GENERAL NOTES

GENERAL CONDITIONS

1. Design values shall be used in conjunction with the drawings in the event of a conflict, notify the Architect for clarification.
2. Before constructing, carefully locate utilities, examine subsoil and conditions. Report any discrepancies, dimensions or elevations, before the Architect and Structural Engineer are misled.
3. The Owner or his representative reserves the right to inspect any material, fabrication, or workmanship at any time to field or shop for conformance to the specifications, general notes and drawings.
4. A meeting with the personnel of Entech Engineering, Inc., the Contractor, and any other appropriate personnel is strongly recommended prior to start of construction in order to discuss the details of the plans.
5. All notes and methods are intended to be typical and shall be construed to apply in any similar details elsewhere, except where a different detail is shown. The dimensions have been developed and detailed for the loads shown on these drawings. Any alterations to the structural system or removal of any component, such as the addition of other construction materials or loads shall not be done under the advice and direction of a registered structural engineer.
6. Temporary supports, such as temporary bracing, shoring, formwork or other elements required for the construction methods will be determined and furnished and installed as required by the contractor. These temporary supports will ensure the stability of and safety of the partially completed building, applied loads appropriate to maturity to which the structure will be subjected. Such loads may include wind, snow, earth, and construction operations.
7. The Contractor shall make submittals as noted below to the Architect in a timely manner as to allow a two business day review period. The Architect and his Consultants will review for conformity with the design concept only. Quantities and dimensions are the responsibility of the Contractor. The Contractor shall make corrections as necessary with the concurrence of the Architect and his Consultants is obtained.
   Shop Drawings: Submit four complete sets.
   Product Data: Submit one complete set.
8. Substitutions will not be considered by the Architect or the Consultants unless submitted two weeks prior to date of installation and complete documentation is provided demonstrating compliance with the Contract Documents. Detail, product data and samples as required. Substitutions will not be considered when consequent with regular subsequent revision of the Contract Documents. The Contractor and the Consultants will reimburse responsibility of proposed substitutions.

DESIGN

1. Codes, specifications and standards (latest editions, U.N.O.)
   a. All design and construction shall conform to the International Building Code (IBC), as adopted and amended by the Pikes Peak Regional Building Code.
   b. All construction shall comply with the provisions of the following codes, specifications and standards(latest editions), except where noted to the contrary on the drawings and specifications in which case stronger requirements are specified or noted.
      ACI 117 "Standard Specifications for Tolerances for Concrete Construction and Materials."
      ACI 301 "Specifications for Structural Concrete for Building."
      ACI 318 "Building Code Requirements for Reinforced Concrete"
      ACI 318.1 "Building Specification for Use Construction of Lifted Slabs"
      SEI/ "Manual of Standard Practice of the American Welding Institute"
      ACI 530 "Building Code Requirements for Masonry Structures"
      AISC/AISC 316 "Steelframe Welding Code - Reinforcing Steel"
      AISC "Specifications for the Design of Cold -formed Steel Structural Members"
      AISC/WFI 2 "Structural Welding Code"
      AISI S 2 "Structural Welding Code - Sheet Steel"
      CISC "Offshore Welding Specifications for Wind Construction and Maintenance"
2. Geology Loads:
   a. See Structural
3. Retaining and wall design parameters:
   Active Soil Pressure: 35 psf
   Passive Soil Pressure: 350 psf
   Soil Unit Weight: 115 pcf
   Coefficient of Sliding Friction: 0.30
4. Wind plus zone designed for the following parameters:
   Wind-speed adjustment and pressure: 130/110 psf
   Minimum steel and wall pressure: 0.018 psf
   Allowable wind deflection: 1/240 per 10 psf (for portion in consideration) (wind)
   Allowable wind deflection: 1/240 per 10 psf (for portion in consideration) (wind) (upper & minimum properties)
   Maximum pier length: 15'-0"
   Maximum cantilever: 2'-0"

FOUNDATIONS

1. Foundation design is based on a soils investigation by Entech Engineering, Inc. dated September 13, 2018. The foundation recommendations contained in the report by Entech Engineering, Inc. prior to placing loads or contracts to verify that the design is appropriate for the site.
2. The Site Engineer of the responsibility shall examine the bearing of the bottom piers to identify the bearing strata, observe construction techniques and confirm subsurface conditions are as anticipated from the exploratory borings and are consistent with the design values considered within the Soils Report. If conditions are found to be different from this advice, then the Engineer shall be promptly notified so that the foundation design may be reviewed.
3. Pile design have been completed in accordance with geotechnical consultants recommendations design and recommendations, and approved engineering design parameters, and is based on the most information available at the time of completion. The design is intended to minimize differential movement resulting from the varying soil expansion and contraction as measured variations changes. It must be recognized that unpredictable characteristics will undergo movement.
4. All foundation elements shall be founded on the proper description.
5. Bearing base on foundation minimum areas by footing schedule.
6. All concrete footings shall be consistently compacted at 97.5 of Modified Proctor Dry Density, ASTM D- 1557.
7. Foundation bases shall remain in place a minimum of three (3) days.
8. For details of all wall construction requirements under foundations and under, refer to the Soils Report.
9. Notify construction consultants before excavation is started to inspect all subgrade surfaces to be free from loose or soft material.
10. For piers, excavation and related controls work shall be inspected by Geotechnical engineer and a soil pocket qualified personnel on site had been during drilling operations.
11. If subject to pier drilling is encountered before reaching depth required to provide sufficient resistance, see sheet S- or different foundation type consistent footings indicated on drawings, notify SEI Geotechnical Engineer and obtain direction prior to proceeding with changed placement.
12. Insert reinforcing steel through steel assembly in several lifts of not to exceed 30 feet per reinforcing during drilling or pouring. Provide centrings sufficient to cover entire depth of each pier under 5 reinforcing.
13. Pier bottoms shall be constructed of steel plate with bolt welded joints. 3 rolls shall be more rigid and of sufficient strength for transportation and deployment, placing and of sufficient for location of reinforcing.
14. Where caisson sized by at pier caisson shown position of the proper direction or fill, as appropriate proceeds, the earth walls are particular efficient and footings are not shall excavation.
15. Steel reinforcing shall be placed so as to be supported in placed so that the concrete being placed or at less than 3 feet above the bottom of the casing in order that concrete will confine the earth wall without voids.
16. Thoroughly disorder and clean holes of debris before placing concrete.
17. Place pier reinforcement and dowels accordingly per drawings. Hold accurate in their during concreting and allows. Other approved of Geotechnical Engineer Colo's supporting materials.
18. Place concrete only with approval of Geotechnical Engineer. All holes with concrete immediately over 3 x 4 feet. Do not leave pier holes open overnight.
19. Place concrete with tremie or otherwise direct concrete down center of pier hole to avoid segregation of aggregate caused by striking reinforcement or sides of hole. Place continuously without construction joints for full length of drilled pier. Vibrate top 4 feet of each pier.
20. Provide drilled pier for holes shown exposed to prevent encroachment at top of pier.
21. Drilled pier location tolerances: Comply with following:
   a. Location: Maximum +/- 3 percent of pier diameter but not to exceed +/- 3 inches.
   b. Plumb: Maximum of 2 inches in any 10 foot length.
   c. Butt Thickness: Within plus one inch, minus zero inches of specified cross section.
   d. Pier Diameter: Plus one inches, minus zero.
22. Underreamed footings shall provide Daily Concrete Placing Report with a shall include for following information: Identification mark, shaft diameter, depth, and reboot bottom diameter, top diameter, diameter bases plus installed and shaped, material in enclosure, hourly start and condition, length and location of casing used, water and condition of underwater, water inside casing during and concrete placement, casing temperature during drilling, reinforcement and concrete placement, or casing removed.

CONCRETE

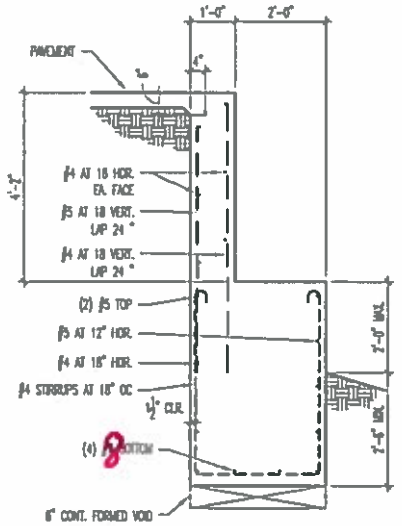
1. Submit shop drawings prepared under the supervision of a registered professional engineer, including complete details for fabrication and installation of reinforcing and embedded items.
2. All concrete shall conform to ACI 318 - Standard Specification for Ready-Mixed Concrete, in accordance with the following: Footings and base base mix cured prior to placing any concrete. Pit work is acceptable on a consolidation and compliant. Under no circumstances shall moisture content considerably established be used.
3. Portland Cement: ASTM C 150, type I.
4. Fly Ash: ASTM C618, Class C or F. Fly ash shall not exceed 15% of total cementitious material by weight.
5. All water retarding admixtures shall conform to ASTM C494.
6. Normal weight aggregates: ASTM C33.
7. All exterior exposed ground concrete shall be air entrained (for Moderate Exposure) ASTM C260.
8. Reinforcing Bars: ASTM A615, Grade 60 unfinished bars. Bars shall be Lead free.
9. Welded deformed Bars: ASTM A706.
10. Synthetic Fibers: Concrete Reinforcement: Fibermesh by Propex, Concrete Systems Inc., or approved equal, 1.5 lbs per cubic yard.
11. Slab edge and expansion joint filler material: Bituminous fiber type conforming with ASTM D1751. Thickness as indicated by bid depth or width.
12. Reinforcement for unreinforced Concrete -
   a. Provides fiber reinforcement: Fibermesh by Propex, Concrete Systems Inc., or approved substitute.
   b. Mixing Chemicals: Master Builders, Inc. Master Engineering Corp. Master Chemicals.
      Grace Construction Products, Formerly Construction Products Division
      Euclid Chemical Company, Euclid Chemical Co.
      Sika Corporation, Sika Chemical Corp.
      Manufacturer Subject to Compliance with Specifications
      Approved Substitutions
13. Concrete shall develop in minimum or compensation of minimum of 75% of the specified 28-day strength in the underlying fill. Provide placing records as all emergency to maintain open density moisture adjustment.
14. Weather Hot Weather: Refer ACI305.
15. During freezing or near freezing weather, adequate equipment shall be provided for heating concrete materials and protecting concrete materials and protecting concrete in accordance with ACI 306 - Standard Specifications for Cold Weather Concreting. All concrete materials and all reinforcing, forms, strands, fillers and ground with which concrete is in contact free from frost. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
16. Before hot weather, proper attention must be given in accordance with ACI 305R Hot Weather Concreting to ingredients, production methods, handling, placement, protection and curing to prevent excessive concrete temperatures or water evaporation that may impair required strength or serviceability of the member or structure.
17. Provide concrete testing by Test Quality Control in accordance with the following: A testing shall be performed by an approved independent testing agency. Certain concrete at the point of placement. Provide test reports for review by Architect and the Consultant.
   Slump: ASTM C143. Test from batch at each load and add water at test cylinders taken.
   Air Content: ASTM C231 and C173. One set of test cylinders for every 150 cubic yards or fraction thereof, minimum once for each day's pour. Two cylinder shall be broken at seven days, other cylinders shall be broken at 28 days and shall be held in reserve to be broken when ordered by the Architect/Engineer. Concrete Test Report: Architect/Engineer records. Test shall be made at time cylinders are taken and as shown by concrete to determine slump, air content, and weight and temperature of concrete. Prepare test and as considered satisfactory if average of three consecutive tests or more exceeds specified strength and no individual test result falls below specified strength by more than 500 psi.
   Core Tests: ASTM C42. If in any time concrete tests indicate deficiencies strength of 28 days is below required test, or if concrete has been frozen before it has taken final set so that in the opinion of the Architect and the Consultants its strength may have been seriously affected, the concrete shall, at the work instructed, have additional core tests taken, examined and tested as directed by the Engineer at such portions of the work as may be affected to determine actual conditions of the concrete.
18. Anchor bolts shall be accurately located, set with templates and removed when in position prior to wall during placement and shall be protected from contamination during work for completion shown on as plans, reinforcing anchor bolts into portions concrete as permissible.
19. Maximum maximum reinforcing by reinforcing to individual bottom unless otherwise on the Contract Documents.
   a. 2" clear where concrete is deposited directly against earth.
   b. 2" clear where concrete is exposed to earth or weather but exposed surface bars are less than #6.
   c. 1 1/2" clear where concrete is exposed to earth or weather but exposed surface bars are less #5 or smaller.
20. All bars at surfaces supporting by ACI Code requirements and not less than #5 for formwork or beam bars 12 inches unless noted otherwise. At bulkhead and keys work as necessary to conform by other footings not less than 12 inches beyond outside of work unless located and noted.
21. Maximum length of reinforcement over for concrete bars shall be 60 feet, except where noted bolts are provided or unless noted otherwise. Location of all construction joints shall be approved by the Engineer.
22. All reinforcement shall be supported by ACI Code requirements not less than one a shall.
23. At top steel and bottom are above shall be properly supported and held securely in place as recommended by the Concrete Reinforcing Steel Institute manual that minimum spacing of one bar equal of shall not 1 bar.
24. All bonds shall be reinforcing placed and tensions bars in specified prior to and during concrete placement. Splicing of bonds bar shall be strictly supervised in accordance.
25. Required Contents properties:

CLASS	28 DAY STRENGTH	CONC. TYPE	MAX. WCR. RTO	SLUMP	AIR CONT.
Entire Bridge	4350 psi	XD	.45	4"	6" ± 1
Bridge Piers	3000 psi	XD	.45	4"	6" ± 1

1. Slump shown are pre-superplasticizer admixture and to maximum use of superplasticizer prior to placement concrete.

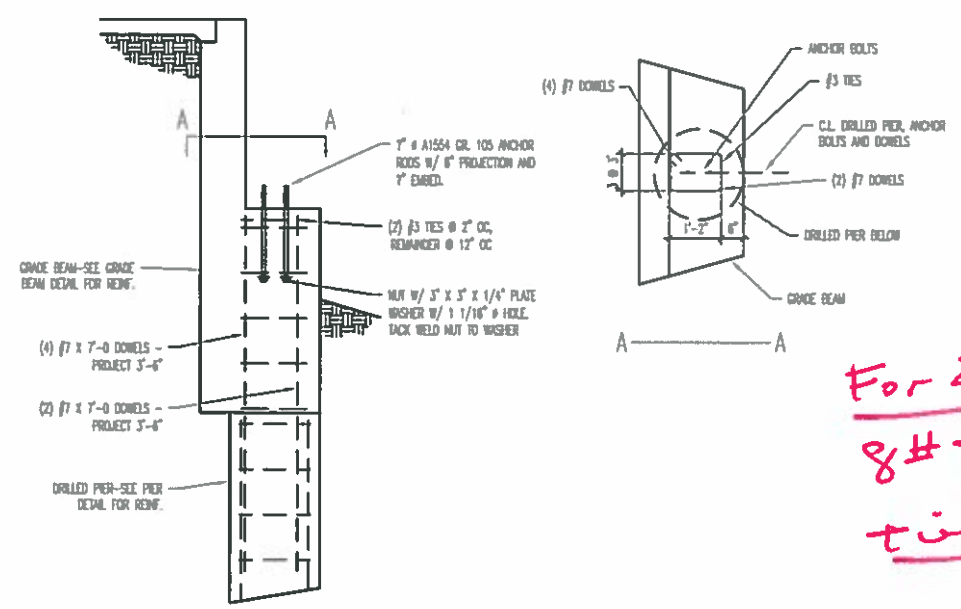
Anticipate
- 10-12 piers per abutment. (if 36" ϕ used)
- wing walls will need additional piers. 2-3 depending on length

BRIDGE REACTIONS				
	P (KIP)			
VERTICAL DEAD LOAD	234			
VERTICAL LIVE LOAD	239			
HORIZONTAL WIND	43			
HORIZONTAL SEISMIC	115			
LONGITUDINAL SEISMIC	239			



1 GRADE BEAM

TYPICAL FOUNDATION PLAN FOR BRIDGE ABUTMENT



2 ANCHOR BOLTS AND GRADE BEAM CONNECTION

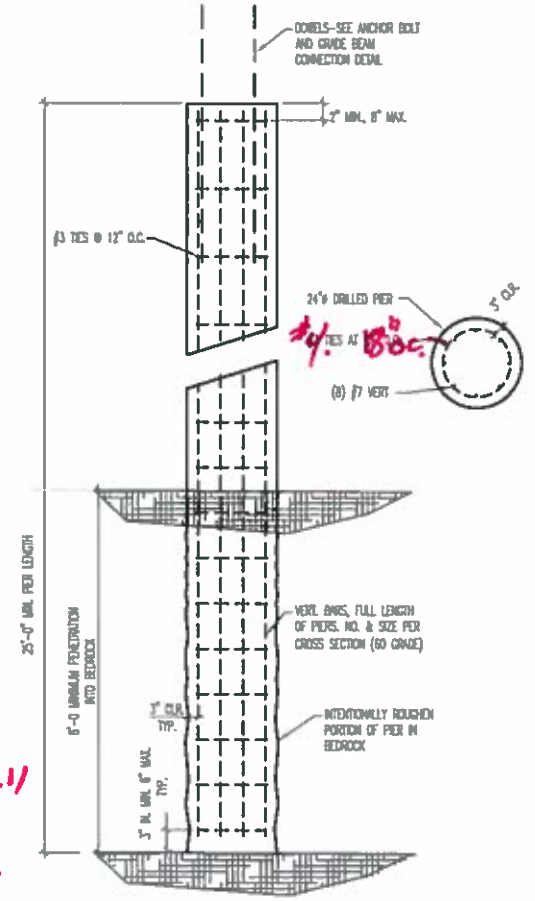
ANCHOR BOLT LAYOUT

VERIFY ALL DIMENSIONS WITH BRIDGE SUPPLIER AND CIVIL DRAWINGS.

MODIFICATIONS TO THIS DESIGN MAY BE REQUIRED.

For 24" ϕ piers
8 #7 vert.
ties same

Reinf in 36" ϕ pier 11-12 #8 vert
~ 9 # 9 reba
ties #4 @ 12 to 18" O.C.



3 DRILLED PIER REINFORCING

REVISIONS | BY:

ENTECH ENGINEERING, INC.
595 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907
(719) 531-5599

STATE OF COLORADO
P.E. NO. - 33402

DRAWN BY: TLC/SJ
DESIGNED BY: SJ
CHECKED BY:
DATE: 8/18/18
SCALE: 1/2" = 1'
JOB NO.: 181414
SHEET NO.: 1 OF 1 SHEETS