhanced communications.

Tier III Communications may include:

- All communication methods and outreach efforts outlined above for Tier II PIM Projects are available and used for Tier III PIM work
- As project specific conditions dictate, the KMP communication team will modify the Tier II activities
- The adjustments will be detailed in the Work-specific communication plan submitted to the Department

### 1.1.2 SAFETY-RELATED COMPLAINTS

Safety is always of highest priority for the KMP team and we immediately address any safety complaints. Safety related concerns reported to the hotline, through emails, and posts to social media are reported to the Department within one calendar day of receipt. If the concern involves an immediate safety hazard, we will report it to the Department within one hour of receipt.

The Public Information team reports every safety incident to the appropriate KMP team member. KMP then responds to each complaint or request as directed by the guidelines of the O&M Requirements and based upon the investigation results. We will forward all other complaints or requests to the Department. All communications and responses are tracked and documented using the InEight Project Suite.

### 1.1.3 OPERATIONS AND MAINTENANCE EDUCATION

Throughout the Operations and Maintenance Period, KMP coordinates with the Department to develop educational campaigns so stakeholders may understand that how KMP maintains the Project and its obligation to meet Department standards. These campaigns will address topics such as HOV, Travel Demand Management, Tolloed Express Lanes, and more as identified through the two-way communications process and the results we learn during the Construction Period. All communications, outreach, and education campaigns will adhere to the HPTE Strategic Communications and Transparency Plans.

### 1.1.4 MAINTENANCE AND OPERATIONS COMMUNICATIONS PLAN QUARTERLY REPORTING

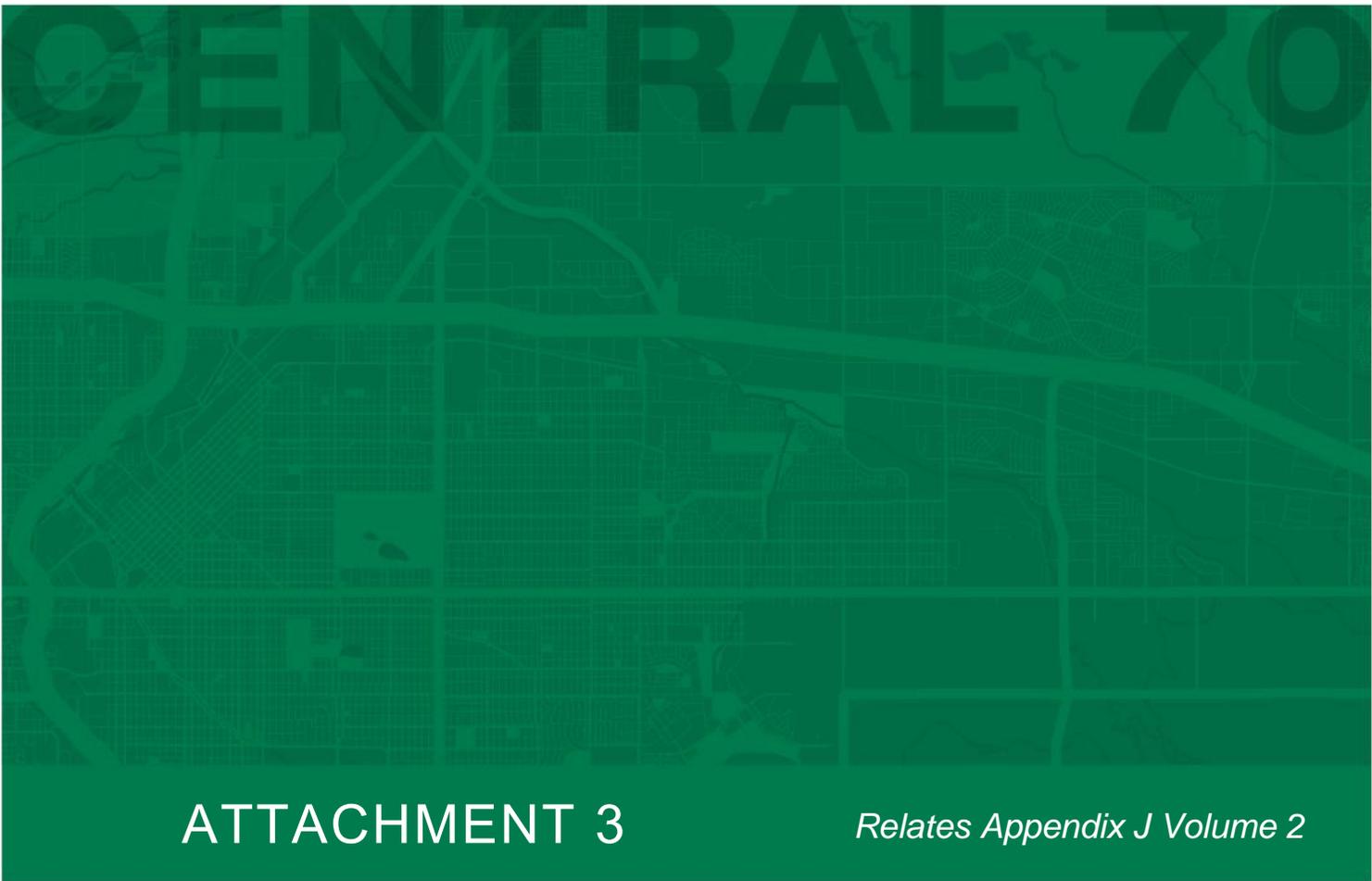
KMP uses our quarterly report process to evaluate the program's future making adjustments based on the previous quarter's activities to make the project more effective and beneficial to the Department and project stakeholders. We will submit the first quarterly report within 10 Working Days after the 90<sup>th</sup> calendar day following Substantial completion. This report is submitted to the Department in English, with Spanish translation upon request. The report will include:

- Details of primary O&M Work activities performed during the preceding quarter as referenced in Schedule 8 (Project Administration)
- A detailed summary of MOCP activities performed during the preceding quarter
- A detailed summary of the Environmental Compliance Work Plan (ECWP) as part of the Progress Report activities during the preceding quarter
- A progress summary of the Small and Disadvantaged Business Participation for the preceding quarter's O&M services
- A detailed summary of number of accidents cleared during the preceding quarter
- A summary of all calls and emails as recorded in the Dialog system
- A detailed summary of measures taken to communicate with LEP persons (Limited English Proficiency) and requests for language assistance during the preceding quarter.



### 1.1.5 EMERGENCY MAINTENANCE

The KMP process and procedures for dealing with emergency maintenance services are outlined in the Maintenance Management Plan (Appendix I) with communication strategies detailed in the Crisis Communication Plan (Appendix J – Attachment 3).



ATTACHMENT 3

*Relates Appendix J Volume 2*



# Draft Crisis Communication Plan



**SUBMITTED TO:**

Colorado Bridge Enterprise  
High Performance Transportation Enterprise  
c/o Colorado Department of Transportation



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## RECORD OF REVISIONS

Revision number	Date issued	Pages affected	Comments
0	5/18/2017	All	Proposal Draft Submittal



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## 1. Overview

The safety and protection of workers, traveling public and community residents always remains KMP's priority; however, with the complexity of the Central 70 project, the potential for an emergency or crisis does exist. Through proper planning, KMP is prepared to respond appropriately.

We have developed and maintain an effective crisis communication plan to successfully manage flow of information during these situations. The construction of the new highway involves many active partners and presents unique communication challenges. To manage crisis communications successfully, KMP coordinates with the Department to integrate three key elements:

- **Establish a detailed plan and educate leadership:** Even the best crisis communications plan will fail if team members are not well trained for their role in crisis protocol.
- **Communicate quickly, clearly, and concisely with Project stakeholders:** Effective and accurate responses during a crisis are the best way to minimize additional negative impacts.
- **Coordinate closely with the Department:** KMP will provide all requested information and support for the Department's communication efforts.

KMP's plan and efforts incorporate guidelines specific to incidents to support and supplement the protocols of individual response agencies and the Department.

### 1.1 PURPOSE

KMP use the Crisis Communications Plan to respond to Project emergencies and incidents in coordination with the Incident Management Plan. This crisis communication plan assist in accomplishing the Project goals of maximizing public safety and successfully delivering the Project. Our plan meets the following objectives:

- Ensuring accurate, consistent and timely communications—both internally and externally
- Eliminating or minimizing confusion and rumors
- Maintaining credible relations with public officials, emergency response agencies, the media, the public, and all mutually identified stakeholders
- Identifying and clarifying responsibilities and ensure Project staff preparedness

We intend this plan to be a living, working, flexible document that is updated annually with input from team members, emergency responders, and lessons learned from actual events. The KMP Public Information and MOT teams will review the plan with the Department to ensure mutual understanding and agreement of plan procedures.

### 1.2 LEAD COMMUNICATOR DURING A CRISIS

The Department leads all communications to the media, public, Department staff, and other stakeholders who may be impacted by a Project crisis. KMP supports these efforts with coordination and information. Clarification and optimization of crisis response protocols and the Incident Management Plan with stakeholders will occur in quarterly meetings to ensure preparation for an effective crisis response should the need arise.



KMP's Communications Manager may serve as spokesperson if requested by the Department. The Communications Manager (and any designated alternates) have unlimited access to the Project management team and will be:

- Thoroughly familiar with the Project
- Proficient in media relations
- Well-spoken and composed under stress

## 1.3 RESPONSIBILITIES AND INCIDENT DEFINITIONS

### 1.3.1 INCIDENT DEFINITIONS

The following table identifies potential crisis scenarios and related incidents for the Project, and staff leads for each. In most cases, we have identified more than one agency communication lead – the circumstances of each incident will determine the appropriate lead:

#### Potential Incidents

Potential Scenario	Potential Incident	Staff to Respond
<b>Death/injury/accident</b> <i>(includes mass casualty incidents)</i>	KMP or Subcontractor fatality/serious injury	KMP Safety Manager, Construction Manager, Project Manager, Communications Manager and EMS
	KMP or Subcontractor accident	KMP Safety Manager, Construction Manager, Project Manager, Subcontractor Lead, Communications Manager and EMS
	Motorist or transit accident/injury/fatality involving KMP or Subcontractor equipment or personnel	KMP Safety Manager, Construction Manager, Project Manager, Subcontractor Lead, Communications Manager and EMS
	Motorist or transit accident/injury/fatality <u>not</u> involving KMP or Subcontractor equipment or personnel	KMP Safety Manager, EMS, RTD if required
<b>Utility disruptions</b>	Utility strikes	KMP Safety Manager, KMP Utilities Manager
<b>Environmental impacts</b> <i>(during construction)</i>	Noise/vibration impacts	KMP Environmental Manager Construction Manager, Project Manager, Communications Manager
	Air quality impacts	KMP Environmental Manager Construction Manager, Project Manager, Communications Manager
	Storm water pollution	KMP Environmental Manager Construction Manager, Project Manager, Communications Manager
	Soil/groundwater contamination (pre-existing conditions)	KMP Environmental Manager Construction Manager, Project Manager, Communications Manager
	Asbestos removal	KMP Environmental Manager Construction Manager, Project Manager, Communications Manager
	Endangered species encroachment	KMP Environmental Manager Construction Manager, Project Manager, Communications Manager

Potential Scenario	Potential Incident	Staff to Respond
<b>Impact to railroad services</b>	Material spill or other incident prohibiting train movements	KMP Safety Manager, Construction Manager, Project Manager, Communications Manager, Railroad Coordinator
<b>Weather-related incident</b>	Flood	KMP Safety Manager, Construction Manager, Project Manager, Communications Manager, Drainage Manager, Traffic Control Manager
	Tornado	KMP Safety Manager, Construction Manager, Project Manager, Communications Manager, Traffic Control Manager
	Lightning strike	KMP Safety Manager, Construction Manager, Project Manager, Communications Manager, Traffic Control Manager
	Blizzard	KMP Safety Manager, Construction Manager, Project Manager, Communications Manager, Traffic Control Manager, Snow Removal Team, Courtesy Patrol
<b>Violence</b>	Workplace violence	KMP Safety Manager, Construction Manager, Project Manager, Communications Manager, HR Manager, and PD
	Violence toward construction crews	KMP Safety Manager, Construction Manager, Project Manager, Communications Manager, HR Manager, and PD
	Vandalism, disturbance by 3 <sup>rd</sup> party	KMP Safety Manager, Construction Manager, Project Manager, Communications Manager, HR Manager, and PD
	Terrorism	KMP Safety Manager, Construction Manager, Project Manager, Communications Manager, HR Manager, and PD; Responding agency
<b>Civil disobedience</b>	Onsite protesters	KMP Safety Manager, Construction Manager, Project Manager, Communications Manager, HR Manager, and PD
<b>Labor crisis</b>	Labor/union dispute	KMP Safety Manager, Construction Manager, Project Manager, Communications Manager, HR Manager, Civil Rights Program Manager, Union Rep

## 1.4 APPROACH TO EMERGENCIES

We have established checklists for our team’s emergency responders. We will implement the Incident Management Plan with an emphasis on safety first, then restoring traffic flow. Our identified response roles include:

### 1.4.1 FIRST ON SCENE: RESPONSIBILITIES

- Stay calm. Assess situation for immediate danger. Do not panic. Do not overreact.
- If safe, secure site. If not, wait for assistance.
- If police, fire or paramedic aid are required, CALL 911 IMMEDIATELY.



- Administer first aid if required until medical professionals arrive.
- Ask for help. Call supervisor on radio or phone.
- Get names and/or deceased.
- With subcontractor foremen as appropriate, account for all other on site personnel.
- Do not release names, ages, residences or other information about injured or deceased personnel to anyone outside of the company. Refer inquiries to your manager.
- Do not talk to media; refer inquiries to your Public Information Manager.

#### 1.4.2 SUPERINTENDENT/SITE SAFETY LEAD: RESPONSIBILITIES

- Verify status of all items listed in the “first-on-scene” protocol.
- Notify appropriate organizations and personnel, using the calling tree.
- Assemble job personnel and count heads. After approval by the project manager, share basic information about the incident with job personnel. Prevent speculation regarding the cause of the incident.
- Direct media inquiries to the Public Information manager. Say, “I’m not the company spokesperson. Please give me your name, media affiliation and contact numbers so that I can put you in touch with someone who can assist you.” Never say, “No comment.”
- Gather/verify available information. What happened? Where? Who was involved? How did it occur?

#### 1.4.3 PROJECT MANAGER/SPONSOR: RESPONSIBILITIES

- Verify status of all items on prior protocol lists and the mission critical notification checklist.
- In the event of a serious injury, notify injured employees family and arrange transportation to hospital.
- In the event of a fatality, arrange for the district manager, or someone on his behalf, to visit the deceased employee’s family in person.
- Consult with the district manager and determine if work should be suspended.
- Establish a command post in a conference room with access to a necessary technology for communication.
- Designate staff employee to screen, log and forward media inquiries to the Public Information Manager.
- Designate Media Escort, and a Local Spokesperson only if approved by District Manager and Public Information Manager.
- Keep the corporate spokesperson and Legal advised of any significant changes in the situation.
- If non-employee is seriously or fatally injured, contact KMP’s legal department before advising family.
- Do not released names, ages, residence or other information about injured or deceased personnel until next of kin have been notified
- In consultation with Legal Department, verify facts and identify potential legal issues.
  - What happened?
  - Where?

- Who was involved?
- How did it occur?  
Determine ways accident might have been prevented.
- Work with safety and legal to prepare and distribute an accident report.
- Conduct mass safety meetings, as appropriate.

#### 1.4.4 MEDIA ON SITE

When media personnel are on site or expected to be on site, we will follow these procedures:

##### 1.4.4.1 Crew Foreman (or senior on-site person):

- Assign someone to carry out Media Control and Public Area (procedures outlined below) until a PCM arrives.
- Call/notify the following immediately:
  - Chris Hodgkins, Project Manager
  - Barry Thoendel, Construction Manager
  - Kenyon Manley, Construction Safety Manager
  - Hunter Sydnor, Public Communications Manager
  - Superintendents as needed
- Provide the following information:
  - What happened
  - Specific location (cross streets, construction entrance, sector of work)
  - Your name
  - Your cell and/or radio number that will remain open for incoming calls
  - General activity involved or how it happened
  - Current status of people/project
  - Is the media on site? If yes, give clear directions to location.

##### 1.4.4.2 Crew Member assigned to Media Control:

If media **is** on site:

- Use tape, traffic control equipment or other means to **mark off a secure area** for the media. Look for an area that is:
  - Away from incident in a “safe zone”
  - Big enough for 20+ people
  - Accessible via car from a public street
  - Direct all media to the “safe zone.” If already on site, escort them to this area
  - They must have hard hats, vests and safety glasses if the “safe zone” is on site. If they DO NOT, direct them to wait off site until additional gear can be brought onsite.
  - Keep other staff completely separate from the media “safe zone.”



- **Stay with this group.** Do not, under any circumstances, leave the media personnel alone. If people demand to go on site remind them:

**“This is an active work site, people are working to respond to the incident. This is for your safety.”**

- **Do not comment.** They will hammer you with questions and try to get you to talk about the incident, the people, your job. They may flatter you or try to upset you. Try to be as polite and courteous as you can, but **at no time should you ever answer any question directed to you by a member of the media.** They are just trying to get a story. In this situation, you do not have a story. Your only statement is:

**“I am not a spokesperson. I am here to keep you safe during this incident. As soon as accurate information is available, a spokesperson will provide it to you.”**

If several media people arrive and the Project Communications Team is not on site yet, send someone to get the Construction Manager. **Do not leave the safe zone.**

Be aware that media scanners monitor radio traffic. Be careful not to transmit information that can be used by the media to substantiate a story or identify accident/incident victims.

#### **1.4.4.3 Project or Construction Manager:**

- If there are several media people present when the Construction Manager arrives and the Project Communications Team is not yet on site, the following statement should be read:

*"My name is \_\_\_\_\_ and I'm a \_\_\_\_ (Title) \_\_\_\_ for KMP. At approximately \_\_\_\_ time \_\_\_\_ we experienced a(n) (accident, fire, explosion, [or describe situation]) near \_\_\_\_ approximate street address \_\_\_\_ . We are working with \_\_\_\_ name agencies \_\_\_\_ to address the situation. This is all I can confirm at this time. I'm sure you understand we're very busy trying to deal with the situation and to gather as much information as possible. Please remain in this safe area and either a spokesperson or I will be back in \_\_\_\_ (# of minutes) \_\_\_\_ with any additional information that can be verified. Sorry. No questions."*

- If possible, wait for the Project Communications Team to arrive before making any more statements to the media. If, for some reason, one or the other cannot arrive in a timely manner, further directions and approved statements will be provided to the Construction Manager over the phone.
- If the incident is resolved quickly, the media will probably leave to do their story, but may still have questions. In that event, please get this information:
  - Name of Media Outlet (publication/radio/TV station)

- Reporter's Name
- Phone #
- Fax #
- Date/Time of Inquiry
- Reporter's Deadline
- Reporter's Questions
- Facts Given (this should consist only of the facts released through the approved statement)

Once you have all of the information, forward your written documentation of the media inquiries to the KMP PCM immediately.

#### 1.4.4.4 Crew Member assigned to Public Area:

- Keep the public in a contained area, safely away from the incident scene AND away from the media safe zone.
  - Use tape, traffic control equipment or other means to mark off a secure area for the public. Look for an area that is:
    - Away from incident in a "safe zone"
    - Big enough for 20+ people
    - Accessible via car from a public street
    - Direct the public to the "safe zone." If already on site, escort them to this area
    - They must have hard hats, vests and safety glasses if the "safe zone" is on site. If they DO NOT, direct them to wait off site until additional gear can be brought onsite.
    - Keep other staff completely separate from the public "safe zone."
- **Stay with this group.** Do not, under any circumstances, leave the public alone. If people demand to go on site remind them:

**"This is an active work site, people are working to respond to the incident. This is for your safety."**

- Provide information/updates on status of situation/victims to any public present. This information should be obtained only from the designated spokesperson onsite.



## 1.4.5 BOILERPLATE MESSAGES

### 1.4.5.1 Flooding

**FOR IMMEDIATE RELEASE**

Contact:

**Flooding Restricts Traffic Flow on I-70 within the Project**

(CITY, STATE,) (DATE) — Heavy rains and flooding have restricted traffic flow in (the northbound lanes) (the southbound lanes) (both directions) of (location) within the (project name).

There are (no reported injuries) (injuries reported), and the (agency name) officials are (detouring traffic) (stopping traffic). The detour is (describe detour).

Agency officials expect traffic delays through the project for the next several hours until they can clear the water and other debris from the highway.

The Department will send out travel updates via emails, tweets and on [www.COTrip.org](http://www.COTrip.org). Information will also be on overhead VMS Boards as well as frequent traffic reports on our local television and radio stations. Please adjust your travel plans to accommodate these conditions.

### 1.4.5.2 Non-Injury Crashes

<b>FOR IMMEDIATE RELEASE</b>
<b>Contact:</b>
<p><b>Crash Restricts Traffic Flow in (Project Name)</b>  (CITY, STATE), (Date) — A (single-, multi-) vehicle crash has restricted traffic flow on (road names) within the (Project Name) limits.</p> <p>There are no reported injuries, but authorities expect traffic delays through the project for the next (length of time) until they can clear the (vehicle or vehicles). Drivers are advised to find alternate routes until the crash site is cleared.</p> <p>The Department will send out travel updates via emails, tweets and on <a href="http://www.COtrip.org">www.COtrip.org</a> . Information will also be on overhead VMS Boards as well as frequent traffic reports on our local television and radio stations. Please adjust your travel plans to accommodate these conditions.</p>

### 1.4.5.3 Emergency Construction Closures

<b>FOR IMMEDIATE RELEASE</b>
<b>Contact:</b>
<p><b>Construction (Closes/Restricts) (Road Location) to Traffic</b>  (CITY, STATE), (Date) — The (project name) has (closed/restricted) (road location) to traffic today because of (describe construction activity).</p> <p>This emergency (closure/restriction) will be in effect for (duration). The project is advising motorists to avoid the area and use alternate routes until the area is safe for traffic.</p> <p>Recommended detour routes include:(insert approved detour route)</p> <p>The Department will send out travel updates via emails, tweets and on <a href="http://www.COtrip.org">www.COtrip.org</a> . Information will also be on overhead VMS Boards as well as frequent traffic reports on our local television and radio stations. Please adjust your travel plans to accommodate these conditions.</p>



#### 1.4.5.4 Injury Crashes

<b>FOR IMMEDIATE RELEASE</b>
<b>Contact:</b>
<p><b>Crash in (Project Name) Results in Injuries</b> (CITY, STATE), (Date) — A (single-, multi-) vehicle injury crash has restricted traffic flow on (road location) within the (Project Name) limits.</p> <p>Authorities expect traffic delays through the project for the next (length of time) until they can attend to the injured parties and clear the (vehicle or vehicles). Drivers are advised to find alternate routes until the crash site is cleared.</p> <p>The Department will send out travel updates via emails, tweets and on <a href="http://www.COtrip.org">www.COtrip.org</a>. Information will also be on overhead VMS Boards as well as frequent traffic reports on our local television and radio stations. Please adjust your travel plans to accommodate these conditions.</p>

#### 1.4.5.5 Crashes with Fatalities

<b>FOR IMMEDIATE RELEASE</b>
<b>Contact:</b>
<p><b>Crash in (Project Name) Results in Death(s)</b> (CITY, STATE), (Date) — A (single-, multi-) vehicle crash has killed (number of people) and restricted traffic flow on (road location) within the (Project Name) limits.</p> <p>Authorities expect traffic delays through the project for the next (length of time) until they can clear the (vehicle or vehicles). Drivers are advised to find alternate routes until the crash site is cleared.</p> <p>The Department will send out travel updates via emails, tweets and on <a href="http://www.COtrip.org">www.COtrip.org</a>. Information will also be on overhead VMS Boards as well as frequent traffic reports on our local television and radio stations. Please adjust your travel plans to accommodate these conditions.</p>

### 1.4.5.6 Construction Worker Injuries

**FOR IMMEDIATE RELEASE**

**Contact:**

**Accident Results in Injuries to (project name) Worker(s)**

(CITY, STATE), (Date) — (Number) construction worker(s) (was/were) injured today while working on the (Project Name).

(Name/names) (was/were) injured when (briefly describe the circumstances) at about (time) while working near (location).

(He/she/they) were treated on scene (or) transferred to (name of hospital) for treatment. (Use the following sentence only if the victims were taken to the hospital: The accident (victim or victims) were treated and released (or) remain hospitalized.)

(He/she/they) work for (name of contractor) and were (briefly describe what was being done when accident happened). The (agency name), (KMP affiliate name), state and federal officials are investigating the accident.

“Worker safety is paramount to this project,” said (Name), (Agency) Project Manager. “The safety of construction workers and the public is a serious matter to us and we will do everything in our power to ensure a situation like this is not repeated.”

“Project safety is our top priority,” said (Name), (title, KMP Affiliate). “We will review our internal procedures and continue to work closely with state and federal officials to safely build this project.”



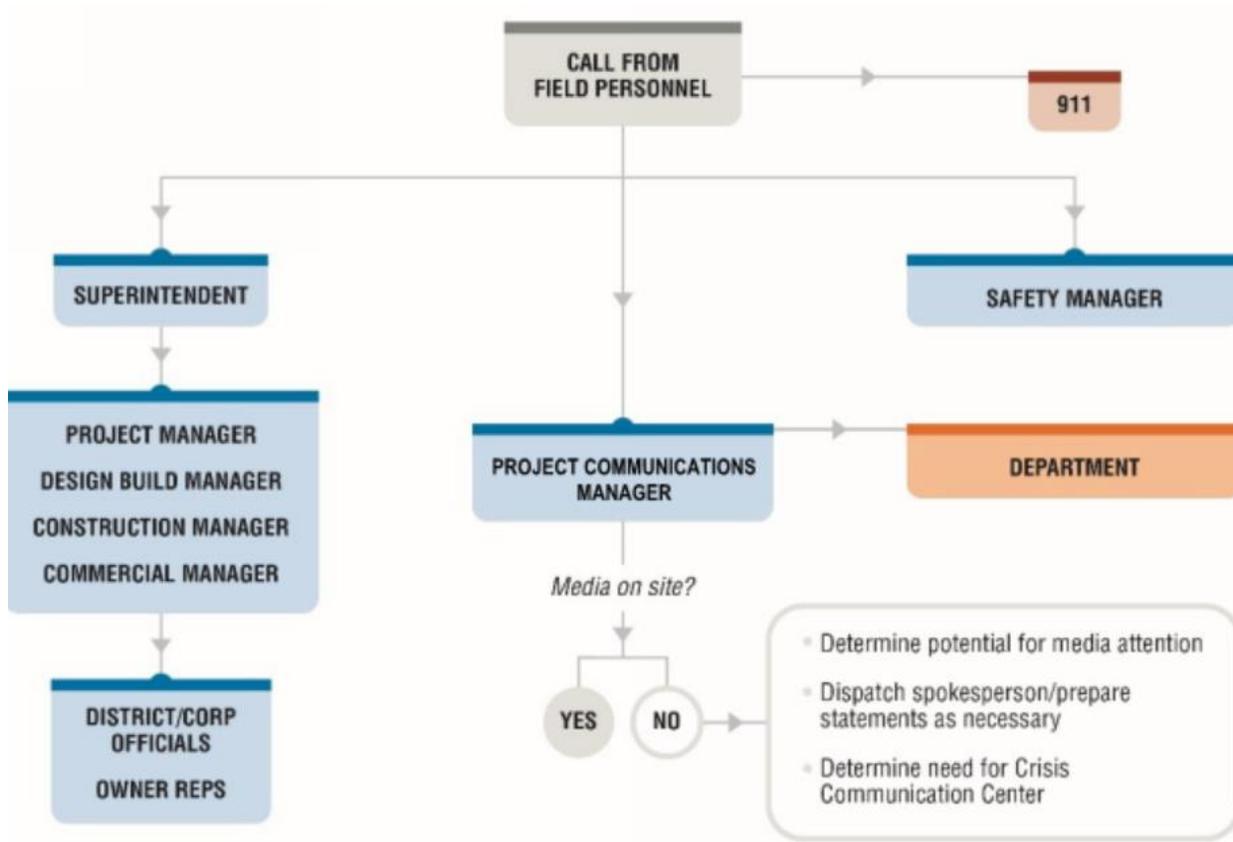
### 1.4.5.7 Construction Worker Fatalities

<b>FOR IMMEDIATE RELEASE</b>
<b>Contact:</b>
<p><b>Worker(s) Dies in (Project Name) Accident</b></p> <p>(CITY, STATE), (Date) — (Number) construction worker(s) died today while working on the (project name).</p> <p>(Name/names), (age/ages), (was/were) killed when (briefly describe the circumstances) at about (time) while working on the project near (location). (Use the following if name(s) have not been released: The name(s) of the dead construction worker(s) (has/have) not been released pending notification of family.)</p> <p>(He/she/they) died on scene (or) died at (name of hospital). (He/she/they) work for (name of contractor) and were (briefly describe what was being done when accident happened). The (agency), (KMP affiliate), the prime contractor, and state and federal officials are investigating the accident.</p> <p>“Worker safety is paramount to this project,” said (Name), (Agency) project manager. “The safety of construction workers and the public is a serious matter to us and we will do everything in our power to ensure a situation like this is not repeated.”</p> <p>“Our thoughts and prayers are with our workers’ families,” said (Name), (title, KMP affiliate). “We are committed to returning every worker home safely after every shift and will work diligently with state and local officials to complete this project safely.”</p>

### 1.4.6 INTERNAL COMMUNICATIONS

KMP will use an internal phone tree for initial communication to the project team and the Department. Once the extent of the incident/crisis has been determined, the KMP and Department Communications Team will determine what additional stakeholders should be notified and distribute pertinent information accordingly.

### Internal Phone Tree



Information to provide:

- What Happened
- Specific Location
- Your Name
- Your cell phone # or radio number
- General activity involved or how it happened
- Current Status of people/project

#### 1.4.7 CRISIS COMMUNICATION PROCEDURES CALLING TREE

We have established systematic Project procedures to ensure consistent and thorough crisis communications. Internal reporting procedures ensure timely, accurate information from the field, through the public information representatives, and to all appropriate stakeholders.



After the initial calls described above, the following Quick Reference Guide provides further notifications as determined by incident type. All superintendents and above will have this information available at all times. The Quick Reference Guide is in checklist format to guide the completion of all items. The Safety Manager and Public Information team also have email contact lists for rapid email distribution. KMP will coordinate with the Department on using the CTMC to communicate major traffic impacts. Prior to NTP2, the calling tree will be developed in coordination with the Department’s Communication Team.

#### 1.4.8 CRISIS COMMUNICATION TRAINING MEETINGS

KMP reviews the Crisis Communication Plan in all training meetings and at regularly scheduled safety and staff meetings. Review items will include:

- Crisis Communication Contact Procedure Cards
- Phone trees
- Emergency phone lists
- 10 different ways to say to the media “no comment”

### 1.5 CRISIS COMMUNICATION BOX

As part of the crisis preparation, we assemble critical equipment kits to ensure team preparation regardless of location or time. We keep kits at the office and with Public Information staff. Items to be included in the kit:

- PPE for media
- Pens and notepads
- Flashlight
- Copies of forms and logs
- Copies of Crisis Communication Plan
- Draft press releases
- Copies of phone lists

## 2. KMP Public Information Team Communications Procedures

For construction-related incidents, the KMP Public Information Officer immediately notifies the Department Public Information representatives to determine the appropriate response, including:

- Additional necessary resources (i.e. establish a crisis communication center)
- Team members to be involved in the response
- The primary spokesperson
- How to best coordinate with other responding agencies
- Key communications to distribute, potentially including:
  - Nature of the incident/crisis/disruption
  - Who/what caused the incident/crisis/disruption
  - Broad or specific, based on verified facts
  - Timing of the incident/crisis/disruption
  - Current actions underway
  - Public impact

- Anticipated duration of the disruption

To ensure the notification of appropriate Project members, the joint KMP/Department Public Information (PI) team work together to develop messages, coordinate media contact, and initiate the Emergency Contact Phone List.

Our established procedures for the Project's Public Information Team, ensure appropriate message development, response approaches, and adequate notification of internal audiences.

## 2.1 RESPONDING TO CRISIS SCENE

If appropriate and safe, one or more Project Public Information Team member(s) will respond to the crisis scene to help respond to media and public information needs.

Any public information team members responding to the scene must work with emergency response agencies and/or railroad officials (if applicable) to determine who is authorized to update the media.

Below are potential procedures for working with the media at crisis scenes. Common sense and coordination with emergency response agency representatives will help determine their use:

- The crisis scene representative will try to record the name and affiliation of all media on scene
- Issue safety equipment and accompany reporters/photographers when site access is allowed for media representatives
- We will provide media access only after appropriate authorities declare the area safe
- To ensure public safety, the on-site Public Information Team representative(s) will ensure only media with proper credentials are provided access to the crisis scene (we will not allow media representatives access to railroad right-of-way)
- The crisis communication team representative(s) will coordinate on-scene media requests for interviews with the appropriate on-scene authorities.

## 2.2 ESTABLISHING CRISIS COMMUNICATION CENTER

In some situations, the Public Information Team will activate the Crisis Communication Center to coordinate information collection and dissemination to the media and other stakeholders.

Potential incidents or crises requiring a Crisis Communication Center may include:

- Fatalities
- Major construction accident
- Accident affecting service on any of the railroad lines
- Hazardous material spill
- Major utility disruption
- Severe weather conditions

When activated, this center will be set up at the Project Office. If the crisis involves the Project Office, we will use the next closest predetermined office. Hunter Sydnor and other Public Information staff will direct and support the center as necessary. Staff from other disciplines may augment the public information team from the scene or in the Crisis Communication Center.



### 2.2.1 CRISIS COMMUNICATION CENTER SET UP SUMMARY

<b>Location</b>	[To be determined] Equipped to handle media needs
<b>Phone</b>	[xxx-xxxx]
<b>Staff</b>	Department/KMP Public Information Managers
<b>Purpose</b>	To provide public information/public affairs support in the event of an Incident or crisis situation
<b>Duties:</b>	<ul style="list-style-type: none"> <li>• Assemble staff: We will notify all Public Information representatives and request their support from the center or a remote location upon activation of the Crisis Communication Center.</li> <li>• Gather situation facts: <ul style="list-style-type: none"> <li>○ What</li> <li>○ Where</li> <li>○ When</li> <li>○ Traffic affects (How long to clear)</li> <li>○ Injuries</li> <li>○ Who is at the scene (emergency responders?)</li> </ul> </li> <li>• Determine lead agency and spokesperson/media control person(s) for media/public response.</li> <li>• Make assignments and pass out the appropriate phone lists as team members arrive <ul style="list-style-type: none"> <li>○ KMP staff–internal team</li> <li>○ Department staff–internal team – Department to lead</li> <li>○ Media–Department to lead</li> <li>○ Government representatives–Department to lead</li> <li>○ Business representatives–Department to lead</li> <li>○ Neighborhood representatives–Department to lead</li> </ul> </li> <li>• Develop official statements for the media in conjunction with the Department and other applicable response agencies. Staff will issue bulletins regarding response to the incident/crisis.</li> <li>• Develop messages and possible Q&amp;A.</li> <li>• Monitor media coverage.</li> <li>• When appropriate, establish a Media Briefing Center at the Project Office or alternate site and staff with a second media control person.</li> <li>• Provide information to media, management, government, business, and community phone inquiries.</li> <li>• Maintain contact lists and make update calls.</li> <li>• Assist media in obtaining information/video/photos in a safe manner.</li> <li>• Arrange follow-up interviews as appropriate.</li> <li>• Communicate with Project Management as to appropriate internal communication with employees, family members, and pertinent stakeholders.</li> </ul>

### 2.2.2 PUBLIC INFORMATION TEAM RESPONSIBILITIES

Depending on the nature of the crisis, and/or at Department direction, KMP team members may fill the following roles:

- **Media spokesperson:** Works with project management and the Department to develop appropriate response. Coordinates with on scene emergency personnel and/or railroad representatives (if applicable) to identify media contacts. Answers and returns media calls and compiles post-crisis report on media requests and responses.
- **Business/community liaison(s):** Initiates and receives calls from businesses and the community. Provides information, as available, to callers. Records caller information and responses and compiles post-crisis report on business/community requests and responses. Posts applicable information to Project website when deemed appropriate.
- **Government liaison:** Initiates and receives calls from local, state and national government representatives and/or staff. Records caller information and responses and compiles post-crisis report on requests for information and responses.
- **Commuter liaison:** Initiates and receives calls regarding commuting from RTD for transit users, the City and County of Denver, and Aurora and Department officials for local commuters. Coordinates variable message board messages if appropriate. Compiles post-crisis report on requests for information and responses.
- **Internal liaison:** During regular business hours, initiates and receives calls and requests for information from the Project team. Communicates updates to internal audiences including e-mail distributions and website postings. Compiles post-crisis report on requests for information and responses.
- **Crisis Communication Center Coordinators:** Provide support to Crisis Communication Center staff as needed. Take notes at press conferences and briefings. Serve as liaison between Crisis Communication Center and on scene personnel. Track media coverage to help determine the accuracy and effectiveness of center messaging. Escort media and/or runners between Crisis Communication Center and the crisis scene.

Crisis Communication Center staff will support the Project spokesperson by gathering information, answering calls, coordinating responses with management team members and coordinating information released to stakeholders.

The checklists below are guidelines for joint Public Information team members responding to incidents.

### 2.2.2.1 Media Spokesperson Checklist

The Media Spokesperson will work with project management to develop appropriate crisis response, and coordinates with on scene emergency personnel and/or Department representatives (if applicable) to identify appropriate media contacts and ensure effective media communication. The Media Spokesperson will compile a post-crisis report on media requests and response.

- Quickly develop basic facts about what happened, current response by emergency response organizations, KMP, the Department, and others, and relay this information to the Crisis Communication Center or other Public Information team members.
- Ensure appropriate routing of, and response to, media calls.



- Log of media calls using the form in shown below.
- Coordinate media responses, as appropriate, with emergency response agencies and/or railroad officials.
- Ensure the Project team receives information before the media
- Use the appropriate fill-in-the-blank news release to respond to initial media.
- Develop a list of potential questions/answers.
- Return media calls expediently and be sensitive to deadlines.
- Updates media quickly and frequently.
- Be honest and stick to known facts. Provide basic information such as what happened, when it happened, and the current situation. Emphasize the emergency response, current efforts to stabilize the situation and minimize negative stakeholder impact.
  - Never speculate or guess.
  - **DO NOT** release the names of the injured or the severity of their injuries. This information should come from medical authorities after family members have been notified.
  - Never assign blame for a situation.
  - Do not over explain.
  - Do not bluff. If you do not have the answer, tell the reporter and offer to find the answer.
  - Do not talk “off the record.”
- Help the media obtain status updates.
- Ensure messages include the following:
  - What is the incident/crisis/disruption?
  - Who/what caused the incident/crisis/disruption (Broad or specific, depending upon fact verification)
  - When did the incident/crisis/disruption begins
  - Actions being taken to alleviate the problem
  - Impact to the public
  - Anticipated duration of the disruption

### 2.2.2.2 Working with the Media Checklist

In a crisis, addressing the information needs of the media is important. The more serious the crisis, the more demanding the media will be. The Project Information Team will provide facts as quickly as possible.

To be prepared to respond, we create a list of office and after-hours telephone numbers for key media representatives, editors, news directors, assignment editors, and key reporters.

#### **How the Media will respond:**

- The media typically responds to a crisis unannounced. Reporters monitor emergency radio frequencies and often arrive at accidents before emergency personnel.

- Pictures are often more important to telling the story than words. Cellphones, video and still cameras and tape recorders will abound. The media may use helicopter-based cameras for live feeds from the crisis scene.
- The media competes to provide reports before the competition. This results in a mad frenzy to get information first.

### **Releasing Information to the Media**

The Department’s Communication Team, in consultation with project management, will determine the timeliest way to release information to the media during a crisis. The Public Information Team could consider the following options:

- On scene group media briefings (informal news conference)
- On scene one-on-one interviews
- Telephone interviews
- Off-site news conference (at Project Office or another neutral site)
- E-mail releases to newsrooms
- Website updates
- Social media

A combination of methods may prove most useful. We will determine the distribution method based on the importance of the information and its timeliness.

KMP and Department Communication representatives will ensure that all Project staff, agency staff and all contractor employees understand the importance of referring all media questions to a member of their respective Public Information teams during and following a crisis. To ensure the dissemination of accurate and timely information, only Public Information Team members or members of the Project Management Team are authorized to respond to media questions.

#### **2.2.2.3 Business/Community Liaison Checklist**

The Business/Community Liaison(s) initiates and receives calls from the community and provides information, as available, to callers. Records caller information and responses and compiles post-crisis report on business/community requests and responses. When appropriate, the liaison may post applicable information to the Project website.

- Become familiar with the basic facts about what happened and how emergency response organizations, KMP, Department, and others have addressed the situation.
- Ensure appropriate response to calls from business representatives and community members.
- Maintain a log of all calls from business and community members using the form below.
- Coordinate responses, as appropriate, with crisis center Authorities/representatives.
- Return calls as promptly as possible.
- Updates business representatives quickly and frequently.



- Be honest and stick to the known facts. Provide basic information such as what happened, when it happened, and the current situation. Emphasize the emergency response and what is being done to stabilize the situation and to minimize negative stakeholder impact.
  - Never speculate or guess.
  - DO NOT release the names of the injured or the severity of their injuries. This information should come from medical authorities after family members have been notified.
  - Never assign blame for a situation.
  - Do not over explain
- Update Project website as needed.

#### 2.2.2.4 Government Liaison Checklist

Initiates and receives calls from local, state and national government representatives, and/or staff. Records caller information and responses and compiles post-crisis report on requests for information and responses.

- Become familiar with the basic facts about what happened and how emergency response organizations, KMP, Department, and others have addressed the situation.
- Ensure appropriate response to calls from government officials.
- Maintain a log of all calls from government representatives
- Coordinate responses, as appropriate, with command center authorities/representatives.
- Return calls as promptly as possible.
- Updates government representatives as quickly and as often as possible.
- Be honest and stick to the facts. Provide basic information such as what happened, when it happened, and the current situation. Emphasize the emergency response and current efforts to stabilize the situation and to minimize stakeholder impact.
  - Never speculate or guess.
  - DO NOT release the names of the injured or the severity of their injuries. This information should come from medical authorities after family members have been notified.
  - Never assign blame for a situation.
  - Do not over explain

#### 2.2.2.5 Commuter Liaison Checklist

Initiates and receives calls regarding commuting from RTD for transit users, Amtrak for train passengers, the City and County of Denver, and Aurora and Department officials for local commuters. Coordinates variable message board messages if appropriate. Compiles post-crisis report on requests for information and responses.

- Become familiar with the basic facts about what happened and how emergency response organizations, KMP, Department, and others have addressed the situation.
- Update RTD operations as quickly and as often as possible and work with these representatives to develop appropriate messaging for transit users.
- Ensure traffic operation centers (CCD, Aurora and the Department) receive and post relevant information.
- Ensure appropriate response to calls from traffic operation centers.
- Coordinate responses, as appropriate, with command center authorities/representatives.
- Return calls as promptly as possible.
- Be honest and stick to the facts. Provide basic information such as what happened, when it happened, and the current situation. Emphasize the emergency response, current efforts to stabilize the situation and minimize negative stakeholder impact.
  - Never speculate or guess.
  - **DO NOT** release the names of the injured or the severity of their injuries. This information should come from medical authorities after family members have been notified.
  - Never assign blame for a situation.
  - Do not over-explain

#### 2.2.2.6 Internal Liaison Checklist

During regular business hours, initiates and receives calls and requests for information from the Project team. Communicates updates to internal audiences including e-mail distributions and website postings. Compiles post-crisis report on requests for information and responses.

- Become familiar with the basic facts about what happened and how emergency response organizations, KMP, Department, and others have addressed the situation.
- Ensure appropriate response to calls from internal stakeholders.
- Coordinate responses, as appropriate, with command center authorities/representatives.
- Ensure the Project team receives information before the media.
- Update Project Team as quickly and as often as possible.
- Be honest and stick to the facts. Provide basic information, such as what happened, when and the current situation. Emphasize the emergency response and what is being done to stabilize the situation and to minimize negative stakeholder impact.
  - Never speculate or guess.
  - **DO NOT** release the names of the injured or the severity of their injuries. This information should come from medical authorities after family members have been notified.
  - Never assign blame for a situation.
  - Do not over explain



### 2.2.2.7 Coordinator/Runner Checklist

Provide support to Crisis Communication Center staff, as needed. Takes notes press conferences and briefings. Liaise between Crisis Communication Center and on scene personnel. Track televised coverage to help determine the accuracy and effectiveness of center messaging. When necessary, escort media and/or runners between Crisis Communication Center and the incident/crisis scene.

- Become familiar with the basic facts about what happened and how emergency response organizations, KMP, Department, and others have addressed the situation.
- Help record incoming phone calls, responses and calls that must be returned.
- Monitor broadcast news media coverage.
- Monitor Internet sites for mentions of the incident including news media sites, social media sites and blogs.
- Ensure all the necessary personal safety equipment is available at the incident/crisis site.
- Deliver information between the on scene representative and the Crisis Communication Center.
- Provide administrative support on scene with news media and/or community.
- When necessary, communicate with nearby businesses or residents in coordination with Business/Community Liaison.
- Be honest and stick to the facts. Provide basic information, such as what happened, when and the current situation. Emphasize the emergency response, current efforts to stabilize the situation and minimize negative stakeholder impact.
  - Never speculate or guess.
  - **DO NOT** release the names of the injured or the severity of their injuries. This information should come from medical authorities after family members have been notified.
  - Never assign blame for a situation.
  - Do not over explain

## 2.3 BRIEFING CENTER

We will use the media briefing center during inclement weather or when it is not feasible or safe to brief the media on scene (such as an incident along Department right-of-way). We will also use it for media briefings and when news conferences are most appropriate.

<b>Location</b>	[To be determined] Equipped to handle media needs
<b>Phone</b>	[xxx-xxxx]
<b>Staff</b>	Department/KMP Public Information Managers

**Purpose** To provide public information/public affairs support in the event of an Incident or crisis situation

**Duties:**

- When use of the Media Briefing Center is decided, we will request all Public Information representatives to the center or provide support from a remote location.
- Staff will set up the media center (Marc: some details on set up?)
- Determine spokesperson/media control person(s) for media/public response.
- Gather and provide information. If appropriate, relay official statements from the Crisis Communication Center.
- Instruct media on behavior and boundaries.
- Distribute press ID's, if appropriate.

## 2.4 COORDINATION WITH OTHER AGENCIES

When a crisis occurs, close collaboration with appropriate agencies is critical for ensuring consistent and accurate release of information from one source. To that end, Project Public Information Team will meet with appropriate representatives from responding agencies and coordinate through the Incident Management Plan.

Municipalities/agencies to coordinate with include:

- Colorado State Patrol
- Aurora Fire Department
- Aurora Police Department
- Aurora Public Works Department
- Aurora Mayor's Office
- Denver Fire Department
- Denver Police Department
- City and County of Denver Public Works Department
- City and County of Denver Mayor's Office
- Regional Transportation District
- Hazardous Materials
- Colorado Department of Public Health and Environment (CDPHE)
- Major utility providers
- The Department

In addition to emergency response units, coordination efforts will include, when appropriate:

- Federal Transit Administration
- Federal Railroad Administration
- Department of Homeland Security
- Municipal and emergency service public information officers

## 2.5 AFTER THE CRISIS / FOLLOW-UP ACTIONS

The Project Public Information Team will meet and develop an Incident Report with information about the crisis communication and media coverage.

Prior to the creating the report, the Joint Public Information Team will meet post-crisis with all team members. Ask the following questions:



- What went right?
- What could have been done differently?
- What components were the most helpful?
- What was not needed?
- Were the media accurate and fair?
- Was the spokesperson helpful to the media in relaying our important messages?
- Were “outside help” organizations helpful and organized?

**Follow-Up Actions**

- Work with Project Public Information Team to contact the media after the crisis when good news or positive steps can be reported.
- Issue an after-crisis statement to all employees.
- Provide a final status report to neighbors, community/opinion leaders and other VIPs.
- Extend thanks to any individuals who were particularly supportive during the crisis.
- Review Crisis Management Plan and make any necessary revisions based on lessons learned.
- Consider including lessons learned in project- or district-level crisis drills.

**3. Phone Lists**

The following lists will be populated prior to NTP2.

**3.1 KMP STAFF**

Name	Title	Office Phone	Mobile Phone	E-Mail

**3.2 KIEWIT DISTRICT STAFF/CORPORATE STAFF**

Name	Title	Office Phone	Mobile Phone	E-Mail

**3.3 DEPARTMENT CONTACTS**

Name	Title	Office Phone	Mobile Phone	E-Mail

**3.4 EMERGENCY SERVICE PROVIDERS**

Name	Non-Emergency Phone	Emergency Phone

### 3.5 HOSPITALS

Name	Address	Phone

### 3.6 OTHER PCM'S INFORMATION DISTRIBUTION SOURCES

Name	Organization	Phone	Email

### 3.7 ENVIRONMENTAL AGENCIES

Name	Company	Phone

### 3.8 UTILITY CONTACTS

Company Name	Working Hours Phone	Non-Working Hours Phone	Emergency

### 3.9 MEDIA CONTACTS

First Name	Last Name	Business/ Organization	Telephone	Cell Phone	Email



### 3.10 MEDIA INQUIRY LOG

<b>Project Name:</b>						
<b>(To be completed by employee screening calls)</b>						
<b>Date/Time of Call:</b>						
<b>Call Taken By:</b>						
<b>Reporter's Name:</b>						
<b>Newspaper/magazine name or station call sign:</b>						
<b>Type (circle one):</b>	<b>Newspaper</b>	<b>Magazine</b>	<b>Television</b>	<b>Radio</b>	<b>Other</b>	
<b>Phone Numbers:</b>	<b>Voice:</b>		<b>Mobile:</b>		<b>Pager:</b>	
<b>Deadline:</b>						
<b>Nature of Inquiry:</b>						
<b>(To be completed by Corporate or Local Spokesperson)</b>						
<b>Question 1:</b>						
<b>Answer Given:</b>						
<b>Question 2:</b>						
<b>Answer Given:</b>						
<b>Question 3:</b>						
<b>Answer Given:</b>						
<b>Question 4:</b>						
<b>Answer Given:</b>						
<b>Question 5:</b>						
<b>Answer Given:</b>						
<b>Question 6:</b>						
<b>Answer Given:</b>						
<b>Question 7:</b>						
<b>Answer Given:</b>						
<b>Question 8:</b>						
<b>Answer Given:</b>						
<b>Question 9:</b>						
<b>Answer Given:</b>						
<b>Question 10:</b>						
<b>Answer Given:</b>						
<b>Call Returned By:</b>						
<b>Date/Time Returned:</b>						
<b>Notes</b>						

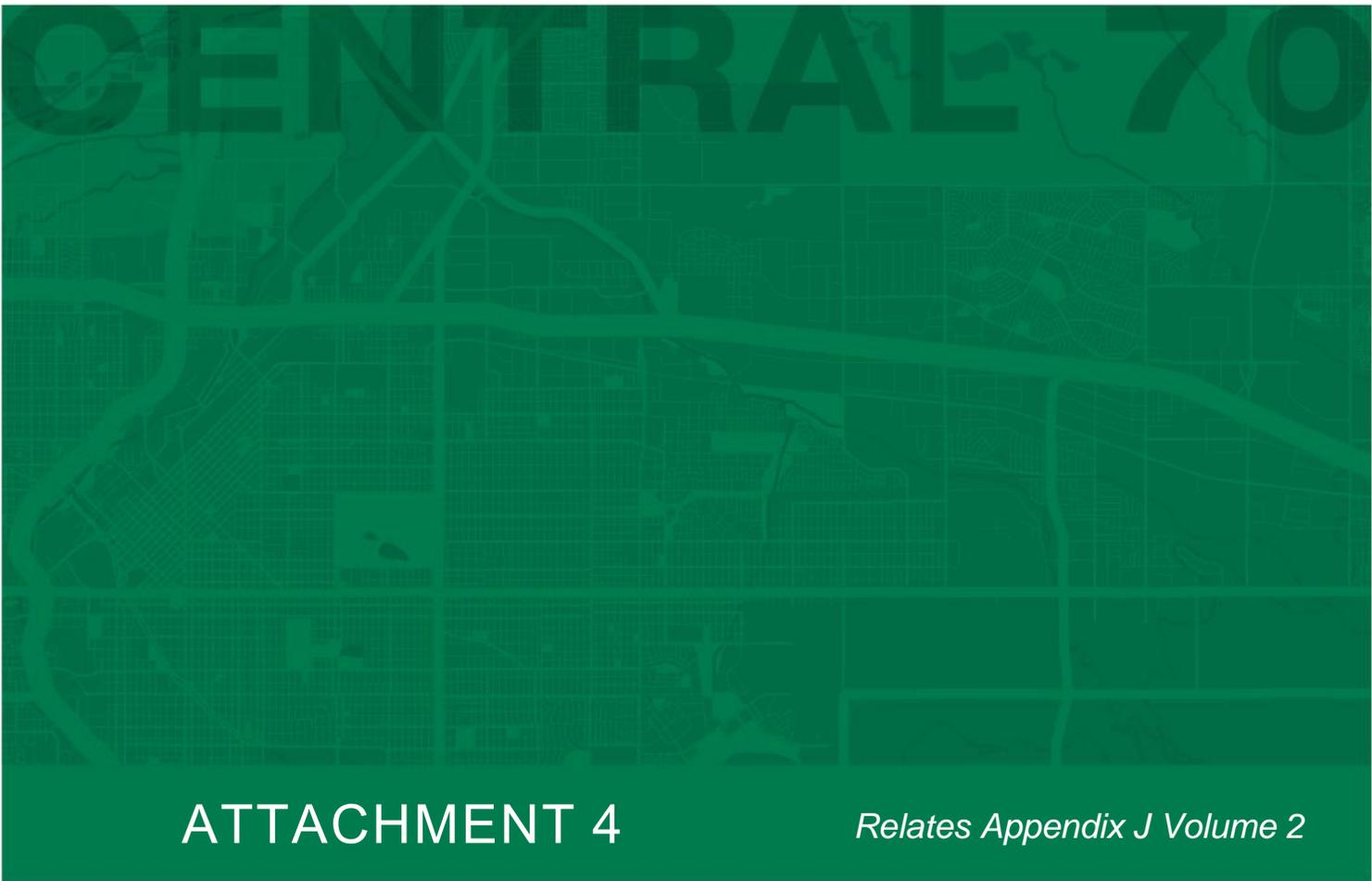
### 3.11 BUSINESS INQUIRY LOG

<b>Project Name:</b>					
<b>Date/Time of Call:</b>					
<b>Call Taken By:</b>					
<b>Business/Community Member Name:</b>					
<b>Business or Community Org Name</b>					
<b>Phone Numbers:</b>	<b>Voice:</b>		<b>Mobile:</b>		<b>Pager:</b>
<b>Nature of Inquiry:</b>					
<b>Question 1:</b>					
<b>Answer Given:</b>					
<b>Question 2:</b>					
<b>Answer Given:</b>					
<b>Question 3:</b>					
<b>Answer Given:</b>					
<b>Question 4:</b>					
<b>Answer Given:</b>					
<b>Date/Time of Call:</b>					
<b>Call Taken By:</b>					
<b>Business/Community Member Name:</b>					
<b>Business or Community Org Name</b>					
<b>Phone Numbers:</b>	<b>Voice:</b>		<b>Mobile:</b>		<b>Pager:</b>
<b>Nature of Inquiry:</b>					
<b>Question 1:</b>					
<b>Answer Given:</b>					
<b>Question 2:</b>					
<b>Answer Given:</b>					
<b>Question 3:</b>					
<b>Answer Given:</b>					
<b>Call Returned By:</b>					
<b>Date/Time Returned:</b>					
<b>Notes</b>					



### 3.12 GOVERNMENT INQUIRY LOG

<b>Project Name:</b>							
<b>Date/Time of Call:</b>							
<b>Call Taken By:</b>							
<b>Government Rep Name:</b>							
<b>Agency/City/County-Title:</b>							
<b>Phone Numbers:</b>	<b>Voice:</b>			<b>Mobile:</b>		<b>Pager:</b>	
<b>Nature of Inquiry:</b>							
<b>Question 1:</b>							
<b>Answer Given:</b>							
<b>Question 2:</b>							
<b>Answer Given:</b>							
<b>Question 3:</b>							
<b>Answer Given:</b>							
<b>Question 4:</b>							
<b>Answer Given:</b>							
<b>Date/Time of Call:</b>							
<b>Call Taken By:</b>							
<b>Government Rep Name:</b>							
<b>Agency/City/County-Title:</b>							
<b>Phone Numbers:</b>	<b>Voice:</b>			<b>Mobile:</b>		<b>Pager:</b>	
<b>Nature of Inquiry:</b>							
<b>Question 1:</b>							
<b>Answer Given:</b>							
<b>Question 2:</b>							
<b>Answer Given:</b>							
<b>Question 3:</b>							
<b>Answer Given:</b>							
<b>Question 4:</b>							
<b>Answer Given:</b>							
<b>Call Returned By:</b>							
<b>Date/Time Returned:</b>							
<b>Notes</b>							



# Communications Team Resumes and Biographies



**SUBMITTED TO:**

Colorado Bridge Enterprise  
High Performance Transportation Enterprise  
c/o Colorado Department of Transportation



# Hunter Sydnor

## PROJECT COMMUNICATIONS MANAGER

16 years of experience (13 years with Kiewit)



Hunter joined Kiewit in 2001 and has 16 years of public information/relations experience. She provides public relations, involvement, and outreach services for large, complex civil and transportation projects. Hunter collaborates with client and contractor senior management teams to anticipate and respond to stakeholder concerns. She has frequently worked with CDOT personnel to develop and implement communication plans to ensure effective information dissemination to relevant stakeholders. These projects included T-REX, DUS, I-25 North Expansion Project and the recent Pecos Street over I-70 Project. Hunter’s roles vary from managing information distribution, producing written communication tools to keeping the public informed of project development, special event planning, responding to public inquiries, developing strategic key messages and participating in community outreach activities such as neighborhood walks, and community meetings. She has solid relationships with CDOT personnel and extensive experience in community relations, government and media relations and crisis communication. She brings a wealth in community knowledge and strategic thinking to our team. Her efforts with the T-REX Communication team earned the Gold Pick for the Best Communications Program Award from the Public Relations Society of America. In 2017, Hunter was elected as a Board Member for the Conference of Minority Transportation Officials (COMTO) (2017)

Years of similar work experience	Employment with current employer	Other employers in past 10 years
16 Years	13 Years	N/A

### FORM F – PROJECT EXPERIENCE:

Public Information Manager, I-225 Rail Line, Kiewit

The I-225 Rail Line is a design build project to construct 10.5 miles of new LRT track in Aurora, Colorado. The light rail tracks run along I-225 and the remainder runs along local streets. There are seven bridges, 16 grade crossings, and eight stations in the stretch between Nine Mile Station (existing) to the new Peoria/Smith Street Station. As the public information manager, Hunter developed the communications plan and crisis management plan for the project. She is responsible for keeping the public informed of all construction-related activities. Since the project occurs in a congested urban area with significant utility conflicts, traffic handling/phasing requirements, and intense coordination with adjacent contractors, local governments, and businesses, there is significant public interface.

Public Information Officer, Denver Union Station Transit Improvements, Kiewit

This \$372 million project to build the DUS Transit Improvements Project covered 40 acres and transformed the historic Union Station into a multimodal transportation hub. The project included construction of a 22-bay bus terminal 23 ft. below grade, an 8-track commuter rail train hall designed to handle up to 10,000 travelers per hour, and relocation of a light rail platform. As public information officer, Hunter executed a strategic communications plan, which included media relations and public outreach. Hunter was also responsible for communicating construction activities, which involved developing communications plans to address specific elements of construction and determining the most effective communication tools for the project.

Public Information Officer, I-25 Transportation Expansion (T-REX), Kiewit

This \$1.28 billion Kiewit-led design build project expanded 17-miles of interstate highway and constructed a new 19-miles of double-track light rail with 13 stations. The project included 61 bridges, 14 LRT bridges, three LRT tunnels, 800 utility relocations, 200 new power feeds, and \$40 million in drainage structures and pipeline. The project was completed 22 months ahead of schedule and under budget. Hunter was the principal contact for elected officials, residents, business owners, commuters and emergency response teams. She worked with CDOT and RTD to determine issues with a political impact and strategized ways to minimize these impacts. She developed communication plans, conducted public meetings, and organized special events. Through constant communication with the public, Hunter helped to deliver the nation's first multi-modal transportation project that received nationwide acclaim and over 30 awards, including the Gold Pick for Best Communications Program Award from the Public Relations Society of America, Colorado Chapter.

Public Information Officer, DFW Connector, Texas Department of Transportation, Kiewit

DFW Connector, a \$991 million design-build-maintain urban interstate toll road located adjacent to Dallas/Fort Worth International Airport had the potential of impacting 200,000 drivers a day as well as the local businesses of Grapevine, Las Colinas, Westlake, and Southlake, TX. Hunter worked on the proposal for the project, researching the community, identifying stakeholders and developing communication tools. When the project started, she developed the Crisis Communication Plan, the Public Information Plan and got new staff trained. At project start, she worked with the construction management team and TxDOT to develop relationships and processes to share information as the project moved forward.

Licenses/Registrations	Service/Awards	Professional Disciplinary Action
N/A	Women's Transportation Seminar (WTS) Diversity Leader Award (2016) Nominated for Denver Business Journal Outstanding Women in Business (2016)	NONE

**Attachment A to Annex 6  
 Form for Key Personnel References**

**Proposer Name:** Kiewit-Meridian Partners  
**Position:** Project Communications Manager  
**Individual:** Hunter Sydnor

References			
1)	<b>DENVER UNION STATION TRANSIT IMPROVEMENT PROJECT (F)</b>	<b>CDOT T-REX (F)</b>	<b>I-25 EXPANSION PROJECT</b>
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|---|--|
| 1) Project(s) / Transaction(s)                        | 6) Reference's Employer (at time of project/transaction) |
| 2) Reference's Name                                   | 7) Reference's Phone and Email                           |
| 3) Reference's Title (current)                        | 8) Reference's Location and Time Zone                    |
| 4) Reference's Employer (current)                     | 9) Other   |
| 5) Reference's Title (at time of project/transaction) |  |

**(F)** – Identifies a Form F project from the SOQ submittal. See Section 3 of this submittal for project details.

# Maise Wingerter

## Communications Coordinator

### Segment 1



<b>YEARS OF EXPERIENCE:</b>	3 Years
<b>YEARS WITH KIEWIT</b>	3 Years
<b>EDUCATION:</b>	B.A. Communication Disorders, University of Wyoming

Maisie serves as a community liaison and public information specialist for Kiewit where she is responsible for informing the public of all construction related activities.

Through collaboration with our clients, and the construction team, she disseminates the most accurate and timely information to project stakeholders in a highly professional manner. Maisie has training and experience in community/government/media relations as well as crisis management and issue resolution to enable her to successfully perform her job.

She has also been involved in the traffic control planning process—deliberating amongst her team and other contractors working in the area to minimize impacts to the traveling public. Maisie has worked with sensitive neighborhoods, local and corporate businesses and elected officials, explaining the construction process and schedule using various communication tools, social media and in-person meetings/presentations. Through her consistent outreach and clear communication style, she quickly develops trusting relationships and credibility amongst the community.

Maisie will bring these talents to the Central 70 Project where she will fulfill the critical role of Communications Coordinator for Segment 1 upon Project award.