

SECTION 501

STRUCTURAL CONCRETE

Special Provisions

501-3.01 PROPORTIONING. Under 1. Determining Proportions and Batch Weights, delete the first sentence and substitute the following: Submit a mix design developed in accordance with ACI 211 and ACI 301, Section 4 to the Engineer for approval. (7/6/99)R37M98

501-3.07 PLACING CONCRETE. Item 13. PIPES, CONDUITS, AND DUCTS. Add the following:

Close ends of utiliduct using threaded caps if the utiliduct is not used in this contract.

501-4.01 METHOD OF MEASUREMENT. Add the following: Water stops are considered subsidiary and are not measured for payment. When the bid schedule lists the appropriate lump sum pay item, Class A concrete, Class A-A concrete or Slope Paving will not be measured, except as provided in Subsection 501-5.01.

501-5.01 BASIS OF PAYMENT. Add the following
Furnishing and installing the utility conduit under the approach slabs is incidental to 501(1) Class A Concrete.

Joint materials and reinforcement for paved slopes are incidental to Item 501(7), slope Paving.

Add the following pay item:

Pay Item	Pay Unit
501(7) Slope Paving	Lump Sum

(04/15/04)R&M, bridge

SECTION 502

PRESTRESSED CONCRETE STRUCTURES

Standard Modifications

502-2.01 MATERIALS. In the second paragraph, delete the words “as determined by ASTM C 271” and substitute “as determined by ASTM D 3575, Suffix W, Method B”.
(02/08/01)M93

Special Provisions

502-2.01 MATERIALS. Remove the first sentence of the first paragraph and substitute the following:

Expanded polyethylene material shall be closed-cell expanded polyethylene planks with a density of 35 (+/- 0.3) kg/m³.

Standard Modification

502-3.01 PRESTRESSING METHODS. Delete the last four paragraphs.
(02/08/01)M93

Special Provisions

502-3.03 FABRICATION. Add the following numbered item:

12. Threaded Inserts. Provide coil anchor inserts as shown on the Plans to aid in adjusting the vertical alignment of the girders. Provide threaded inserts, coil anchors or approved equal, in the girder to anchor the diaphragm reinforcement as shown on the Plans.

Standard Modifications

502-3.06 PLACING. In the third paragraph, replace the words “place the grout” with “place grout conforming to Subsection 701-2.03 and”.
(02/08/01)M94

SECTION 503
REINFORCING STEEL

Special Provisions

503-1.01 DESCRIPTION. Add the following:

Furnish all reinforcement in the full lengths specified in the Plans, unless otherwise approved.

503-2.01 MATERIALS. Add the following:

Welded headed reinforcing steel to conform to ASTM A970M.

503-3.05 SPLICING. Add the following to the first paragraph:

Do not lap splice more than 50% of bars at one section. Do not lap splice two adjacent bars at one section. Stagger adjacent lap splices not less than 100% of the required lap splice length.

(04/15/04)R&M&bridge

SECTION 505

PILING

505-1.01 DESCRIPTION. Add the following:

The Engineer shall perform high-strain dynamic testing on one pile at each pier, one pile at abutment 1 - Br#2081 and one pile at abutment 2 - Br#2082, on the C Street/O'Malley Bridges, Bridge No. 2081 and 2082. After performing the test pile program as described below, the Engineer shall establish the installation and construction control criteria which will then be applied to the service piles. All test piles and service piles shall be driven at least to the minimum tip elevations shown on the plans.

This item shall not include any work required to install reinforcing steel or place concrete in the steel pile shell.

Practical refusal is defined as Pile Refusal in Section 505-4.01, numbered paragraph 8 of these Special Provisions.

505-3.01 TEST PILES. Add the following:

There shall be high-strain dynamic testing performed on at least four (4) piles at the C Street/O'Malley Bridges. The Engineer will take dynamic measurements during the driving and re-strike testing of the test piles.

C Street/O'Malley Bridges

<u>Test Site</u>	<u>Test Pile</u>	<u>Type Requirements</u>
Br#2081, Abutment 1	H-Pile - Plumb	One pile test is required
Br#2082, Abutment 3	H-Pile - Plumb	One pile test is required
Br#2081, Pier 2	Pipe Pile - Plumb	One pile test is required
Br#2082, Pier 2	Pipe Pile - Plumb	One Pile test is required

The initial pile driven at each test location shall be a test pile. If the immediate results from the high strain dynamic testing on the test pile are acceptable to the Engineer, the Contractor may then drive the remaining piles at the test pile bent. Further dynamic pile tests may be required on other piles or at other test sites if in the opinion of the Engineer, performance of the hammer-pile-soil system changes from that of the test pile program. For the dynamic testing of the piles, the Contractor shall provide the Engineer reasonable and safe means of access to the test piles for attaching instruments after the pile is placed in the leads. It is estimated that the Engineer will need approximately 4 (four) hours maximum to set up and install the dynamic test equipment. The Engineer will furnish the equipment, materials, and labor necessary for drilling holes in the test piles for mounting the testing instruments. The testing instruments will be attached near the

top of the pile. If necessary, the Contractor shall furnish electric power for the setup and use of the high-strain dynamic test equipment. The power supply at the outlet shall be at least 10 amp, 115 volt, 55-60 cycle, AC only. Delays resulting from installation of the high-strain testing equipment shall not be a basis for a claim.

The test piles shall remain as part of the permanent structure after testing, analysis, and recommendations are completed.

The test pile program with high-strain dynamic testing shall consist of the following tasks:

1. For the test pile program, 30 calendar days prior to driving the first test pile, the Contractor shall submit to the Engineer the necessary pile driving equipment information as shown on the Pile Driving Equipment Data Form. The Engineer will provide the Pile Driving Equipment Data Form. A minimum of 21 calendar days prior to driving the first test pile, the Contractor shall attend a meeting with the Engineer to evaluate and discuss the pile test program. The Contractor shall give the Engineer at least 7 calendar days advance notice that a test pile will be driven.
2. The Engineer shall perform an initial wave equation analysis based on subsurface conditions, pile capacity, and pile type.
3. The Contractor shall drive the test piles as specified above and to the tip elevations shown on the plans, and to criteria established by the initial wave equation analysis. Dynamic pile testing will be performed for the total length of each test pile that is driven with an impact hammer. If an obstruction is encountered during driving of the test pile, that pile will not be considered a test pile and the next pile driven at the test site shall be designated as a test pile as directed by the Engineer. This dynamic pile testing shall be performed in accordance with ASTM D 4945-00.
4. If necessary, the Engineer shall evaluate the test pile at each test site by re-striking the test piles a minimum of 48 hours after completion of driving the test piles to the specified tip elevation. The Contractor shall perform the re-strike of the test piles with simultaneous testing by the Engineer using the pile dynamic analyzer.

The re-strike testing procedure shall be performed with a warmed up hammer, the energy or fuel setting adjusted to the maximum position and shall consist of striking the test pile with 60 consecutive blows or until the pile penetrates an additional 76 mm (3 inches), whichever comes first. In the event the pile movement is less than one 25 mm (1-inch) during the re-strike, the re-strike may be terminated after 25 blows, or even fewer blows if the pile is at practical refusal.

505-3.03 PILE BEARING VALUES. Delete this subsection in its entirety and substitute the following:

C STREET, O'MALLEY ROAD
TO DIMOND BOULEVARD
MGE-0527(14)/54281

All piles shall be driven to a depth at which they will satisfy the required ultimate bearing capacity. The required ultimate bearing capacity on this project is the ultimate pile load as indicated on the bridge plans. The pile driving criteria for the bridge on this project shall be determined by the Engineer using a Wave Equation analysis and results from the high-strain dynamic testing. The Wave Equation computer program to be used on this project shall be the "GRLWEAP" program using the GRLWEAP industry standard hammer input data and as required, data from the high-strain dynamic testing. Determination of the ultimate bearing capacity of production piles may include re-strike testing as described above and as directed by the Engineer.

505-3.05 MINIMUM PENETRATION. Add the following:

The Contractor shall furnish piles of sufficient length to be driven to 1) the minimum tip elevation, 2) to meet the driving criteria as specified herein and 3) to provide the required cut-off elevation. Pile lengths shall be calculated from the design cut-off elevation to the minimum tip elevation. The Contractor shall at their own expense, increase the pile lengths given to provide for fresh heading and for such additional pile lengths as may be necessary to suit their method of operation.

505-3.09 DRIVING PILES. Add the following:

All pile driving equipment used by the Contractor shall be subject to approval by the Engineer. All pile driving systems shall be equipped with an appropriate thickness of hammer cushion to prevent damage to the hammer or pile and to insure uniform driving performance. Hammer cushions shall be made of durable, manufactured materials, and provided in accordance with the hammer manufacturers guidelines except that wood, wire rope, and asbestos hammer cushions shall not be used. The hammer cushion shall be inspected in the presence of the Engineer prior to beginning pile driving or after 100 hours of pile driving, whichever is less. The Contractor shall replace any reduction of hammer cushion thickness exceeding 25% of the original thickness before driving is permitted to continue.

The pile driving equipment shall be sized such that the piles can be 1) driven to the required ultimate bearing capacity, 2) without damage to the piles, and 3) have compressive driving stresses as indicated by the high-strain dynamic testing and the wave equation analysis not exceeding 90% of the pile yield stress. A driving head (or cap) which is compatible with both the hammer and the pile will be used. Concentric alignment and proper dimensions of the driving head is required so as to minimize damage to the butt of the pile and to efficiently transfer energy. Approval of the pile driving equipment by the Engineer will be based on the high-strain dynamic testing, the wave equation and the Engineer's recommendations.

All service piles shall be driven at least to the minimum tip elevation as shown in the Structural Foundation Engineering Report and the bridge plans or to a tip elevation based on the high-strain dynamic test results and the Engineer's recommendations. Adequate pile penetration will be considered to be obtained when the specified high-strain dynamic testing criteria is achieved.

Piles not achieving the required ultimate bearing capacity within these limits shall be driven to a tip elevation established by the Engineer.

After the test piles are driven and during the service pile driving operations, the Contractor shall use the approved driving system to install the service piles. No variations in the driving system will be permitted without the Engineer's written approval. Any change in the driving system will only be considered after the Contractor has submitted a revised Pile Driving Equipment Data Form for a revised wave equation analysis by the Engineer, and the analysis indicates an acceptable result. Approval of any change in the Contractor's driving system may be contingent upon obtaining satisfactory results from additional high strain dynamic tests. The Contractor will be notified of the acceptance or rejection of the revised driving system within 7 calendar days of the Engineer's receipt of the requested change. The time required for submission, review, and approval of a revised driving system shall not constitute the basis for a contract time extension.

The high-strain dynamic testing and analyses shall be performed to confirm or modify pile driving criteria developed using the wave equation for the Contractor's pile-hammer combination. The Engineer reserves the right to require dynamic monitoring in addition to those previously specified if the Contractor's pile driving equipment does not seem to be working properly or in accordance with these specifications, or if pile design modifications are ordered by the Engineer. The Engineer shall perform all dynamic monitoring. If the Contractor requests change in the approved driving system, the additional high-strain dynamic testing shall be performed at the Contractor's expense.

505-3.10 METHOD OF MEASUREMENT

Add the following to the first paragraph "Furnish Piles":

Piles not achieving the required ultimate bearing capacity within five (5) feet below the minimum pile tip elevation shown on the plans shall be driven to a penetration established by the Engineer. Requirement to drive the piles more than five (5) feet deeper than the minimum pile tip elevations shown on the plans shall be at the written direction of the Engineer. For depths up to fifteen (15) feet below the minimum pile tip elevations, the contract bid price for piling shall be applied. For depths beyond fifteen (15) feet below the estimated pile tip elevations, the pile unit costs shall be determined on a time and materials basis in accordance with Section 109, Paragraph 1.05, of the Standard Specifications.

Add the following to the fourth paragraph:

Load Tests. The specified high-strain dynamic load tests on this project will not be measured for payment. The number of high-strain dynamic load tests to be paid for shall be the number of additional tests required by the Engineer. This unit price per load test shall provide payment to the Contractor for their work required to assist the Engineer in performing additional high-strain dynamic testing, if required. The four specified high-strain dynamic load tests on this project will not be paid for directly, but will be subsidiary to Item 505(6), Structural Steel Piles, Driven.

Add the following:

Special Pile Excavation: Removal of unusual obstructions causing pile refusal above the specified minimum pile tip elevations, when required by the Engineer, shall be classified as Special Pipe Pile Excavation. This work will be measured on a time and materials basis in accordance with Section 109, Paragraph 1.05, of the Standard Specifications. Pile refusal is defined as the condition reached during pile driving which results in a bearing pile driven by an impact hammer having a negligible rate of penetration per blow (such as when a pile tip reaches an impenetrable bottom such as a rock or a bedrock formation), or when the effective transferred energy (ram stroke, rate in blows per minute and rate in blows per 305 mm (foot) of a properly maintained, operating and efficient impact hammer blow is no longer sufficient to advance the pile tip.

505-5.01 BASIS OF PAYMENT. Add the following:

The reinforcing steel to be used in the piling shall be measured and paid as Item 503(1), Reinforcing Steel. Concrete fill used in the piling shall be measured and paid as Item 505(1), Class A Concrete.

Pay Item	Pay Unit
505(12) Special Pipe Pile Excavation	Contingent Sum

Delete this Section in its entirety and substitute the following:

SECTION 508

WATERPROOFING MEMBRANE

Special Provisions

508-1.01 DESCRIPTION. This work consists of furnishing and installing preformed waterproofing membrane on concrete bridge decks as specified.

508-2.01 MATERIALS.

1. Membrane Material. Membranes for bridge deck waterproofing shall be a manufactured type membrane as specified herein. The material shall consist of a cold-applied, self-adhering membrane incorporating a non-woven geotextile embedded between 2 layers of SBS modified asphalt, a primer, and a mastic. The membrane shall have a top layer of non-structural non-woven geotextile for protection against construction traffic. The sheet membrane shall have the following properties:

PROPERTY	TEST METHOD	SPECIFIC VALUE
Tensile Strength (kPa)	ASTM D 412 Modified Method A	345
Elongation (percent)	ASTM D 412 Modified Method A	60 min.
Thickness (mm)	ASTM D 1777	1.5 min.
Puncture Resistance (kg)	ASTM E 154	11.3 min.
Permeance (perms) (g/Pa?s?m ²)	ASTM E 96B	2.87 max.
Pliability	ASTM D 146	No cracks bent 180 around 6 mm mandrel at -32°C
Asphalt Concrete Mat Surface Compaction Temperature (C)	None	120

2. Overlay Material. Material requirements for pavement overlays on waterproof membranes shall conform to those specified in Section 401.

CONSTRUCTION REQUIREMENTS

508-3.01 APPLICATION OF MEMBRANE WATERPROOFING

1. General. Install membrane in a manner to assure the following results:

- a. A complete bond between the membrane and the concrete surface of deck and curb face.

- b. An unbroken waterproof membrane in-place between the concrete deck surface and the asphalt overlay.
- c. A complete bond between the membrane and the asphalt overlay.

Install the membranes under the supervision of a representative from the membrane manufacturing company and in accordance with the manufacturer's published instructions.

2. Preparation of Concrete Deck. All concrete surfaces including grout in girder keyways to receive membranes shall have attained a compressive strength of not less than 80 percent of the specified 28-day compressive strength (f'c) prior to application of the membrane. The entire deck shall be free of all foreign materials such as dirt, dust, moisture, loose concrete, etc. Prior to applying the membrane primer, all dust and loose materials shall be removed from the deck by power sweeping followed by a thorough cleaning with compressed air. Any sharp concrete edges on the deck surface that would puncture the membrane shall be corrected in a satisfactory manner prior to application of the membrane. Grease, oil, paint, etc., shall be removed with solvents, detergents or sand blasting on decks that are to receive manufactured membranes.

Perform additional power sweeping, vacuuming, compressed air cleaning, or hand brooming immediately before applying the primer if deemed necessary by the Engineer or Manufacturer's representative.

3. Weather and Moisture Limitations. Work shall not be done during wet weather conditions, nor when the deck and ambient air temperatures are below 4 degrees C.
4. Overlaying and Protection of Membrane. Do not place the asphalt overlay until the bond between the concrete deck and the membrane has fully developed. Vehicles, except the spreader and trucks used for hauling the asphalt overlay mix, shall not be operated on the membrane.

Paving machines used over the membrane shall be rubber tired or rubber tracked. Steel-wheeled rollers only shall be used to compact the asphalt paving on the bridge decks.

Place, spread, and roll asphalt in such a manner that the membrane will not be damaged. Adhere to the manufacturer's published instructions for preparation, laydown, compaction, minimum and maximum temperature limitations for asphalt overlay material. The use of vibratory rollers, with vibrator on, will not be permitted.

508-4.01 METHOD OF MEASUREMENT. Membrane will not be measured for payment.

All materials for the asphalt overlay will be included in the measurements of quantities for the appropriate paving items.

No adjustments will be made in the quantities or prices of materials for asphalt overlay because of any variations resulting from utilizing waterproof membranes of greater or lesser thickness.

508-5.01 BASIS OF PAYMENT. Waterproofing Membrane will be paid for at the contract lump sum price. Payment shall also include all costs of furnishing and installing primers.

Where Pay Item 508(1) does not appear on the Bid Schedule, membrane will be considered subsidiary.

Payment for the asphalt overlay will be made under the appropriate paving items.

Payment will be made under:

Pay Item	Pay Unit
508(1) Waterproofing Membrane	Lump Sum

(3/15/00)R172M98

Add the following Section:

SECTION 514

CONCRETE SURFACE TREATMENTS

Special Provisions

514-1.01 DESCRIPTION. This work consists of providing an aesthetic fascia on all precast and cast-in-place concrete walls. Use form liners on all cast-in-place concrete walls. Install graffiti protection on all walls and surfaces designated on the Plans. This includes aesthetic fascia on the bridge wing walls and graffiti protection on the bridge abutments, wing walls, culvert head walls and slope paving.

514-2.01 MATERIALS. Reinforcing steel shall meet the requirements of Subsection 709-2.01 Reinforcing Steel.

Provide standard reusable, non-porous form liners conforming to:

Pattern: Ashlar Stone; or approved equal.
Color: Davis Colors – Miami Buff, 0.454 kg per bag of cement.

(04/19/04)R&M

Use a two-step graffiti protection system designed specifically for this use. The system shall consist of a single component clear acrylic base coat covered by a clear urethane finish coat. This material is not a sealer or vapor barrier and no appreciable discoloration is allowed.

Trained personnel shall apply the material according to the manufacturer's recommendations.

514-3.01 AESTHETIC FASCIA. Use form liners on all concrete wall forms which have exposed surfaces. The wall dimensions and concrete quantities provided on the Plans are minimum and do not include allowances for the thickness of the form liners and must be accounted for by the Contractor.

The liners will cover the majority of the form with a minimum of 50 mm and a maximum of 300 mm between the edge of liner and the finished top of the wall, pathway or original ground grade at the bottom, and edge or expansion joints of the wall on the sides. The Engineer shall approve the liner placement on the form prior to the concrete pour.

514-3.02 GRAFFITI PROTECTION. Let all concrete surfaces set at least 28 days before applying any coatings. Apply the base coat with a roller or sprayer in accordance with the manufacturer's recommendations. Apply two coats of the finish coat after the base coat has cured for 72 hours. Apply appropriate masking as required.

514-4.01 METHOD OF MEASUREMENT. Measure aesthetic fascia by the square meter of actual design exposed in the finished structure, regardless of the type.

Measure graffiti protection by the square meter of surface area designated by the Engineer.

514-5.01 BASIS OF PAYMENT. Payment for concrete wall treatments will be full compensation for all labor, equipment and materials, including reinforcing steel, required to complete the walls in accordance with the Plans and Specifications.

(2/28/01)R41M98(4/19/04)R&M

Payment will be made under:

Pay Item	Pay Unit
514(1) Aesthetic Fascia	Square Meter
514(2) Graffiti Protection	Square Meter

SECTION 603

CULVERTS AND STORM DRAINS

Special Provisions

603-2.01 MATERIALS. Delete the second paragraph and substitute the following:

When Item 603(17), Pipe, is listed in the bid schedule, furnish either Corrugated Steel Pipe (CSP) or Reinforced Concrete Pipe. Corrugated Polyethylene Pipe is not allowed. End Sections for Metal Pipe must be of the same material as the pipe.

Standard Modifications

603-3.03 JOINING PIPE.

3. Metal Pipe. Replace the second sentence with the following: "Use bands that are no more than two nominal sheet thicknesses lighter than the pipe being joined, and in no case lighter than 1.3 mm."

(02/08/01)M95