

DOCUMENT 00820
REVISIONS TO THE STANDARD SPECIFICATIONS (ISPWC) & SPECIAL PROVISIONS

Idaho County, Sally Ann Creek Watershed AOP Crossings
Great West Engineering Project No. 1-22212

The following Special Provisions and all addenda issued supplement or modify the 2020 Idaho Standards for Public Works Construction (ISPWC) Manual.

COMPLETION TIME AND LIQUIDATED DAMAGES

All work shall be substantially complete by **XXXX and final completion by XXXX**. The amount of Liquidated Damages for failure to complete the work on time will be \$1,500 per day. Refer to Document 00520, 4.03.

CONTRACTOR NOTES

BASIS OF PAYMENT

Except as modified herein, the various roadway work called for on the Bid Schedule shall be performed, measured, and paid for as indicated on said Bid Schedules and as provided in the 2020 IDAHO STANDARDS FOR PUBLIC WORKS CONSTRUCTION (ISPWC) and the latest supplements. The Contractor is required to have the current edition of the ISPWC standards to perform this work. Unless otherwise specified herein, all plan quantities are based upon in-place, completed and accepted units.

PAY QUANTITIES

Engineer will supply the Contractor a copy of the bid schedule in Microsoft Excel. By the 25th of each month the Contractor shall return an electronic copy of the spreadsheet with quantities that are to be paid for that month. Each bid item shall be accompanied with the appropriate backup documentation on how the pay quantity was calculated. This shall include such documentation as, but not limited to; stationing, location, tallied weight tickets, sketch of calculated areas, and/or any other appropriate documentation to verify the pay quantity request. Engineer will verify quantities prior to remitting payment. Items failing to have the appropriate backup supporting documentation will not be paid until the information is supplied. The cost associated with providing the above outlined documentation shall be considered incidental to the project and no additional compensation will be granted.

PERMITTING

Contractor needs to comply with approved and applicable 404, IDWR and other such permit requirements for the project.

SUBGRADE

It shall be the Contractor's responsibility to maintain the integrity for the exposed subgrade. Degradation due to his operations or weather shall be remedied under the guidance of a geotechnical engineer.

All costs to maintain and repair including, geotechnical engineering, etc. shall be incidental to the project and no additional compensation will be made.

FORCE ACCOUNT AND EQUIPMENT RATES

As needed, all force account rates and equipment rates shall be determined in accordance with Section 109.03 Extra and Force Account Work of the latest edition and supplement of the Idaho Transportation Department STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.

TRAFFIC CONTROL

Local and emergency vehicle access shall be maintained at all times, except for designated and allowed closure periods. All traffic control items not specifically listed in the bid schedule shall be incidental to this contract, and no additional compensation will be paid. The Contractor shall coordinate closures with emergency responder agencies.

UTILITY COMPANY COORDINATION

Refer to Article 7.01 of the Supplementary Conditions for additional information.

DAMAGED AREAS

Damage to areas outside of the construction area shall be promptly repaired by the contractor. The cost to complete such repairs shall be considered incidental to the cost of the project and no additional payment will be made therefore.

PROJECT MAINTANENCE DURING CONSTRUCTION

The Contractor shall be responsible for project maintenance throughout the life of the contract. This responsibility includes, but is not limited to, blading, sweeping, proper and adequate drainage, access for emergency equipment, appropriate access for property owners, and dust control. All project maintenance activities shall also conform to requirements specified in any project permits. BMP's at the project site shall be the sole responsibility of the contractor.

The Contractor shall be responsible for maintaining both on-site and off-site roadway facilities that are adversely affected by construction activities, including hauling. This maintenance may include; but is not limited to, street sweeping to eliminate tracking (within the project limits, adjacent streets, private driveways, and parking lots), and roadway repairs due to truck and equipment traffic. Required roadway facility maintenance shall be at the discretion of the Owner.

The Contractor shall backfill trenches as soon as possible the same day the trench is excavated. Pipe and conduit crossings, manholes, and miscellaneous construction in existing roadways remaining open to traffic shall be constructed with temporary gravel patches.

The cost of all project maintenance and roadway facility work shall be considered incidental to other items of work and no separate payment will be made.

SOURCES

Contractor is to use approved commercial sources for all uncrushed aggregate, crushed aggregate, and concrete aggregates which are not designated to be Owner furnished.

PROPERTY OWNER COORDINATION

The contractor shall coordinate with property owners for construction activities affecting the private property. This may include but is not limited to limited access, temporary access closures, fencing, staging areas, safety concerns, schedules, etc.

TRENCHING

All excavation and trenching shall meet OSHA requirements. Trenches shall be backfilled and properly compacted, closed at the end of each day, and barricaded, as needed.

EROSION CONTROL

The General Contractor shall provide a comprehensive Erosion Control Plan to Owner.

ON-SITE SUPERVISION

The General Contractor shall provide competent supervision during all construction activities, including SUBCONTRACTORS activities. The superintendent shall be identified at the preconstruction conference and shall at a minimum be on-site from the notice to proceed date to the completion date. If for any reason the superintendent needs to be replaced by the General Contractor, a written notice must be submitted to the Owner within (5) five working days before the event occurs.

STORMWATER FLOWS

The Contractor is responsible for transmitting existing stormwater flows during construction. All costs associated with transmitting existing flows, including flows from the temporary water quality best management practices on the project, shall be considered incidental to 1001.4.3.A.1.

EXCESS MATERIAL SITE

The Contractor shall be responsible for preparing a site for the disposal of excess or unsuitable materials. All excess material sites shall be approved by Engineer. No separate payment will be made for the acquisition or operation of the sites, or for loading, hauling or unloading the materials at the site. Adjacent property owners may be willing to work with the Contractor to provide limited disposal site for excess excavated materials.

Removed material (pipe, etc) shall be removed from the project site and properly disposed of or returned to the Owner if specified. The Contractor shall dispose excess material at an approved location. Any costs of the disposal shall be included in appropriate bid items.

TRUCK/TRAILER LOAD COVERAGE AND WEIGHT LIMITS

All loads of gravel, sand, dirt, landscape bark, and other loose material hauled on the public roadway by the Contractor or any of its subcontractors, shall be covered and properly secured so as to prevent the load from dropping, sifting, leaking, or otherwise escaping from the vehicle or becoming loose, detached, or in any manner a hazard to other uses of the public roadway. All construction traffic shall adhere to any County load limit posting to reduce the potential for construction traffic degrading existing road surfaces.

RE-TESTING OF MATERIALS

Re-testing necessitated by the failure of quality assurance testing of materials placed by the contractor shall be at the contractor's expense. These costs shall be deducted from progress estimates.

SITE CLEANUP

Upon completion of all work, the Contractor shall clean the entire construction site. Final clean up shall consist of removal of all construction debris, trash, remaining construction stakes, construction signs, etc. from the site. The Contractor shall clean all inlets removing any sand, dirt, gravel or debris. Final cleanup shall be considered incidental to the project and no separate payment will be made.

SUBSTANTIAL COMPLETION

Substantial completion is defined as having the roadway surfacing, drainage, and embankment construction completed. The Contractor shall notify the owner in writing five (5) working days before his/her proposed substantial completion date is reached, so the owner can complete the project punchlist and prepare the substantial completion notice. After the issuance of the substantial completion notice, the Contractor will be given ten (10) calendar days to complete all of the project punchlist items. The

substantial completion notice will suspend the accounting of contract time related to liquidated damages for substantial completion.

If the Contractor has not finished all contract requirements and/or punchlist items after the ten (10)-day period, the liquidated damages clause of the contract related to ready-for-final-payment will be enforced by the Owner.

GENERAL PROJECT INFORMATION, SCHEDULE, AND COORDINATION

1. All work shall conform to the requirements of the Construction Drawings, Contract Documents, 2020 Edition of the Idaho Standards for Public Works Construction (ISPWC), and Local Permit requirements, and easement or use of property agreement or conditions.
2. Coordination of work will be required and include, but not be limited to: traffic control, staging, trenching, utility relocations, and testing.
3. The CONTRACTOR shall comply with all local and state and sediment control requirements for this project. Permits shall include all utility relocations (by utility companies) necessary to complete the project.
4. Approval of dewatering discharges to any surface waters, storm drainage or irrigation facilities has not been secured by OWNER. CONTRACTOR shall be required to obtain all necessary agency approvals if applicable.
5. All fences, irrigation facilities, utility services, landscaping, and other miscellaneous facilities, removed or altered during construction shall be replaced in-kind or restored to their original (or better) condition prior to final completion. This work shall be incidental to the contract, and no payment will be made unless item(s) are specifically listed on the Bid Form.
6. CONTRACTOR shall coordinate work with OWNER, utility companies, local property owners, and other CONTRACTORS, mobilized in the area as specified in the Special Provisions.

DIVISION 200-EARTHWORK

SECTION 204
STRUCTURAL EXCAVATION AND COMPACTING BACKFILL

2.1 Add the following:

Structural backfill shall be 8" minus in accordance with Section 801-2.2-Table 1.

SECTION 206
PERMANENT EROSION CONTROL

PART 2 – MATERIALS

2.7.B Remove and replace with the following:

B. Riprap

Furnish hard, durable, angular rock that is resistant to weathering and water action and free of organic or other unsuitable material. Angular rock is characterized by sharp, clean edges at the intersections of relatively flat surfaces. Do not use shale, rock with shale seams, or other fissile or fissured rock that may break into smaller pieces in the process of handling and placing. Conform to the following:

Apparent specific gravity, AASHTO T 85	2.40 min.
Absorption, AASHTO T 85	4.0 percent max.
Soundness of aggregate using sodium sulfate, AASHTO T 104 (5 cycles)	12 percent loss max.
Los Angeles abrasion, AASHTO T 96	50 percent max.
Rock particle intermediate dimension (width) and minimum dimension (thickness)	1/3 longest dimension (length) min.
Gradation, FLH T 521	Table 705-1

**Table 705-1
Gradation Requirements for Riprap⁽¹⁾**

Class	% of Rock Equal or Smaller by Count, D_x	Range of Intermediate Dimensions,⁽²⁾ inches (millimeters)	Range of Rock Mass,⁽³⁾ pounds (kilograms)
1	100	9 – 15 (230 – 380)	59 – 270 (27 – 120)
	85	7 – 11 (180 – 280)	28 – 110 (13 – 50)
	50	5 – 8 (130 – 200)	10 – 42 (5 – 19)
	15	3 – 6 (80 – 150)	2 – 18 (1 – 8)
2	100	15 – 21 (380 – 530)	270 – 750 (120 – 340)
	85	11 – 15 (280 – 380)	110 – 270 (50 – 120)
	50	8 – 11 (200 – 280)	42 – 110 (19 – 50)
	15	6 – 8 (130 – 200)	10 – 42 (6 – 19)
3	100	21 – 27 (530 – 690)	750 – 1600 (340 – 730)
	85	15 – 19 (380 – 480)	270 – 560 (120 – 250)
	50	11 – 14 (280 – 360)	110 – 220 (50 – 100)
	15	8 – 10 (200 – 250)	42 – 81 (19 – 37)
4	100	27 – 33 (690 – 840)	1600 – 2900 (730 – 1300)
	85	19 – 23 (480 – 580)	560 – 990 (250 – 450)
	50	14 – 17 (360 – 430)	220 – 400 (100 – 180)
	15	9 – 12 (230 – 300)	59 – 140 (27 – 64)
5	100	33 – 39 (840 – 990)	2900 – 4850 (1300 – 2200)
	85	23 – 28 (580 – 710)	990 – 1800 (450 – 820)
	50	17 – 20 (430 – 510)	400 – 650 (180 – 290)
	15	11 – 15 (280 – 380)	110 – 270 (50 – 120)
6	100	39 – 45 (990 – 1140)	4850 – 7400 (2200 – 3350)
	85	28 – 32 (710 – 810)	1800 – 2650 (820 – 1200)
	50	20 – 23 (510 – 580)	650 – 990 (290 – 450)
	15	13 – 17 (330 – 430)	180 – 400 (82 – 180)
7	100	45 – 54 (1140 – 1370)	7400 – 12,800 (3350 – 5800)
	85	32 – 38 (810 – 970)	2650 – 4450 (1200 – 2000)
	50	23 – 28 (580 – 710)	990 – 1800 (450 – 820)
	15	15 – 20 (380 – 510)	270 – 650 (120 – 290)
8	100	54 – 66 (1370 – 1680)	12,800 – 23,400 (5800 – 10,600)
	85	38 – 47 (970 – 1190)	4450 – 8450 (2000 – 3850)
	50	28 – 35 (710 – 890)	1800 – 3500 (820 – 1600)
	15	19 – 25 (480 – 640)	560 – 250 (250 – 570)
9	100	66 – 78 (1680 – 1980)	23,400 – 38,600 (10,600 – 17,500)
	85	47 – 55 (1190 – 1400)	8450 – 13,500 (3850 – 6100)
	50	35 – 41 (890 – 1040)	3500 – 5600 (1600 – 2550)
	15	22 – 30 (560 – 760)	870 – 2200 (390 – 1000)
10	100	78 – 90 (1980 – 2290)	38,600 – 59,300 (17,500 – 26,900)
	85	55 – 64 (1400 – 1630)	13,500 – 21,300 (6100 – 9650)
	50	41 – 48 (1040 – 1220)	5600 – 9000 (2550 – 4100)
	15	26 – 36 (660 – 910)	1450 – 3800 (660 – 1700)

(1) Gradation includes spalls and rock fragments to provide a stable, dense mass.

(2) The intermediate dimension is the longest straight-line distance across the rock that is perpendicular to the rock's longest axis on the rock face with the largest projection plane.

(3) Rock mass is based on a specific gravity of 2.65 and 85 percent of the cubic volume as calculated using the intermediate dimension.

Add the following Subsections:

2.9 Streambed Simulation Rock

A. Placed Streambed Simulation Rock shall be a furnished mixture of soil, gravel, cobble, and boulders to simulate a natural streambed. The cobbles and boulders should be hard, durable rock. The Streambed Simulation Rock shall meet the gradation requirements in the table below:

Gradation requirements for Streambed Simulation Material (inches or sieve size)

Bed Class	100% passing	84% passing	50% passing	16% passing	10% passing
2	5	2	3/4	1/4	No. 10
4	10	4	1 3/4	1/2	No. 10
6	14	6	2 1/2	3/4	No. 10
8	22	8	3	1	No. 10
10	24	10	4	1	No. 10
12	30	12	5	1 1/2	No. 10
14	36	14	6	1 3/4	No. 10
16	42	16	7	2	No. 10
20	48	20	8	3	No. 10
24	60	24	10	3	No. 10
36	72	36	14	4	No. 10
48	96	48	18	6	No. 10

2.10 Channel Rock

A. Placed Channel Rock shall be furnished hard durable rock that is resistant to weathering and water action, free of organic or other unsuitable material, similar in color to those in the area, and at least as angular as that found in the natural stream channel. Do not use shale, rock with shale seams, or other fissile or fissured rock that may break into smaller pieces in the process of handling and placing. The Channel Rock shall meet the gradation requirements in the table below:

Gradation Requirement for Channel Rock (CR)

Class	Mass (Pounds)	Approximate Cubic Dimension (inches)
CR - 0	12 - 90	6 - 12
CR - 1	90 - 300	12 - 18
CR - 2	300 - 700	18 - 24
CR - 3	700 - 1350	24 - 30
CR - 4	1350 - 2400	30 - 36
CR - 5	2400 - 3700	36 - 42
CR - 6	3700 - 5500	42 - 48
CR - 7	5500 - 7900	48 - 54
CR - 8	7900 - 10800	54 - 60

Note: Mass / Pounds of channel is based on a sphere of the approximate cubic dimensions composed of granite. Mass will vary with rock type. Inspection should be performed by using the cube root of the A axis * B axis * C axis of each piece.

PART 4 – MEASUREMENT AND PAYMENT

Amend the following in 4.1:

- H. Loose Riprap: By the cubic yard based on neat line dimensions in place.
 - 3. Bid Schedule Payment Reference: **206.4.1.H.3**
 - 4. Bid Schedule Description: **Loose Riprap, Class ___cubic yard (CY)**

I. Placed Streambed Simulation Rock: By the cubic yard based on neat line dimensions in place.

3. Bid Schedule Payment Reference: **206.4.1.I.1**

4. Bid Schedule Description: **Placed Streambed Simulation Rock, Bed Class ___...cubic yard (CY)**

J. Placed Channel Rock: By the cubic yard based on neat line dimensions in place.

3. Bid Schedule Payment Reference: **206.4.1.J.1**

4. Bid Schedule Description: **Placed Channel Rock, Class CR-___...cubic yard (CY)**

END OF SECTION

DIVISION 800-AGGREGATES AND ASPHALT

SECTION 802
CRUSHED AGGREGATES

PART 2 – MATERIALS

Add the following Subsections:

2.6 Crushed Aggregate for Subbase Gradation

- A. The crushed aggregate subbase material (4”-Minus) shall be run through a crushing plant. Material that has been only screened may be accepted from Local Highway Jurisdiction approved sources. The subbase shall be placed to a minimum of 8-inches in thickness. The material shall be durable, have a sand equivalent not less than 30, and shall meet the following gradations:

Sieve Size	% Passing
4"	100
3"	98-100
2"	75-100
1"	40-80
#4	25-60
#200	5-12

PART 4 – MEASUREMENT AND PAYMENT

Add the following Subsection:

- E. Crushed Aggregate for Subbase, 4”-Minus: By the cubic yard based on neat line dimensions in place.
3. Bid Schedule Payment Reference: **802.4.1.E.1**
4. Bid Schedule Description: **Crushed Aggregate for Subbase, 4”-Minus...cubic yard (CY)**

SECTION 810
PLANT MIX PAVEMENT

PART 2 – MATERIALS

2.1.D.2 add the following:

Plant mix pavement, SP-2, ½-inch nominal size is required for this project. Other mix designs may be considered for approval by the engineer.

2.3.A.1 add the following:

Asphalt cement shall be PG 64-28 meeting the requirements of Section 805, or approved higher grade oil. Shall include a minimum of 0.5% anti-strip.

3.7 add the following:

- E. Adjacent pavement sections shall be paved within 24 hours.
- F. Thickness Tolerances:
 - 1. The average pavement thickness shall be within 0.25 inches of the specified thickness with no location varying more than 0.375 inches for roadways with 3-inch minimum specified thickness.
 - 2. Pavement not meeting the specified tolerance shall be removed and repaved or overlaid as determined by the engineer.
 - 3. No payment will be made for material constructed outside the planned geometry. A pre-paving meeting with the paving crew, foreman, quality control personnel and other key individuals will be conducted prior to start of paving operations to ensure that everyone involved with the paving is aware of the project requirements and how their actions can affect the quality of the finished product.

3.12.B Add the following:

Density shall be determined by Method 1 (paragraph 3.12.B.1 is specified).

END OF SECTION

DIVISION 1000-CONSTRUCTION STORMWATER BMPs

SECTION 1001 CONSTRUCTION SITE MANAGEMENT

PART 4 – MEASUREMENT AND PAYMENT

Add the following Subsection:

4.3 Unless specifically indicated in the Bid Schedule, all labor, materials, and equipment required for Soil Erosion and Pollution Control will be considered incidental to other Bid Items.

A. Soil Erosion and Pollution Control: Per lump sum as specified in the Bid Schedule. Includes all appurtenances not itemized in the Bid Schedule.

1. Bid Schedule Payment Reference: **1001.4.3.A.1**

2. Bid Schedule Description: **Soil Erosion and Pollution Control...lump sum (LS)**

END OF SECTION

DIVISION 2000-MISCELLANEOUS

**SECTION 2040
FENCING**

PART 4 – MEASUREMENT AND PAYMENT

Add the following Subsection:

- D. Replacing/Resetting Fences: Per lump sum as specified in the Bid Schedule. Includes all appurtenances not itemized in the Bid Schedule.
- 3. Bid Schedule Payment Reference: **2040.4.1.D.1**
- 4. Bid Schedule Description: **Replacing/Resetting Fences...lump sum (LS)**

END OF SECTION

TECHNICAL SPECIAL PROVISIONS

SP-601 STRUCTURAL STEEL PLATE ARCH

PART 1 - GENERAL

- 1.1 This specification covers the design, manufacturing and installation of the STRUCTURAL STEEL PLATE ARCH 6" x 2" corrugated structure detailed in the plans.
- 1.2 The design of the structure shall be in accordance with:

AASHTO Standard Specification for Highway Bridges 17th edition with interim revisions, Section 12 Working Stress Design.
- 1.3 **Design Loads:** Design loads shall be specified by the contractor retained Engineer. Construction loads and any temporary loads exceeding the service live load are not allowed on the structure without approval from the Engineer.
- (a) The contractor retained Engineer shall specify the materials and extents of the foundations or bedding and backfill material within the critical backfill zone with consideration of structure shape and in situ conditions.
 - (b) The contractor retained Engineer shall consider the structural capacity of trench walls or adjacent embankments to provide balanced soil loads on the structure.
 - (c) The contractor retained Engineer shall consider hydraulic forces on the ends of the structure. End treatments such as headwalls, slope collar, slope paving or cut-off walls shall be considered to protect the backfill and provide stability and protection to the ends of the structure as well as to prevent erosion or washout.
 - (d) The contractor retained Engineer shall consider scour effects on the structure foundation. The use of scour countermeasures shall be considered for strip footings. The contractor retained Engineer shall consider potential washout/undermining effects on the invert. The scour mitigation shown on the plans is a minimum requirement; however, more stringent standards can be used by the contractor retained Engineer.
 - (e) The required structure will be designated by standard applicable catalog structure number, span, and rise.
 - (f) Cover over the structure shall be determined from the crown of the structure to the bottom of flexible pavement or top of rigid pavement.
- 1.4 **Shop Drawings:** Shop drawings and design calculations shall be prepared and submitted to the owner for approval. The contractor shall be responsible for verification of all field dimensions prior to fabrication.
- 1.5 **Structural Steel Plate Arch:** Shall conform to ASTM A36.
- 1.6 **Dimensions:**
- (a) **Span:** Bottom span shall be **19 ft – 0 in.** Span shall be determined at the inside corrugations.
 - (b) **Rise:** Total rise shall be **6 ft – 4 in.** Rise shall be determined at the inside corrugations.
 - (c) **Thickness:** Plate thickness shall be 0.140" (10 gage)
 - (d) **Corrugation:** The Structural Steel Plate Arch shall have 6 inch x 2 inch annular corrugations. The corrugation profiles shall have AASHTO recognition for a minimum of 15 years.

PART 2 - MATERIALS

- 2.1 **Structural Plate:** Furnish structures conforming to AASHTO M 167 (ASTM A761) for the sizes and types specified.
- 2.2 **Fasteners:** Furnish assembly fasteners to connecting plates conforming to AASHTO M 167 (ASTM A761).
- 2.3 **Field Applied Bituminous (Asphalt) Coating:** If specified, field-applied bituminous coating shall conform to AASHTO M 190.
- 2.4 Final manufacturing processes including corrugating, punching, curving, special fabrication and optional zinc priming shall be performed in the United States of America at a common location.
- 2.5 All raw materials shall be traceable and certified by the mill for material composition and physical properties.

PART 3 - EXECUTION

- 3.1 **Assembly:** The structure shall be assembled in accordance with the shop drawings and plate layout provided by the manufacturer. Bolts shall be tightened to an applied torque between 100 and 300 ft-lbs.
- 3.2 **Installation:** The structure shall be installed in accordance with AASHTO Standard Specifications for Highway Bridges Section 26 or ASTM A807, the plans and specifications, and the manufacturer's recommendations.
 - (a) The Contractor shall provide footings as required per the plans and specifications.
 - (b) The Contractor shall provide proper bedding and backfill to avoid distortion that may create undesirable stresses in the structure and/or settlement of the roadway. The bedding shall be free of rock protrusions, frozen material or organic material.
- 3.3 **Backfilling:** The structure shall be backfilled with material meeting Structural Fill requirements or alternate material requirements as determined by the contractor's Engineer.
 - (a) Backfill materials shall be placed in symmetrical lifts on each side of the structure. The differential between the lifts on either side shall not exceed 24 inches. Each layer of soil shall be placed in 6 to 8 inch loose lifts and compacted.
 - (b) Backfill soils shall be free of rocks exceeding 3 inches, frozen lumps, ice, organic matter and foreign materials that could cause hard spots or decompose to create voids.
 - (c) The presence of a high percentage of silt or fine sand in the native soils suggests the need for well graded granular material in the critical backfill zone or the use of non-woven geotextile to prevent soil migration.
 - (d) During backfilling operations, only small tracked construction equipment (such as D-4 or smaller) shall be near the structure as fill progresses above the crown and to the minimum height of cover. After adequate cover and compaction is achieved, live loads may increase at the direction of the Engineer.

PART 4 - MEASUREMENT AND PAYMENT

- 4.1 Work includes all labor, equipment and materials required to complete the work including design, manufacturing and installation of the corrugated aluminum structural plate arch detailed in the plans including pipe, fittings, couplings, connections, and all appurtenances not itemized in the Bid Schedule.
 - A. Structural Steel Plate Arch: by the linear foot for the size, type, thickness, and corrugations of structure specified measured along the horizontal centerline through all fittings and structures including flared ends.

1. Bid Schedule Payment Reference: **SP-601.4.1.A.1**
2. Bid Schedule Description: **19'-0" Span x 6'-4" Rise Structural Steel Plate Arch, 0.140" Thickness, 6"x2" Corrugations...linear foot (LF).**

END OF SECTION

SP-602
PRECAST CONCRETE AND MEMBERS

PART 1 - GENERAL

- 1.1 This section covers the materials and procedures for all precast concrete members and structures including culvert stem wall with footing, culvert wingwalls, and the three-sided concrete box culvert. Except as otherwise indicated herein, all work shall conform to the requirements of Section 704 of the ISPWC and ASTM C1504.

The work shall consist of furnishing all plant, labor, materials, and equipment for the design, manufacture, transportation, storage, and erection of stem wall and footings, wingwalls, and/or box culvert fabricated from reinforced, precast concrete in accordance with the Plans and this Specification.

The *Culvert Stem Wall w/Footing* item shall consist of precast reinforced concrete footing sections as well as all connection plate hardware and appurtenant items needed to assemble each section as shown on the plans.

The *Culvert Wingwalls* item shall consist of precast reinforced concrete wingwalls with integral footings as well as all connection plate hardware and appurtenant items needed to connect each wingwall to the box culvert per manufacturer's recommendations.

The *Concrete 3-Sided Box Culvert* item shall consist of the reinforced, precast, concrete box culvert sections complete with associated high-strength non-shrink grout, shims, and all inserts and connector plates for making the connections between the sections.

PART 2 - MATERIALS

2.1 Concrete

- A. Cement, Air entraining Agents, and Admixtures: These materials shall meet the requirements of the ISPWC Section 703.2.1, Section 703.2.2, and Section 703.2.4 except that no admixture (703.2.2) shall be used without written approval from the Engineer.
- B. Water: All water used in concrete for precast concrete members shall conform to the requirements of the ISPWC Section 703.
- C. Aggregates: Aggregates for precast concrete members shall conform to the requirements of the ISPWC Section 703.2.1.D and 703.2.1.E.
- D. Strength: The concrete for all concrete members shall have a minimum ultimate compressive strength of 4,000 psi at age 28 days. These strengths are the MINIMUM required and may vary with the footing design, wingwall design, and/or culvert design. The fabrication drawings shall show the actual compressive strengths required. It shall be the responsibility of the Contractor to furnish a concrete mix design which will produce concrete capable of achieving the required compressive strengths. The mix design shall be submitted to the Engineer for review prior to its use.

2.2 Reinforcing Steel

- A. Rebar dowels, welded wire fabric, bar reinforcing, and deformed reinforcing steel shall conform to the requirements of the ISPWC Section 702.2.1.

2.3 Structural Steel

- A. Structural steel shall conform to the applicable requirements of AASHTO M 270.

2.4 Non-Shrink Grout

An approved non-shrink grout shall be used for filling the joints between adjacent precast culvert footing sections, adjacent precast culvert sections, welded-plate connectors, and miscellaneous fixtures such as lifting eyes. Non-shrink grout shall conform to the requirements of the ISPWC Section 704.2.3.B. Once the footing and/or culvert sections have been connected and prior to application, the joints between sections shall be thoroughly cleared out, and all loose material, dirt, debris, dust, etc, shall be removed from surfaces with which the grout will be in contact by washing with water. The grout shall then be applied while the joints are still damp or as otherwise recommended by the manufacturer of the material used. Grout placed during cold weather shall follow applicable sections of the cold weather concrete specifications.

2.5 Acceptance Requirements

- A. Permanently mark each precast unit with date of casting and supplier identification.
- B. Workmanship and Tolerances

Variations in footing dimensions, structure span or rise, or wingwall dimensions from those shown on the drawings shall not be permitted. The general shape of the precast sections shall not be altered from those shown on the drawings without approval by the Engineer.

All tolerances shall be applied with respect to the theoretical positions and dimensions shown on the plans and approved fabrication drawings.

The tolerances listed below represent the total allowable tolerance that will be accepted in the finished product(s). Tolerances allowed in other manufacturing sequences shall not be accumulated to supersede any individual tolerance. Members having dimensions outside of the tolerance limits shall be subject to rejection. Any acceptance of an individual dimension in excess of the tolerance shall not constitute a waiver of the requirement that the remainder of the work be within the tolerances specified.

Length of culvert, wingwall, or footing section	$\pm \frac{1}{2}$ "
Internal Dimensions	$\pm \frac{1}{2}$ "
Flatness: All external and internal faces shall be flat, true, and plumb.	Less than $\frac{1}{2}$ " per 8'
Joint tolerance	Gaps between joint sections must not exceed $\frac{3}{4}$ "

PART 3 - EXECUTION

3.1 Storage and Transportation

Care shall be taken during storage, hoisting, and handling of the precast culvert sections to prevent cracking or damage. Precast sections shall not be moved from the casting yard until the specified ultimate compressive strength (28-day strength) of the concrete has been attained and the plant inspector has been notified of the intent to transport the member.

Lifting of the precast concrete footing/wingwall/culvert sections shall be done only by use of the lifting eyes. During lifting of the members, spreaders shall be used between slings to eliminate the horizontal component of the lifting force applied to the member, except that when the angle between the sling and the top of the member exceeds 45 degrees, a spreader will not be required.

Units damaged by improper storage or handling shall be replaced by the Contractor at their expense.

3.2 Installation

- A. Precast footing/wingwall/culvert sections shall be placed as recommended by supplier on accepted foundation. Construction equipment shall not have direct contact with the footing/wingwall/culvert sections to prevent damage.
- B. Refer to project plans for excavation, bedding, and backfill requirements.
- C. Joint Sealant: Install flexible plastic gaskets between culvert sections meeting the requirements of ASTM D3542. Use the seal manufacturer's recommended adhesive lubricant for seal installation in accordance with ASTM D4070. Provide joint material that is 1.25 inch (31.75 mm) equivalent diameter (1 inch (25.4 mm) x 1.23 inch (31.12 mm) actual dimensions).
- D. External Joint Wrap: Furnish Type III, chemically bonded adhesive butyl bands for all joints between box sections meeting the requirements of ASTM C877. Use Type A designation with a sealing bandwidth of 12 inch (300 mm). Apply joint wrap material externally around each joint over semi-liquid paintable butyl rubber-based adhesive primer. Begin each joint wrap at haunch, extend up and over the top of the culvert, and terminate at the other haunch. Extend joint wrap under the haunches as far as possible on each side of the box culvert while maintaining seal with adhesive primer. If two or more pieces are required, lap a minimum of 6 inches (150 mm). Replace punctured or torn joint wrap damaged by culvert installation at Contractor expense.
- E. Plug all lift holes and fabrication holes before placing backfill. Use the manufacturer supplied plugs for filling holes in the top slab. Grout all holes in the side and floor slabs (if applicable).
- F. Tie Bolt Holes: Fill the annular area by injecting silicone caulking in tie bolt holes or fill with joint material after installation of the bolt and before placing the washer.

3.3 Welding

- A. Welding Requirements: Perform all welding on precast member connections in accordance with AWS D1.1 Structural Welding Code.

3.4 Finish

- A. Finishing shall be in accordance with the ISPWC Section 704.2.5.

3.5 Deck Sealer

- A. All exposed deck surfaces shall be coated with a high performance clear silane penetrating sealer. Sealer shall be “Hydrozo 100” or approved equivalent with installation per manufacturer’s recommendations.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Work includes all labor, equipment and materials required to complete the work including design, manufacturing and installation of the precast concrete items listed below and detailed in the plans including appurtenances not itemized in the Bid Schedule.

- A. Precast Concrete Members (Culvert Stem Wall w/Footing): by lump sum for all materials.
 - 1. Bid Schedule Payment Reference: **SP-602.4.1.A.1**
 - 2. Bid Schedule Description: **Precast Concrete Members, Culvert Stem Wall w/Footing...lump sum (LS).**

- B. Precast Concrete Members (Culvert Wingwalls): by lump sum for all materials.
 - 1. Bid Schedule Payment Reference: **SP-602.4.1.B.1**
 - 2. Bid Schedule Description: **Precast Concrete Members, Culvert Wingwalls...lump sum (LS).**

- C. Precast Concrete 3-Sided Box Culvert: by the linear foot for the size, type, thickness, and corrugations of structure specified measured along the horizontal centerline through all fittings and structures including flared ends.
 - 1. Bid Schedule Payment Reference: **SP-602.4.1.C.1**
 - 2. Bid Schedule Description: **Precast Concrete 3-Sided Box Culvert, 19'-0" Span x 4'-0" Rise...linear foot (LF).**

END OF SECTION