[Note: The following is only a guide for General Notes. Omit those sections, items and terms in parentheses that are not applicable, except retain the parenthetical references to ASTM equivalents to AASHTO Specifications.] [Revisions for May 2020 are marked in yellow highlight]

( ) indicates (Options), [ ] indicates [Instructions]

GENERAL NOTES:

*Provide all materials and perform all work according to the “Oregon Standard Specifications for Construction 20XX”.*

*Bridge(s) is(are) designed in accordance with the 20XX edition of the “AASHTO LRFD Bridge Design Specifications” (including 20XX thru 20XX interim revisions) and \_\_\_\_ edition of the “Oregon Bridge Design Manual” with an allowance of (\_\_\_\_psf for present wearing surface) (and) (\_\_\_\_psf) for future wearing surface and all of the following Live Loads :*

*Service and Strength I Limit States:*

*HL-93: Design truck (or trucks per LRFD 3.6.1.3) or the design tandems and the design lane load.*

*Strength II Limit State:*

*ODOT Type STP-5BW Permit truck*

*ODOT Type STP-4E Permit truck*

*[Select one of the following notes depending on the methodology used in the seismic design of the bridge]:*

*[New Seismic Designs ----- Multi-Span Bridges]:*

*Seismic design is performed by the multi-mode (single-mode) analysis in accordance with the “AASHTO Guide Specifications for LRFD Seismic Bridge Design” (“AASHTO LRFD Bridge Design Specifications") as modified by the \_\_\_\_ edition “ODOT Bridge Design Manual”. The 2014 USGS Seismic Hazard Maps have been used to collect the Seismic Hazard Values for the bridge site with Latitude 00.0000N and Longitude 000.0000W:*

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *Seismic Performance Criteria* | *Earthquake* | *Mapped Hazard Values* | | | *Site Class* | *Design Hazard Values* | | | *Seismic Design Category* |
| *PGA* | *Ss* | *S1* | *As* | *SDS* | *SD1* |
| *Life Safety* | *1000-Year Return* | *0.000* | *0.000* | *0.000* | *X* | *0.000* | *0.000* | *0.000* | *X* |
| *Operational* | *Cascadia Subduction Zone* | *See the Design Response Spectrum plot below.* | | | | | | | |

*[Insert Design Response Spectrum plot here]*

*(The Response Modification factors used are: R=\_\_\_ for column moments, R= 0.8 for abutment connections, and R= 1.0 for other components).*

*[New Seismic Designs -----Single-Span Bridges]:*

*Seismic design is performed in accordance with the “AASHTO Guide Specifications for LRFD Seismic Bridge Design” (“AASHTO LRFD Bridge Design Specifications") as modified by the \_\_\_\_ edition “ODOT Bridge Design Manual”.  The Horizontal Peak Ground Acceleration Coefficients (PGA) for 1000-year return (Life Safety) and Cascadia Subduction Zone Earthquake (Operational) are \_\_\_g and \_\_\_g respectively, based on 2014 USGS Seismic Hazard Maps. The bridge site is defined as a Site Class \_\_ with Site Factor (Fpga) of \_\_\_.*

*[Widenings which do not carry the existing structure]:*

*Seismic design for widening is performed by the single-mode (multi-mode) analysis, in accordance with the “AASHTO Guide Specifications for LRFD Seismic Bridge Design” (“AASHTO LRFD Bridge Design Specifications") as modified by the \_\_\_\_ edition “ODOT Bridge Design Manual”.  Seismic design is based on \_\_ feet of superstructure width and is not designed to carry the seismic load of the existing structure. The 2014 USGS Seismic Hazard Maps have been used to collect the Seismic Hazard Values for the bridge site with Latitude 00.0000N and Longitude 000.0000W:*

*[Insert the Seismic Data Table here]*

*[Widenings which do carry the existing structure]:*

*Seismic design for widening is performed by the single-mode (multi-mode) analysis, in accordance with the “AASHTO Guide Specifications for LRFD Seismic Bridge Design” (“AASHTO LRFD Bridge Design Specifications") as modified by the \_\_\_\_ edition “ODOT Bridge Design Manual”.  The widened structure is designed to resist the full seismic load including the existing structure. The 2014 USGS Seismic Hazard Maps have been used to collect the Seismic Hazard Values for the bridge site with Latitude 00.0000N and Longitude 000.0000W:*

*[Insert the Seismic Data Table here]*

*[Phase 1 Seismic Retrofit Designs - select appropriate sections:]*

*Seismic retrofit design to prevent superstructure pull-off is based on a Horizontal Peak Ground Acceleration Coefficient (PGA) of \_\_\_\_g and a Site Factor (Fpga) of \_\_\_\_ for the Site Class \_\_.*

*[Simple Span Support Connections:]*

*Longitudinal design forces:*

*Force to prevent pull-off by single-mode analysis, without substructure stiffness considered, with a maximum response not greater than 2.5 x PGA.*

*Transverse design forces:*

*Force equal to 2.5 x PGA x supported dead load.*

*[Continuous Span Series Support Connections:]*

*Longitudinal design forces:*

*"Plastic hinging" of columns and forces to prevent pull-off by single-mode analysis, considering substructure stiffness with column capacity limitation (strength), maximum response not greater than 2.5 x PGA.*

*Transverse design forces:*

*"Plastic hinging" of column(s) (and crossbeam frame).*

*[In-Span Hinges:]*

*Longitudinal design forces:*

*"Plastic hinging" of columns and forces to prevent pull-off by single-mode analysis, considering substructure stiffness with column capacity limitation (strength), maximum response not greater than 2.5 x PGA.*

*Transverse design forces:*

*Force equal to 2.5 x PGA x supported dead load.*

*Cable for seismic restraint devices will be furnished by the Department. See Section 00160.30 of the Special Provisions.*

*[Use the following notes for FRP strengthening project]*

*FRP Strengthening Notes:*

*Provide Fiber-Reinforced Polymer (FRP) products from the QPL, Section\_\_\_.*

*FRP material properties used for the design:*

*[Specify section properties]*

*Ultimate tensile strength = \_\_ ksi*

*Tensile modulus of elasticity = \_\_ ksi*

*Ultimate strain = \_\_in./in.*

*Environmental reduction factor, CE = \_\_*

*Existing material properties of the strengthened elements used for the design:*

*Concrete, f’c = \_\_ksi*

*Reinforcing steel, fy = \_\_ksi*

*Design and construct FRP strengthening according to Special Provision Section \_\_\_\_.*

*For pile foundations:*

*All Bent(s), Provide \_\_\_\_\_\_\_ [insert pile type & grade of steel\*] piling (with reinforced tips) driven (open-ended or closed-ended) to a nominal resistance of \_\_\_\_\_\_\_ kips per pile.*

*\* Example ==> Pipe Pile ==> 12-3/4 x 0.375, ASTM A252 (Grade 2) or (Grade 3)*

*H-Pile ==> HP 10 x 42, ASTM A572, Grade 50*

*Pile tip elevation for minimum pile penetration at (All) Bent(s) (\_\_\_) (is elevation \_\_\_\_\_ feet) (according to the Pile Penetration Table).*

*[Use one of the following as directed by the Geotechnical Designer]*

*Drive (Bent \_\_\_), (All) piling to the specified nominal resistance using driving criteria developed from a Wave Equation Analysis.*

*Drive (Bent \_\_\_), (All) piling to the specified nominal resistance using driving criteria developed from the FHWA Gates Equation.*

*Determine pile resistances from the results of Capwap Analysis and/or Dynamic Pile Load Tests as specified in the Special Provisions.*

*(If applicable)*

*Support all falsework on driven piles.*

*[NOTE: If project plans have a separate footing plan sheet, place all foundation design notes on the footing plan sheet and reference them in the "General Notes"; "See Footing Plan for Foundation Design Notes."]*

*Provide spiral column reinforcement according to ASTM Specification A706, AASHTO Specifications M31 (ASTM A615) Grade 60, AASHTO M225 (ASTM A496), or AASHTO M32 (ASTM A82).*

*[Specify ASTM A706 reinforcement for vertical column bars when columns are supported on drilled shafts or when plastic hinging is anticipated in either the top or bottom of the column]*

*Provide reinforcing steel according to ASTM Specification A706 for the following bars:*

* *Welded*
* *Column spirals and vertical reinforcement*
* *Drilled shaft spirals and vertical reinforcement*

*Provide Type 2 mechanical splices for vertical reinforcement in column and drilled shaft as shown on the detail plans.*

*Provide all (other) reinforcing steel according to ASTM Specification A706, or AASHTO M31 (ASTM A615) Grade 60. (Provide Field bent stirrups according to ASTM Specification A706.) Use the following splice lengths (unless shown otherwise):*

*[Use the following chart when the minimum concrete strength required is 3.3 ksi]*

*[Table not used for column and drilled shaft reinforcing splice length]*

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *Reinforcing Splice Lengths (Class B) Grade 60 f’c = 3.3 ksi, rc = 0.4, 2in min. concrete clear cover* | | | | | | | | | | |
| *Bar Size* | *#3* | *#4* | *#5* | *#6* | *#7* | *#8* | *#9* | *#10* | *#11* | *#14 & #18* |
| *Uncoated* | *1’-4”* | *1’-9”* | *2’-2”* | *2’-7”* | *3’-0”* | *3’-5”* | *3’-10”* | *4’-4”* | *4’-10”* | *Not permitted* |
| *Coated (1)* | *1’-7”* | *2’-1”* | *2’-7”* | *3’-2”* | *3’-8”* | *4’-2”* | *4’-8”* | *5’-3”* | *5’-10”* | *Not permitted* |
| *Coated (2)* | *2’-0”* | *2’-7”* | *3’-3”* | *3’-11”* | *4’-7”* | *5’-2”* | *5’-10”* | *6’-7”* | *7’-4”* | *Not permitted* |

*Use Coated (1) for epoxy coated bars with cover at least 3\*db and clear spacing between bars at least 6\*db.*

*Use Coated (2) for epoxy coated bars with cover less than 3\*db or clear spacing between bars less than 6\*db.*

*Increase all splice lengths 30% for horizontal or nearly horizontal bars so placed that more than 12” of fresh concrete is cast below the bar.*

*[Use the following chart when the minimum concrete strength required is 4.0 ksi]*

*[Table not used for column and drilled shaft reinforcing splice length]*

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *Reinforcing Splice Lengths (Class B) Grade 60 f’c = 4.0 ksi, rc = 0.4, 2in min. concrete clear cover* | | | | | | | | | | |
| *Bar Size* | *#3* | *#4* | *#5* | *#6* | *#7* | *#8* | *#9* | *#10* | *#11* | *#14 & #18* |
| *Uncoated* | *1’-4”* | *1’-7”* | *2’-0”* | *2’-5”* | *2’-9”* | *3’-2”* | *3’-7”* | *4’-0”* | *4’-5”* | *Not permitted* |
| *Coated (1)* | *1’-5”* | *1’-11”* | *2’-5”* | *2’-10”* | *3’-4”* | *3’-9”* | *4’-3”* | *4’-10”* | *5’-4”* | *Not permitted* |
| *Coated (2)* | *1’-10”* | *2’-5”* | *3’-0”* | *3’-7”* | *4’-2”* | *4’-9”* | *5’-4”* | *6’-0”* | *6’-8”* | *Not permitted* |

*Use Coated (1) for epoxy coated bars with cover at least 3\*db and clear spacing between bars at least 6\*db.*

*Use Coated (2) for epoxy coated bars with cover less than 3\*db or clear spacing between bars less than 6\*db.*

*Increase all splice lengths 30% for horizontal or nearly horizontal bars so placed that more than 12” of fresh concrete is cast below the bar.*

*Splice reinforcing steel at alternate bars, staggered at least one splice length or as far as possible, unless shown otherwise.*

*[Use the following chart when the minimum concrete strength required is 4.5 ksi]*

*[Table not used for column and drilled shaft reinforcing splice length]*

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *Reinforcing Splice Lengths (Class B) Grade 60 f’c = 4.5 ksi, rc = 0.4, 2in min. concrete clear cover* | | | | | | | | | | |
| *Bar Size* | *#3* | *#4* | *#5* | *#6* | *#7* | *#8* | *#9* | *#10* | *#11* | *#14 & #18* |
| *Uncoated* | *1’-4”* | *1’-6”* | *1’-11”* | *2’-3”* | *2’-7”* | *3’-0”* | *3’-4”* | *3’-9”* | *4’-2”* | *Not permitted* |
| *Coated (1)* | *1’-4”* | *1’-10”* | *2’-3”* | *2’-8”* | *3’-2”* | *3’-7”* | *4’-0”* | *4’-6”* | *5’-0”* | *Not permitted* |
| *Coated (2)* | *1’-8”* | *2’-3”* | *2’-10”* | *3’-4”* | *3’-11”* | *4’-5”* | *5’-0”* | *5’-8”* | *6’-3”* | *Not permitted* |

*Use Coated (1) for epoxy coated bars with cover at least 3\*db and clear spacing between bars at least 6\*db.*

*Use Coated (2) for epoxy coated bars with cover less than 3\*db or clear spacing between bars less than 6\*db.*

*Increase all splice lengths 30% for horizontal or nearly horizontal bars so placed that more than 12” of fresh concrete is cast below the bar.*

*Splice reinforcing steel at alternate bars, staggered at least one splice length or as far as possible, unless shown otherwise.*

*[Use the following chart when the minimum concrete strength required is 4.5 ksi and reinforcing steel is Grade 80]*

*[Table not used for column and drilled shaft reinforcing splice length]*

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *Reinforcing Splice Lengths (Class B) Grade 80 f’c = 4.5 ksi, rc = 0.4, 2in min. concrete clear cover* | | | | | | | | | | |
| *Bar Size* | *#3* | *#4* | *#5* | *#6* | *#7* | *#8* | *#9* | *#10* | *#11* | *#14 & #18* |
| *Uncoated* | *1’-6”* | *2’-0”* | *2’-6”* | *3’-0”* | *3’-6”* | *4’-0”* | *4’-6”* | *5’-0”* | *5’-7”* | *Not permitted* |
| *Coated (1)* | *1’-10”* | *2’-5”* | *3’-0”* | *3’-7”* | *4’-2”* | *4’-9”* | *5’-4”* | *6’-0”* | *6’-8”* | *Not permitted* |
| *Coated (2)* | *2’-3”* | *3’-0”* | *3’-9”* | *4’-5”* | *5’-2”* | *5’-11”* | *6’-8”* | *7’-6”* | *8’-4”* | *Not permitted* |

*Use Coated (1) for epoxy coated bars with cover at least 3\*db and clear spacing between bars at least 6\*db.*

*Use Coated (2) for epoxy coated bars with cover less than 3\*db or clear spacing between bars less than 6\*db.*

*Increase all splice lengths 30% for horizontal or nearly horizontal bars so placed that more than 12” of fresh concrete is cast below the bar.*

*Splice reinforcing steel at alternate bars, staggered at least one splice length or as far as possible, unless shown otherwise.*

*Support the bottom mat reinforcing steel from the forms with precast mortar blocks at 24” maximum centers each way. Support the top mat of reinforcing steel from the bottom mat of reinforcing steel with wire bar supports as shown in Chapter 3 of the “CRSI Manual of Standard Practice” (SBU, BBU, or CHCU). Place wire bar supports at 24” maximum centers.*

*Use (Stainless steel) (Epoxy coated) (uncoated) reinforcing steel in the deck (and bridge end panel). This includes top and bottom longitudinal bars, (and) top and bottom transverse bars, (and all bars extending into the (sidewalk) (curb) (parapet)).*

*Epoxy coat reinforcing steel, except prestressing steel, in precast (slabs), (boxes). This includes bars extending from the precast (slab) (box) into the (bridge rail) (curb) (sidewalk) (deck).*

*Place bars 2” clear of the nearest face of concrete (unless shown otherwise). The top bends of stirrups extending from beam stems into the top slab may be shop or field bent (unless shown otherwise). The top bends of stirrups extending from prestressed precast units may be shop or field bent (unless shown otherwise).*

*Do not fabricate reinforcing steel for columns (and walls) until final footing elevations have been determined in the field.*

*Provide Class \_\_\_\_ ‑ \_\_\_ concrete in post‑tensioned box girder superstructure (prestressed‑precast units) and as shown on detail plans. See dwg. \_\_\_\_\_\_.*

*Provide Class HPC4500 – 1 1/2 concrete in deck (except in prestressed or post‑tensioned sections).*

*Provide Class \_\_\_\_ ‑ 1 1/2, 1 or 3/4 concrete in (columns, footings, etc.).*

*Provide Class 3300 (Seal Concrete) - 1 1/2, 1 or 3/4 concrete in seals.*

*Provide Class 4000 – 3/8 concrete for all drilled shafts.*

*Provide Class HPC4500 – 1 1/2 concrete in reinforced concrete end panels.*

*Provide Class 3300 ‑ 1 1/2, 1 or 3/4 concrete for All (other) concrete.*

*Provide Class 3300 ‑ 1 1/2, 1, 3/4 or 3/8 concrete in walls with form liners.*

*Provide Class \_\_\_\_\_ - \_\_\_\_\_ concrete in precast prestressed (beams, boxes, slabs) according to detail plans. See dwg. \_\_\_\_\_. The minimum strength of concrete at transfer of prestress is \_\_\_\_ psi.*

*Provide prestressing steel according to detail plans.*

*Provide structural steel according to (AASHTO) [or] (ASTM) Specifications in accordance with detail plans.*

*("Galvanize‑Control Silicon" – provided silicon content of the base metal in either of the ranges 0 to 0.06 percent, or 0.153 to 0.25 percent.)*

*Structural Steel Notes:*

*All structural steel in girder webs, flanges, and cross frames, including splice plates, stiffeners, and all connection and gusset plate, shall be (weathering structural steel) conforming to (ASTM Specification A709, Grade 50W), except as noted. All steel members subject to tensile stresses shall meet the (ASTM A709 Supplemental Requirement S83 for Impact Testing Temperature Zone 2). This includes all girder flanges and webs designated with a (\*), and all cross frame members. Paint structural steel portion as shown on Dwg. XXXXX and finish all exposed faces of weathering steel according to the Special Provisions.*

*Do not punch or drill holes in webs of interior girders for falsework.*

*WELDING NOTES:*

*Produce welds according to the latest edition of “AWS D 1.5 Bridge Welding Code”.*

*BOLTING NOTES:*

*Provide 7/8" diameter Type 3 weathering high-strength bolts at structural connections according to ASTM Specification F3125 GR A325 unless shown otherwise.*

*All structural steel connections are slip critical connections with Class B faying surfaces unless shown otherwise. (Bolt threads shall be excluded from shear plane.)*

*Tighten all high-strength bolts using the "Turn-of-Nut Tightening" method.*

*[Note: Consult with the Steel Design Standards and Practice Engineer to review structural steel and painting General Notes.]*

*Coat all girders as shown, in accordance with the Specifications.*

*Produce the finish coat on all girders according to Federal Color Standards most closely matching steel rusted shade.*

*Submit rusted shade color to engineer for approval.*

1. *All longitudinal dimensions are on a horizontal line - adjust for superelevation and grade.*
2. *All stiffeners and beam ends are to be vertical in final erected position unless noted otherwise.*
3. *Web thickness shown may be increased up to 1/16".*
4. *Additional compression flange weld splices will be permitted at locations approved by the engineer.*
5. *Provide steel in top and bottom flanges according to ASTM A709, Grade 50W.*
6. *Provide steel in web according to ASTM A709, Grade XXXXX*
7. *Provide all other steel according to AASHTO M270, Grade XXXXX (ASTM A709, Grade XXXXX).*
8. *Indicates check sample required from flange plates so marked, see Special Provisions.*
9. *For the purpose of charpy toughness testing and welding inspection/repair, etc., main load carrying members are Girders and Stiffeners.*
10. *Assumed design temperature is XXX F.*

*Timber Notes:*

*Provide Douglas Fir (non-laminated) timber conforming to \_\_\_\_\_\_\_\_ Grade [insert lumber grade] according to WCLIB rules.*

*Incise and treat sawn members with \_\_\_\_\_\_\_\_\_\_\_\_\_\_ [insert appropriate treatment from Section 02190] to a minimum retention level of \_\_\_\_\_\_\_\_ pcf [insert appropriate treatment level] in accordance with AWPA Specification C-2.*

*Provide all glued laminated timber members according to the requirements of the current “American Institute of Timber Construction (AITC) Timber Construction Standards”.*

*Allowable stresses in glued laminated members are per the latest version of AITC Specification 117.*

*Provide [insert wood species] glued laminated stringers according to combination symbol \_\_\_\_\_\_\_. [insert combination symbol]*

*Provide [insert wood species] glued laminated deck panels and rail posts according to combination symbol 2. [insert combination symbol]*

*Mark glued laminated stringers "Top" on the top at both ends.*

*Incise and treat glued laminated timber members with \_\_\_\_\_\_\_\_\_\_\_ [insert appropriate material from Section 02190] to a minimum retention level of \_\_\_\_\_\_\_ pcf. [insert appropriate level of retention] Treat laminated members after laminating in accordance with AWPA Specification C-28.*

*Perform cutting and drilling of timber members before preservative treatment. No field cutting of treated material will be permitted unless absolutely necessary. In the event of injury, drilling or cutting of treated material, field treat according to AWPA Specification M-4.*

*Provide structural steel, dowels (etc.) according to ASTM Specification \_\_\_\_\_\_. [insert Specification number] Provide all bolts, lag nuts and drift pins according to AASHTO Specification M314, Grade 35 (ASTM A307) and/or AASHTO M314 Grade 105 (ASTM A449) as shown on the detail plans. Hot-dip galvanize structural steel, dowels, miscellaneous metal, bolts, lag bolts and drift pins after fabrication.*

*Resin Bonded Anchor Notes:*

*Provide and install (\_\_\_" diameter Grade (36) (55) (105)) (#\_\_ AASHTO M 31, Grade 60 rebar) resin bonded anchors with high strength resin from the QPL. The minimum pullout strength is \_\_\_\_\_\_ lbs with a minimum embedment of \_\_\_\_in. Install anchors according to the manufacturer's recommendations and the Special Provisions.*