

Project: US 6 over Garrison Street
Project Sub Acct. No: 19478
July 10, 2014
DRAFT Technical Requirements

Section 12 - Hydraulics

General

The Project shall include all Work for the modification of existing drainage facilities, construction of new drainage facilities, construction of permanent Best Management Practices (BMPs), comply with CDOT Municipal Separate Storm Sewer System (MS4) permit, the City of Lakewood MS4 Permit, the requirements of this section 12 and all other applicable permits and standards as included in the Contract Documents to provide adequate highway drainage for this Project. The project shall be designed to accommodate the design flows and to meet project design criteria.

This project is not located within a FEMA floodplain.

The flood design requirements for all proposed and existing structures shall be in accordance with the CDOT Drainage Design Manual and City of Lakewood Storm Drainage Design Manual, where applicable.

Stormwater Permits

The Contractor shall be cognizant of and adhere to the requirements of the various environmental and stormwater permits that will be necessary for construction and operation of this Project. Fines may be incurred upon the project for permit non-compliance by CDOT or other regulatory agencies. Any non-compliance fines shall be passed onto the Contractor.

Coordination with Other Agencies and Disciplines

The Contractor shall coordinate all water resource issues with affected regulatory agencies, where appropriate. The Contractor shall include CDOT in all meetings with the water resource regulatory agencies.

The Contractor shall acquire approvals through the permit processes as required by the City of Lakewood and pay any associated fees. The Contractor shall submit the required design documents to the City of Lakewood for approval and obtain acceptance of the design from the City of Lakewood.

Hydrology

Hydrology calculations shall be in accordance with CDOT Drainage Design Manual and the City of Lakewood Drainage Design Manual. Hydrologic analysis is provided in the Reference Documents.

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Hydraulic Design Requirements

Drainage Design Software

The following software (most recent versions) may be used in performing drainage design calculations.

1. USACE, HEC-RAS
2. FHWA, HY-8
3. Haestad Methods, StormCAD
4. Haestad Methods, Flow Master
5. Haestad Methods, Culvert Master
6. EMS-I, WMS
7. Inroads Storm and Sanitary
8. UDFCD Spreadsheets

Data Collection

The Contractor shall be responsible for all additional mapping and surveys necessary to meet the Contract Requirements. The contractor shall be responsible for verifying utility locations and avoiding or relocating utilities due to design of drainage facilities.

The Contractor shall design drainage facilities compatible with existing or proposed drainage systems on adjacent properties, and shall preserve existing drainage patterns wherever possible. If existing drainage patterns must be changed due to design of the Project, the Contractor shall design and construct a solution that does not adversely impact property owners outside the ROW. The contractor's hydraulics design approach shall meet CDOT and FHWA requirements.

Roadways

Roadway component geometric configurations shall be designed to provide adequate drainage and minimize hydroplaning and icing problems.

Roadway Ditches

The roadway ditch design shall minimize erosion risk with the appropriate design and erosion control measures. The design shall be in accordance with the CDOT Drainage Design Manual and City of Lakewood requirements where applicable.

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Bridge Deck Drainage

Bridge deck drainage requirements shall be determined according to criteria in the CDOT Drainage Manual.

Pipe Material Selection

Drainage pipes shall have water tight joints and comply with the current CDOT Pipe Material Selection Policy. If the pipe is part of a storm sewer system with concrete manholes and inlets then concrete pipe shall be used for uniformity of material.

Municipal Separate Storm sewer System (MS4)

CDOT has obtained an MS4 Permit for the storm sewer systems that it owns and maintains (Permit Number COS-000005). CDOT submitted a modification request for the permit on April 17, 2014. The Water Quality Control Division conditionally approved CDOT's request on April 22, 2014. The Contractor shall be responsible for complying with the terms and conditions of the CDOT MS4 Permit and the conditionally approved New Development and Redevelopment Program that pertain to the Project.

The 6th and Garrison Project falls under the modified New Development and Redevelopment Program. This project does not have an EA/EIS associated with it, it does not discharge to an impaired water as defined in the Requirements for CDOT's Interim New Development and Redevelopment Program Description, and as designed in the reference documents, does not increase the imperviousness within the project limits by 20%. Therefore this is a standalone project and no permanent water quality BMP's at the project site are necessary to meet CDOT's MS4 permit.

The Conditional Approval for the CDOT CDPS Permit is in the Reference Documents for this project.

Any impacts to the City of Lakewood ROW will need to comply with the City of Lakewood's MS4 permit and obtain approval from the City of Lakewood.

Section 12 - Hydraulics

Deliverables:

Preliminary Hydraulic Report

A Preliminary Hydraulics Report is provided in the Reference Documents. The report illustrates a summary of pertinent hydraulic information in accordance with the CDOT Drainage Design Manual.

Drainage Design Deliverables

The Contractor shall prepare plans and specifications for all drainage facilities for the Project in a format that facilitates design review by the CDOT Project Engineer. The design deliverables for drainage facilities shall include plans, profiles, structure cross-sections, special details, and special provisions that are prepared for items that are not in compliance with the 2011 CDOT Standard Specifications and the revisions to Standard Specifications. Hydraulic design information shall be shown on the plans in accordance with the CDOT Drainage Design Manual.

Final Hydraulic Report

The Final Hydraulic Report (or addenda to previously Accepted reports), shall be prepared by the Contractor and submitted for acceptance prior to Final Project Acceptance. The Final Hydraulic Report shall follow the report outline in the CDOT Drainage Design Manual, and shall include references to relevant design criteria, circumstances influencing design, discussion of all drainage issues and drainage facilities, permanent water quality features, detailed design calculations, computer printouts, and appropriate maps and plans. The final drainage reports shall be sealed by a Colorado Licensed Professional Engineer, and one copy shall be submitted to the CDOT Project Engineer for Acceptance.

At a minimum, the Contractor shall submit the following to the CDOT Project Engineer for review, approval and/or acceptance:

Deliverable	Acceptance or Approval	Schedule
Final Hydraulic Report	Acceptance	Prior to Final Acceptance
Pipe Selection Report	Acceptance	Prior to Construction