MICHIGAN

DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION

FOR

**CONCRETE PIPE ENDS FOR LARGE DIAMETER PIPE CULVERTS**

BAY:KSH 1 of 3 APPR:MJF:DMG:09-21-23

**a. Description.** This work consists of designing, manufacturing, and installing precast or cast-in-place headwalls, wingwalls, aprons, and curtain walls as shown on the plans and in accordance with section 406 of the Standard Specifications for Construction and this special provision. This work includes any dewatering necessary to facilitate construction.

Do not manufacture precast concrete elements on the jobsite. Ensure all precast elements are manufactured at a commercial precast plant in accordance with the *MQAP Manual*.

**b. Materials.** Use materials meeting the requirements of subsection 406.02 of the Standard Specifications for Construction and the following additional requirements:

Miscellaneous Steel. Furnish plates, bars, bolts, nuts, and washers in accordance with sections 906 and 908 of the Standard Specifications for Construction. Hot-dip galvanize all steel items according to *ASTM A123/A123M* or *ASTM A153/A153M* as applicable.

Select a manufacturer that meets the plan certification requirements specified in subsection 406.02 of the Standard Specifications for Construction.

**c. Construction.** Furnish a plan for dewatering and/or maintaining stream flow that is in accordance with EGLE permit requirements and the Standard Plans and submit it to the Engineer for review 7 working days before the installation of the system. Installation of the system may only begin after the Engineer’s approval of the plan.

1. Design precast or cast-in-place headwalls, wingwalls, aprons, and curtain walls in accordance with subsection 406.03.A.4 of the Standard Specifications for Construction.

Design foundations using soil bearing pressures as shown on the plans. Ensure footings are cantilever-style footings.

Ensure the design and certification are sealed by a Professional Engineer, licensed in the State of Michigan, and submitted for approval to the Engineer. Do not manufacture elements until the Engineer has approved all documents submitted.

2. Furnish working drawings in accordance with subsection 406.03.C of the Standard Specifications for Construction.

3. Fabricate precast elements in accordance with subsection 406.03.D of the Standard Specifications for Construction. Ensure the slab and wall thicknesses meet tolerances in accordance with subsection 406.03.E of the Standard Specifications for Construction.

4. Furnish a smooth finish on the concrete surfaces, free of fractures. Repair fabrication imperfections, handling damage, or construction damage to precast or cast-in-place elements as approved by the Engineer, in accordance with section 712 of the Standard Specifications for Construction and at no additional cost to the contract. The Engineer may reject precast or cast-in-place elements due to the following:

A. Defects that indicate imperfect proportioning, mixing, or forming.

B. Honeycombed or open-textured surfaces that would adversely affect the function of the headwall, wingwall, apron, or curtain walls.

C. Damaged ends preventing required joint construction.

D. Concrete that does not attain the required compressive strength.

E. Out of tolerance dimensions.

F. Low or high air content.

G. Exposed reinforcing steel.

**d. Installation.** Unless otherwise shown on the plans, construct culvert bedding for headwalls, wingwalls, aprons, and curtain walls by placing a 9-inch-thick layer of coarse aggregate 6A, with an 80 percent minimum crushed material, or 46G aggregate, covered with a 3-inch-thick layer of 34G, 34R, 26A aggregate, or approved equal. Before placing the 3-inch-thick layer, compact the 9-inch-thick layer using at least three passes of a vibrating plate compactor. Compact the 3-inch-thick layer using at least one pass of a vibrating plate compactor.

Treat the joints between the pipe and headwall with cold applied culvert joint sealer and cover with a 24-inch-wide strip of geotextile blanket centered on the joint.

Erect the precast members as shown on the plans, in accordance with the approved shop drawings and the following:

1. Handle the precast elements by a method approved by the manufacturer and Engineer. Do not drill holes in the precast units for handling. Ensure cast holes are tapered.

2. Install all precast elements plumb, level, and in alignment within specified limits of erection tolerances. Furnish shims, supports, and bracing as required to maintain position, stability, and alignment as elements are being permanently connected. Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses.

3. Install cold applied joint sealer and geotextile blanket in accordance with the manufacturer’s recommendations and the standard specifications.

**e. Measurement and Payment.** The completed work, as described, will be measured and paid for at the contract unit price using the following pay item:

**Pay Item Pay Unit**

Conc, Pipe End Each

**Conc, Pipe End** will be measured at each end of pipe requiring a headwall and as shown on the plans. **Conc, Pipe End** includes all labor, equipment, and materials necessary to design, manufacture, and install the precast or cast-in-place headwall, wingwall, apron, and curtain wall including:

1. Cold-applied culvert joint sealer.

2. Geotextile blanket for collar connection.

3. Inserts for bars and connection hardware.

4. Fastening the ending to the pipe.

5. Furnishing and placing shims to level the precast elements.

6. Dewatering and maintaining stream flow during construction stages.

Culvert bedding under the precast or cast-in-place headwall, wingwall, apron, and curtain wall will be paid for separately.