SP00250 (2015 Specifications: ~~08-01-16~~01-01-17)*(This Section requires SP00230 when temporary detours are required. Requires SP02520 when steel pipe piles are required.)*

(Use this Section when the Contractor is to provide a temporary detour structure. This Section is for temporary highway bridges.)

SECTION 00250 - TEMPORARY DETOUR BRIDGES

(Follow all instructions. If there are no instructions above a subsection, paragraph, sentence, or bullet, then include them in the project. The specifications may be modified to include project specific specifications, but all additions, deletions, or modifications must be sent to the ODOT Technical Resource and Senior Specifications Engineer for review and approval.)

Section 00250, which is not a Standard Specification, is included in this Project by Special Provision.

Description

00250.00 Scope - This work consists of designing, constructing, inspecting, maintaining, and removing temporary detour bridges as shown or directed.

00250.03 Submittals - Submit the following 14 Calendar Days before the preinstallation conference:

- The Temporary Detour Bridge Design Checklist which is included at the end of this Section.
- Stamped working drawings and calculations, including hydraulic, scour, and foundation calculations, according to 00150.35.
- For used material, provide the following:
  - The locations of all acceptable defects on the working drawings with supporting design calculations.
  - Documentation that all primary and secondary members to be incorporated into the temporary detour bridge meet the requirements of 00250.10.
  - A statement that the Design Engineer of Record has inspected the used material to be incorporated into the temporary detour bridge.

00250.04 Preinstallation Conference - Hold a preinstallation conference with the Engineer, Contractor personnel, fabricator, Design Engineer of Record, and all other personnel who will be involved in installing the temporary detour bridge. Meet at a mutually agreed time two weeks before installation work begins. Present and discuss all phases of the temporary detour bridge installation work.

Materials

00250.10 Material - Furnish new or used material for temporary detour bridges.

(a) New and Used Material - New and used material for temporary detour bridges may contain the following defects:

- Precast prestressed concrete members with spalling, cracking, section loss, or other distress that still satisfy the strength and serviceability requirements for the intended use.
- Structural steel members with notches, gouges, flame cuts, welds that have been repaired according to AWS D1.5, Section 3 or holes meeting the requirements of AWS D1.5 that still meet the structural design and fatigue requirements for the intended use.

(b) New Material - Furnish new material for temporary detour bridges according to the applicable Sections of Part 00500.

(c) Used Material - Used materials are defined as materials that:

- Are reclaimed from previous projects.
- Performed satisfactorily on previous projects.
- Have no damage that affects the strength or serviceability required for the application intended.
- The Design Engineer of Record can certify for use as a part of the temporary detour bridge according to 00250.44.

(1) Precast Prestressed Concrete Members - Furnish precast prestressed concrete members that:

- Meet the requirements of Section 00550.
- Are permanently marked, in a location that is visible after assembly, with the manufacture's initials, cast date, job number, piece number, bridge number, and contract number.

Provide copies of the original shop drawings.

(2) Structural Steel Members - Furnish primary and secondary members that meet one of the following criteria:

Documented Steel:

- Meet the requirements of AASHTO M 160 (ASTM A 6).
- All existing welds were tested for discontinuities using magnetic particle, ultrasonic, or radiographic testing as appropriate according to AWS D1.5, Section 3. Evaluate all full penetration welds using tension criteria. Submit copies of all nondestructive testing (NDT) test reports to the Engineer.

- Meet the requirements of Section 02530. Verify by providing original material test reports or test reports on samples tested for yield and tensile strength, elongation, and Charpy Impact strength (zone 2).

Undocumented Steel:

- Meet the requirements of AASHTO M 160 (ASTM A 6).
- For the purpose of this Section, all design calculations for undocumented steel will be limited to the minimum requirements of ASTM A 36 steel.
- All existing welds were tested for discontinuities using magnetic particle, ultrasonic, or radiographic testing as appropriate according to AWS D1.5, Section 3. Evaluate all full penetration welds using tension criteria. Submit copies of all NDT test reports to the Engineer.

(3) Timber Members - Furnish timber members that:

- Meet the requirements of Section 02130.
- Do not contain rot, physical damage, or undue distortion.

(4) Piling:

a. Steel Piles - Furnish steel piles meeting the requirements of Section 02520.

Verify the grade of steel piles by furnishing original material test reports or test reports on samples tested for yield and tensile strength, and elongation.

For the purpose of this Section, all design calculations for undocumented steel will be limited to the minimum requirements of ASTM 252, Grade 1 steel for pipe piles and ASTM A 36 steel for H-Piles.

b. Timber Piles - Used timber piles are not allowed.

Construction

00250.41 Design - Design temporary detour bridges according to the "Bridge Temporary Works" section of the ODOT "Bridge Design and Drafting Manual". Use the ODOT "Bridge Design and Drafting Manual" edition that is current on the date of Advertisement.

(a) Spread Footings - For temporary bridges supported on spread footings, provide the following information:

- Soil or rock properties, ground water levels and all assumptions used to characterize the subsurface conditions for footing design.
- Estimated scour depths used in the analysis.
- Bearing capacity design calculations and recommendations.
- Recommended footing elevations.
- Estimated footing settlements and differential settlement, if applicable, based on the service conditions.

- Global stability analysis of spread footing locations.
- Method of providing adequate footing scour protection.

(b) Driven Piles - For temporary bridges supported on driven piles:

- Include the following information on the drawings:
  - Pile type, size, and steel grade.
  - Pile layout and spacing.
  - Required ultimate bearing capacity (nominal resistance).
  - Method for field determination of ultimate (nominal) bearing capacity (dynamic formula, wave equation, or dynamic load test).
  - Minimum pile tip elevations.

- Provide the following information and calculations:
  - Subsurface material properties, ground water levels and all assumptions used to characterize the subsurface conditions for pile design.
  - Estimated scour depths used in the analysis.
  - Pile bearing capacity design calculations and recommendations.

- Provide the following analysis and recommendations when applicable:
  - Lateral pile load analysis.
  - Pile tip protection.
  - Pile uplift capacity.

(c) Stream Crossings - For stream crossings, provide vertical and horizontal clearances as required by the applicable permitting agencies, but not less than a 5 year flood. Provide scour calculations to support the estimated scour depth used in the foundation design.

(d) Roadway and Railroad Crossings - For roadway and railroad crossings, provide the vertical and horizontal clearances as shown and the following:

(1) Bents Adjacent to Highways - For bents located adjacent to highway traffic openings, provide:

- Temporarily pinned, pin and loop concrete barrier to protect the structure from damage by adjacent traffic. Provide at least 1 foot clearance between the barrier and the bent.
- Posts designed for 150% of the calculated vertical loading.
- Mechanical connections (2,000 pounds minimum capacity) between the bottom of post and footing.
- Mechanical connections (1,000 pounds minimum capacity) between the top of post and cap.
- Connections (500 pounds minimum capacity) between the beams and cap.
- 5/8 inch diameter minimum bolts at timber bracing connections.

(2) Bents Adjacent to Railroads - For bents located adjacent to railroad traffic openings, in addition to the requirements of (d-1) above, provide the following:

- Collision posts as shown.
- For bents located within 20 feet of the centerline of track, solid sheathing 3 feet and 16 feet above top of rail with 5/8 inch thick minimum plywood, properly blocked at the edges.
- For bents located within 20 feet of the centerline of the track, bracing adequate to resist the required horizontal design loading or a minimum 5,000 pounds horizontal loading.

(e) Width - Design temporary detour bridges to match the temporary roadway width and vertical and horizontal alignment as shown.

(f) Surfacing - Except for concrete decks, provide the structure with a minimum 2 inch asphalt concrete or equivalent wearing surface. Immediately prior to placing the asphalt concrete:

- Clean and dry the surface to be covered.
- Apply a hot asphalt prime coat at a uniform rate of 0.20 to 0.25 gallons per square yard of deck surface or as directed by the Engineer.
- Apply a spread of aggregate, 1/4 inch to 1/2 inch in size, to give the appearance of 50 percent coverage.
- Roll the surface to secure the maximum embedment of the aggregate into the prime coat and surface.

(g) Roadway Openings - At roadway openings, provide 25 watt amber lights at 3 foot centers around the perimeter of each side of the detour bridge opening. Illuminate the lights from 30 minutes before sunset to 30 minutes after sunrise.

00250.43 Construction - Construct temporary detour bridges according to the applicable Sections of Part 00500 and the requirements of applicable permitting agencies.

Perform structural steel welding according to 00560.26(a) and steel piling welding according to 00520.43(g). Do not begin welding until all of the following have been approved:

- WPS-Welding Procedure Specification
- PQR-Procedure Qualification Records
- WQTR-Welder Qualification Test Records
- MTR-Material Test Report
- CWI-AWS Certified Welding Inspector

Field welding to girders, beams, stringers, crossbeams, and floor beams is not allowed.

00250.44 Opening to Traffic:

(a) Before Opening to Traffic - Before opening temporary detour bridges to traffic, have the Design Engineer of Record perform the following:

- Inspect the soils to confirm that bearing capacity equals or exceeds design assumptions.
- Accompany the Engineer on an inspection of the structure to confirm the structure and materials conform to the plans and specifications.
- Furnish a written statement that the structure and the materials used will serve the intended use and that they comply with the Design Engineer of Record's submitted plans and drawings.

(b) After Opening to Traffic - On temporary detour bridges that are open to traffic for more than one year, do the following:

- On or before each anniversary of the opening of the temporary detour structure, have the Design Engineer of Record inspect the structure and certify that a hands-on inspection of the structure has been performed and a determination has been made that the structure is consistent with the approved design and is currently adequate for its design loads.
- Furnish a signed and stamped report of the inspection results and certification within 30 Calendar Days of the inspection.

(Use the following heading and subsection .50 when "temporary detours" are required.)

Temporary

00250.50 Temporary Detour - Provide temporary detours according to Section 00230.

Maintenance

00250.60 Structure Maintenance - Maintain temporary detour bridges, including wearing surfaces, in a safe and functional condition. Keep bracing and connections tight and immediately replace any damaged members, as directed or approved by the Engineer. For stream crossings, remove all debris or drift from the structure.

Finishing and Clean Up

00250.70 Structure Removal - When temporary detour bridges are no longer needed, remove them according to Section 00310. Unless otherwise shown or specified, all temporary bridge materials will remain the property of the Contractor.

Satisfy all requirements of applicable permitting agencies during bridge removal.

Restore all areas occupied by the temporary bridges to original condition or as shown.

Measurement

00250.80 Measurement - No measurement of quantities will be made for work performed under this Section.

Payment

00250.90 Payment - The accepted quantities of work performed under this Section will be paid for at the Contract lump sum amount for the item "Temporary Detour Bridges".

Payment will be payment in full for furnishing and placing all materials, and for furnishing all equipment, labor, and incidentals necessary to complete the work as specified.

No separate or additional payment will be made for designing, constructing, maintaining, inspecting, and removing the temporary detour bridges.

(Use the following paragraph when "temporary detours" are required.)

Temporary detours will be paid for according to 00230.90.

TEMPORARY DETOUR BRIDGE DESIGN CHECKLIST

Instructions - This checklist was developed to facilitate the design, review, and erection of temporary detour bridges. It is intended to remind the Design Engineer of Record to design and to check for specific aspects of construction. It is not a substitute for plan and design criteria or specification requirements.

The checklist is to be completed and signed by the temporary detour bridge Design Engineer of Record. Answer every question. Attach explanations of all negative responses to this checklist. Submit this checklist with the submittals.

	YES	NO	N/A
A. Contract Plans, Specifications, and Permits			
1. Are the temporary detour bridge's plans prepared, stamped and signed by an engineer registered to practice in Oregon?	____	____	____
2. Have three complete sets (five if railroad approval is required) of the design calculations been included with the temporary detour bridge drawings submittal?	____	____	____
3. Are temporary detour bridge plans in compliance with the requirements of the construction plans and specifications?	____	____	____
4. Are temporary detour bridge plans in compliance with the requirements of the Oregon Standard Specifications for Construction, subsection 00150.35?	____	____	____
5. Are all existing, adjusted or new utilities in proximity with the proposed temporary detour bridge shown on the temporary detour bridge plans and is protection of these utilities addressed?	____	____	____
6. Are clearance requirements satisfied and shown on the temporary detour bridge plans?	____	____	____
7. For construction in or over navigable waters, have all requirements for construction of the temporary detour bridge that are called for in the Coast Guard Permit been incorporated?	____	____	____
8. Has possible damage from traffic been considered?	____	____	____
9. Has damage from stream drift been considered?	____	____	____

B. Foundation Requirements

1. Is the temporary detour bridge supported on driven piling? ____ ____ ____

   a. Are minimum pile tip elevations or penetration depths indicated on the drawings? ____ ____ ____

   b. If timber temporary detour bridge piles are used, are the lengths sufficient to eliminate the possibility of pile splices? ____ ____ ____

   c. Is a static pile capacity analysis included in the calculations? ____ ____ ____

   d. If lateral loads are applied to the piling by equipment, dead loads, flowing water, or drift, is a detailed lateral load analysis included in the calculations? ____ ____ ____

   e. When piling are in an active waterway, have the potential effects of scour on axial and lateral pile support been addressed in the calculations? ____ ____ ____

   f. If the FHWA Gates Equation is used to determine bearing capacity, does the proposed pile hammer meet the minimum field energy requirements as listed in 00520.20(d-2)? ____ ____ ____

   g. Will a driving criteria graph, plotting blow count versus stroke for an acceptable pile hammer, be provided for the project inspector? ____ ____ ____

2. Is the temporary detour bridge supported on spread footings? ____ ____ ____

   a. Are the spread footing elevations shown on the drawings? ____ ____ ____

   b. Has a rational method for determining the ultimate bearing capacity of the foundation materials been presented and described in the calculations? ____ ____ ____

   c. Have the soil parameters used in calculating the ultimate bearing capacity been listed and confirmed by the Design Engineer of Record? ____ ____ ____

   d. Has an appropriate Factor of Safety, or resistance factor, been used for calculating the allowable (or factored) bearing capacity of the foundation materials? ____ ____ ____

e. Are spread footing settlement estimates included in the calculations? ____ ____ ____

f. Have effective stresses been used in the calculations, when applicable? ____ ____ ____

g. When spread footings are founded near the top of a slope or in a slope, have the ultimate bearing capacity calculations been modified accordingly? ____ ____ ____

h. When spread footings may be subjected to flowing water, have the potential effects of scour on ultimate bearing capacity been addressed in the calculations? ____ ____ ____

C. Loads

1. Has the mass of the contractor's heavy equipment units crossing the temporary detour bridge been included in the calculations? ____ ____ ____

2. Are design loads and material properties used to determine design stresses for each different temporary detour bridge member shown on the temporary detour bridge plans? ____ ____ ____

3. Is the worst loading and member property condition, rather than the average condition, used to obtain design loads? ____ ____ ____

4. Are concentrated loads included in the analysis of supporting beams or steel beam caps? ____ ____ ____

D. Allowable Stresses

1. Has the method used for temporary detour bridge design of all members except for manufactured assemblies been noted in the design calculations? ____ ____ ____

2. Are manufactured assemblies identified as to manufacturer, model, rated working capacity and ultimate capacity? ____ ____ ____

3. Is the allowable stress and the calculated stress listed in the summary for each different temporary detour bridge member, except for manufactured assemblies? ____ ____ ____

E. Timber Temporary Detour bridge Construction

1. Are timber grades consistent with material to be delivered to the construction site, and noted on temporary detour bridge drawings, and in accompanying calculations for all timber temporary detour bridge material? ____ ____ ____

2. If "rough" lumber is used, are the actual lumber dimensions used in the calculations? ____ ____ ____

3. If timber spans are governed by the strength of the timber, are the allowable stress and the calculated stress shown in the calculations? ____ ____ ____

4. If timber spans are governed by the allowable spacing of supporting joists or beams, are the allowable and the proposed spacing shown on the temporary detour bridge plans? ____ ____ ____

5. Has timber been checked for bending, shear, bearing stresses, and deflection? ____ ____ ____

6. Is deck timber identified as being continuous over three or more spans when they are not analyzed as simple spans? ____ ____ ____

7. Have deck timber and cap beams been checked for bearing stresses perpendicular to the grain as well as for bending and shear stresses? ____ ____ ____

8. Have posts been checked as columns as well as for compression parallel to the grain? ____ ____ ____

F. Prestressed Concrete Members

1. Are manufacturer initials, cast date, job number, piece number, bridge number, and contract number either permanently cast into each member or on a permanently attached stamped steel plate? ____ ____ ____

2. Are members adequate for indented use? ____ ____ ____

3. Are members free of spalls, cracks, section loss or any other distress? ____ ____ ____

4. Is location of each member marked on plans? ____ ____ ____

5. Is location of spalls or section loss of each member marked on plans? ____ ____ ____

G. Steel Temporary detour bridge Construction

1. Are steel structural shapes and plates identified by ASTM number on the temporary detour bridge plans and in the calculations? ____ ____ ____

2. Have exiting holes, notches, gouges, flame cuts, and welds been repaired according to AWS D1.5, Section 3? ____ ____ ____

3. Have exiting welds been ground flush and tested for discontinuities? ____ ____ ____

4. Have steel beams been checked for bending, shear, web crippling and buckling of the compression flange? ____ ____ ____

5. Has horizontal plane bracing been shown where required to limit compression flange buckling? ____ ____ ____

6. Are holes meeting the requirement of AWS D1.5, Section 3 shown in the temporary detour bridge plans? ____ ____ ____

7. Are supporting calculations showing the adequacy of steel sections with existing holes included? ____ ____ ____

8. Are fatigue category D, E and E' marked on the temporary detour bridge plans and is supporting analysis showing adequacy for each fatigue category provided? ____ ____ ____

H. Deflections and Settlement

1. Is temporary detour bridge deflection for concrete dead load shown on the plans for all spans? ____ ____ ____

2. Do stringers supporting cast-in-place concrete compensate for estimated camber? ____ ____ ____

3. Are provisions shown for taking up temporary detour bridge settlement? ____ ____ ____

I. Compression Members, Connections and Bracing

1. Has general buckling been evaluated for all compression members? ____ ____ ____

2. Has bracing been provided at all points of assumed support for compression members? ____ ____ ____

3. Has bracing in each direction been considered in establishing the effective length used to check post capacity? ____ ____ ____

4. Is bracing strength and stiffness sufficient for the intended purpose? ____ ____ ____

5. If temporary bracing is required during intermediate stages of temporary detour bridge erection, is it shown on the plans? ____ ____ ____

6. Have all connections been designed and detailed? ____ ____ ____

7. Are web stiffeners required on steel cap beams or steel beams to resist eccentric loads? ____ ____ ____

8. Are wedges required between longitudinal beams and cap beams to accommodate longitudinal slope or to reduce eccentric loading? ____ ____ ____

9. Have sloping temporary detour bridge members that exert horizontal forces on the temporary detour bridge been braced or tied to resist these loads? ____ ____ ____

10. Have timber headers set on shoring towers been checked for eccentric loads, and for shear and bending stresses produced by the eccentricity? ____ ____ ____

J. Highway and Railroad Traffic Openings (For temporary detour bridge over or adjacent to highway or railroad traffic openings.)

1. Does the temporary detour bridge have a minimum of 25 feet of horizontal clearance from center of the outside track to the bridge abutment? ____ ____ ____

2. Does the temporary detour bridge have a minimum of 23 feet 6 inch vertical clearance from the top of rail to the bottom of the bridge beam? ____ ____ ____

3. Does the temporary detour bridge meet all of the railroad permit requirements? ____ ____ ____

_____ _____

Design Engineer of Record Signature Date