

GENERAL NOTES

Structure excavation and backfill shall be as shown on the plans.

Expansion joint material shall meet AASHTO M213.

Grade 60 reinforcing steel is required.

All reinforcing steel shall be epoxy coated unless otherwise noted.

Ⓝ denotes non-coated reinforcing steel.

Concrete color for all MSE block shall be Dark Brown Color No 30108.

Structural concrete exposed to soil shall conform to cementitious materials requirements Class 2, corresponding to sulfate exposure Class 2.

The top of leveling pad elevations shown for MSE walls are the highest allowable elevations. In no case shall the top of the leveling pad be less than 1'-6" from finished grade at the front face.

The Contractor shall be responsible for the stability of the structure and excavation during construction.

Stations, elevations, and dimensions contained in these plans are calculated from a recent field survey. The Contractor shall verify all dependent dimensions in the field before ordering or fabricating any material.

The information shown on these plans concerning the type and location of underground utilities is not guaranteed to be accurate or all inclusive. The Contractor is responsible for making his own determination as to the type and location of underground utilities as may be necessary to avoid damage thereto.

The Contractor shall contact the Utility Notification Center of Colorado at 811 (1-800-922-1987) at least 3 business days (2 full business days in advance not including the day of notification) prior to any excavation or other earthwork.

Shop drawings shall be submitted to the Project Engineer for the precast coping, geomembrane and down drain prior to fabrication.

The stations and offsets shown are along wall layout line and reference wall stations as shown on the Contract Plans.

For location and alignment of adjacent walls or structures, see other contract walls and related as-built plan.

If manholes, piles, or drop inlets are present, they shall be detailed in the shop drawings.

If piles are located within the reinforced earth volume, they shall be driven prior to construction of Reinforced Earth or GRS wall unless a method to protect the structure, which is acceptable to the Engineer, and is proposed and approved in writing by the Engineer.

Wall facing geometry controls and shall be checked every 20 feet.

Contractor shall coordinate if existing or future structures, pipes, foundations or guardrail posts which are within the reinforced earth volume interfere with the normal placement of reinforcement. If specific direction has not been provided on the plans, the Contractor shall notify the Engineer to determine what course of action should be taken.

The Contractor is responsible for gradually deflecting upper reinforcing and geomembrane downward to avoid conflicts with paving and subgrade preparation.

The Contractor is responsible for controlling storm water drainage in the vicinity of the wall during construction. Storm water runoff is to be controlled and discharged away from the wall and reinforced backfill to maintain dry condition.

Compaction and operation equipment shall be kept a minimum distance of 3'-0" from back face of GRS or MSE walls. Compaction within 3'-0" of GRS or MSE walls shall be achieved with at least three (3) passes of lightweight compaction mechanical tamper, roller or vibratory system. No compaction density tests shall be taken within the 3-foot zone.

If structures in excess of 20 feet in height occur, the finished grade in front of the wall shall be placed and compacted before wall construction exceeds a height of 20 feet. Finished grade backfill shall be compacted to 95% of ASTM D698, methods 'C' or 'D' unless otherwise directed by the Engineer.

The Contractor shall make an independent review and analysis of all handling, loading, lifting and erection. The Contractor shall devise and execute project-specific procedures for handling, loading and lifting which comply with all federal, state and local safety laws, regulations and requirements, and all applicable contract requirements.

DESIGN CRITERIA

Mechanically stabilized earth (MSE) or Geosynthetic reinforced soil (GRS) wall design criteria:

1. AASHTO LRFD and/or FHWA GRS abutment design method for 75-year design life.
2. OSHA excavation or 29 CFR 1926 (Type-A soil, Type-B soil, in between Type A and stable rock) requirements.
3. No hydrostatic pressure assumption with Class I backfill and associated drainage details.
4. Test Level TL-4 railing (Bridge Rail Type 9 or 10MASH) with rail anchoring slab or micropile cap beam).
5. Extreme Event I; no analysis for seismic performance zones (SPZ) 1-3; Earthquake Load (EQ) resistance wall details for improved seismic performance as stipulated in worksheets are required.
6. Both Core Walls (uniform soil reinforcement length (RL) equals 70% design height (DH) and Class I backfill in extended trapezoidal retained zone) and Truncated Base Walls (with minimum RL equals 45% DH or 4 feet) meet a single Global Factor of Safety (FS) of 1.3 or resistance factor ϕ equals 0.75 with detailed boring, soil classification and Geotechnical report.
7. Provide applied maximum factored toe stress and meet foundation bearing pressure (BP) requirement.

Engineer of Record (EOR) may modify worksheets in parts or whole; however these design criteria and set of Damage Avoidance Details (DAD) represent CDOT structural design policies and shall be maintained as minimum requirements. DAD shall include but not be limited to: coping, rail anchor slab/beam, waterproofing membrane/drain, truncated base excavation/backfill, topmost extended soil reinforcements, panel joints, closely spaced GRS, wire basket/wrap around, RSF/RSW and concrete leveling pad/step/FRP stopper, etc.

Live Load Surcharge = 2'-0" of soil
Vehicular Horizontal Impact = 10 Kip

Backfill (Class 1)

$\phi = 34^\circ$
Unit weight of soil = 125 PCF

Reinforced Concrete:

Unit weight of concrete = 150 PCF
Concrete Class D (Wall): f'c = 4500 psi
Reinforcing Steel: fy = 60,000 psi

ABBREVIATIONS USED

- ABC = Aggregate Base Course
- BP = Bearing Pressure (TSF)
- BM1 = Quantities of Structure Backfill (Class 1) without Shoring (CY/LF)
- Bott = Bottom
- Beta (β) = Angle of Slope
- DH or z = Design Height (or Avg height for quantity calculations) (Ft)
- DRSF = Depth of Reinforced Soil Foundation (Ft)
- D = Depth of Block or Total panel depth
- DHWE = Design Height Water Elevation
- DRSF = Depth of RSF as Specified by Engineer
- DRSW = Depth of RSW = Soil Reinforcement Spacing
- DH (Avg) = Average Wall Design Height
- DHu = Design Height of Upper tiered wall
- DHL = Design Height of Lower tiered wall
- EM1 = Quantity of Structure Excavation without Shoring (CY/LF)
- EJM = Expansion joint material
- H = Height of Excavation at Wall Layout Line (Ft)
- σ = Factored horizontal stress
- Le = Length of reinforcement in resisting zone (Ft)
- MRS = Quantity of Mechanical Reinforcement for Prescribed Soil Zone (CY/LF)
- OS = Offset
- PLG = Pay Length for Geomembrane (Ft)
- PCF = Pound(s) per cubic foot
- RL = Reinforcement Length (Ft)
- RSF = Quantities of Reinforced Soil Foundation (CY/LF) (Excavation, Reinforcement & Backfill)
- RSF = Reinforced Soil Foundation (CY) (Excavation, Reinforcement & Backfill)
- RSW = Reinforced Soil Wrapper (SY) (Reinforcement)
- WRSF = Width of Reinforced Soil Foundation (Ft) as Specified by Engineer
- WRSW = Width of RSW = 3'-0" (Typ)
- Tmax = Applied Factor Load in reinforcement
- Theta (θ) = Existing Slope Angle
- Zu = Upper reinforcement depth
- Zl = Lower reinforcement depth
- 03 BP = BP FOR 2:1 Infinite slope
- 04 BP = BP FOR 2:1 Broken slope

Revision Dates
09-16
10-24

INITIALS	DESIGN	DATE	DETAIL	DATE	QUANTITY	DATE
By						
Checked By						

All seals for this set of drawings are applied to the cover page(s)	Print Date: \$DATE\$	Sheet Revisions			Colorado Department of Transportation 2829 West Howard Place, 3rd Floor Denver, CO 80204 Phone: 303-512-4079 FAX: 303-757-9197 	As Constructed	GENERAL NOTES			Project No./Code
	File Name: Sheet_B-504-A C.dgn	Date:	Comments	Init.		No Revisions:				
	Horiz. Scale: Vert. Scale: As Noted					Revised:	Designer: XXXXXXXX	Structure Numbers	XXXXXXXXXXXXX	
	Unit Information Unit Leader Initials					Void:	Detailer: XXXXXXXX	Sheet Subset: WALL	Subset Sheets: WXX of XXX	Sheet Number