

# ADDITIONAL CONDITIONS TECHNICAL SPECIFICATIONS

---

## Table of Contents

### **ADDITIONAL CONDITIONS**

<b>AC1</b>	<b>SUMMARY OF WORK</b>
<b>AC2</b>	<b>LOCATION OF PROJECT</b>
<b>AC3</b>	<b>STANDARD SPECIFICATIONS</b>
<b>AC4</b>	<b>CONTRACT CORRELATION</b>
<b>SECTION 01012 – PRESERVATION, RESTORATION AND CLEANUP</b>	
<b>SECTION 01060 – CODES, PERMITS, AND PREVENTION OF ENVIRONMENTAL POLLUTION</b>	
<b>SECTION 01150 – MEASUREMENT AND PAYMENT</b>	
<b>SECTION 01300 – SUBMITTAL PROCEDURES</b>	
<b>SECTION 01310 – CONSTRUCTION SCHEDULES</b>	
<b>SECTION 01340 – SHOP DRAWINGS</b>	
<b>SECTION 01550 – TRAFFIC CONTROL</b>	
<b>SECTION 01610 – DELIVERY, STORAGE, AND HANDLING</b>	
<b>SECTION 01710 – CLEANING</b>	
<b>SECTION 01900 – MOBILIZATION AND DEMOBILIZATION</b>	
<b>SECTION 02200 – EARTHWORK</b>	
<b>SECTION 02220 – SALVAGE AND DEMOLITION</b>	
<b>SECTION 02221 – TRENCH EXCAVATION, BACKFILLING AND COMPACTION</b>	
<b>SECTION 02280 – UTILITY GRADE ADJUSTMENTS</b>	
<b>SECTION 02301 –BOULDERS AND ROCK MATERIALS</b>	
<b>SECTION 02630 - STORM DRAINAGE</b>	
<b>SECTION 02710 – AGGREGATE BASE COURSE</b>	
<b>SECTION 03300 – CONCRETE</b>	
<b>SECTION 03400 - MANHOLES, CATCH BASINS, DROP INLETS, AND APPURTENANCES</b>	

# **ADDITIONAL CONDITIONS**

## **AC1 SUMMARY OF WORK**

The Work to be done under these Specifications shall include the installation of all Contractor furnished materials and equipment necessary for, or incidental, to the transportation and delivery and installation of the waterline as indicated on the Plans and as specified herein for the construction of the **Johnson Lane Drainage Basins**.

The work shall also include all incidental, accessory, and/or supplemental work necessary for a complete and usable system.

## **AC2 LOCATION OF PROJECT**

This work shall be constructed in Douglas County, Nevada.

## **AC3 STANDARD SPECIFICATIONS**

By reference the "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" (Orange Book) as adopted by Washoe County, City of Sparks, City of Reno, Carson City and Douglas County are included in these Contract Documents as if included in part or whole.

## **AC4 CONTRACT CORRELATION**

In the event that the terms, provisions, conditions, specifications or requirements contained in one contract document should conflict with those contained in another contract document, then such conflict shall be resolved in accordance with the following order of precedence:

- A. Change Orders.
- B. Addenda.
- C. Special Provisions.
- D. The Plans.
- E. The General Provisions.
- F. The OWNER-CONTRACTOR Agreement.
- G. Standard Details for Public Works Construction, as adopted by Douglas County.

Specifications shall take precedence over notes on drawings. Large-scale drawings shall take precedence over smaller scale drawings.

## **SECTION 01012 – PRESERVATION, RESTORATION AND CLEANUP**

### **PART 1 – GENERAL**

#### **1.1 ROADS AND STREETS**

- A. At all times during the work, keep the premises clean and orderly, and upon completion of the work, repair all damage caused by equipment and leave the project free from all rubbish and excess material of any kind.
- B. Thoroughly clean all spilled dirt, gravel, or other material caused by the construction activities from all roads and streets at the end of each day.

**— END SECTION 01012 —**

## **SECTION 01060 – CODES, PERMITS, AND PREVENTION OF ENVIRONMENTAL POLLUTION**

### **PART 1 – GENERAL**

#### **1.1 CITY, COUNTY, AND STATE LAWS**

- A. The contractor shall comply with the requirements of all city, county, state and federal laws, whether or not stated herein, having specific control over this type of construction and operation.

#### **1.2 FEDERAL, STATE AND LOCAL POLLUTION CONTROL REGULATIONS**

- A. Meet all federal, state, and local pollution control regulations for all work performed under this contract. No lime, wet concrete, petroleum products, silt, organic material, or other deleterious materials are allowed to fall, flow, leach, or otherwise enter public waters.
- B. Observe all statutes, ordinances, and regulations pertaining to the prevention of environmental pollution and the preservation of public natural resources. All such statutes, ordinances, regulations, or portions thereof pertaining to work performed under this contract are hereby incorporated with and made a part of this contract.
- C. The Contractor shall be aware of these provisions and coordinate with the specific controlling agencies.
- D. The Contractor shall furnish all bonds and insurance required by the controlling agencies and shall, if requested, pay for any inspections and testing accomplished or furnished by them.

#### **1.3 PERMITS**

- A. The Owner will pay for the following permits:
  - 1. Site Improvement Permit, Douglas County, if one is required
  - 2. Building Permit, Douglas County, if one is required
  - 3. Access and Utility Easements, including the NDOT encroachment permit, if required

These permits will be applied for by the Owner. The Contractor shall be responsible for picking up permits from Owner or Douglas County.

- B. A copy of these permits, if available, can be reviewed by the Contractor at the Engineer's or Owner's office prior to the bid closing date. The Contractor shall be aware of the conditions of these permits, and shall

comply with their conditions, and any other regulations of the above agencies for any other agencies having jurisdiction over this type of work.

- C. The Contractor shall obtain the following permits:
  - 1. All permits required by regulatory agencies not identified above, if any, including but not limited to project SWPPP, Dust Control, etc.
- D. The Contractor shall furnish all bonds and insurance required by the controlling agencies, and shall, if requested, pay for any inspection and testing accomplished or furnished by them.
- E. All work performed within the jurisdiction of the controlling agencies, such as river banks and public waters, including restoration of surfaces, opening and closing of excavations and other work which could affect the hydraulics or fish life of the receiving waters, shall conform to the requirements and regulations of the various controlling agencies, and shall be subject to their approval. The Contractor shall coordinate all work with the controlling agencies.

#### **1.4 STATE AND FEDERAL SAFETY REQUIREMENTS**

- A. The Contractor shall include in the work all components and features required for both state and federal safety regulations. Such components and features shall include, but not be specifically limited to, any and all protective devices, guards, restraints, locks, latches, shoring, switches, and other safety provisions that may be required or necessitated by state and federal safety regulations. The Contractor shall determine the specific requirements for safety provisions and shall cause inspections and reports by the appropriate safety authorities to be conducted to insure compliance with the intent of the regulations.
- B. The Contractor shall perform all work in accordance with state and federal safety regulations. Any and all safety procedures and equipment shall be followed and utilized as may be required. All costs for components and features required to meet state and federal safety regulations shall be incidental to performance of the work.

**— END SECTION 01060 —**

## **SECTION 01150 - MEASUREMENT AND PAYMENT**

### **PART 1 – APPLICATIONS FOR PAYMENT**

#### **1.1 SUMMARY**

- A. General work included in this Section:
  - 1. Measurement and Payment.

#### **1.2 GENERAL**

- A. Submit Applications for Payment to Engineer in accordance with the schedule established by conditions of the Contract and Agreement between Owner and Contractor.
- B. Additional requirements specified elsewhere.
  - 1. Progress payments, retainages, and final payment: Conditions of the Contract and Agreement.
  - 2. Schedule of Values: Bid Form.

#### **1.3 FORMAT AND DATA REQUIRED**

- A. Submit applications per form including Application for Payment, or a similar form, with itemized data typed on 8-1/2" x 11" white paper continuation sheet.
- B. Provide itemized data on continuation sheet.
  - 1. Format, schedules, line items, and values: Those of the Schedule of Values.

#### **1.4 PREPARATION OF APPLICATION FOR EACH PROGRESS PAYMENT**

- A. Application form:
  - 1. Fill in required information, including that for Change Orders executed prior to the date of submittal application.
  - 2. Fill in summary of dollar values to agree with the respective totals indicated on the continuation sheets.
  - 3. Execute certification with the signature of a responsible officer of the Contractor's firm.
- B. Continuation Sheets:
  - 1. Fill in total list of all scheduled component items of work with item number and the scheduled dollar value for each item.
  - 2. Fill in the dollar value in each column for each scheduled line item when work has been performed or products stored.
    - a. Round off values to the nearest dollar.
- C. List each Change Order executed prior to the date of submission at the end of the continuation sheets.

1. List by Change Order number and description, as for an original component item of work.

#### **1.5 SUBSTANTIATING DATA FOR PROGRESS PAYMENTS**

- A. When Owner or Engineer requires substantiating data, Contractor shall submit suitable information, with a cover letter identifying:
  1. Project.
  2. Application number and date.
  3. Detailed list of enclosures.
  4. For stored products:
    - a. Item number and identification as shown on application.
    - b. Description of specific material.
- B. Submit one copy of data and cover letter for each copy of the application.

#### **1.6 PREPARATION OF APPLICATION FOR FINAL PAYMENT**

- A. Fill in application form as specified for progress payments.

#### **1.7 SUBMITTAL PROCEDURE**

- A. Submit Application for Payment to Engineer as described in General Conditions.
- B. Number: One original plus one copies of each application.
- C. When Engineer finds the application properly completed and correct, he will transmit a Certificate of Payment to the Owner.

### **PART 2 – BID ITEM CLARIFICATION SUMMARY**

#### **1. Mobilization and Demobilization (LS)**

- Mobilization consists of preparatory work and operations for movement of personnel, equipment and incidentals to the site for the beginning of work.
- Demobilization consists of work and operations necessary for movement of personnel, equipment and incidentals from the site upon completion of project improvements.
- All incidental work including providing and maintaining traffic control for the project.
- Provision of and installation of Project Construction Sign.
- Misc. Items such as farm gate not included in other bid items but called out on the plans.
- Erosion Control
- Payment for mobilization/demobilization will be made as follows:

- When 5% of the total original Contract amount is earned from other bid items, 50% of the amount of bid for mobilization/demobilization will be paid.
- When 10% of the total original Contract amount is earned from other bid items, 90% of the amount bid for mobilization/ demobilization will be paid.
- Upon completion of all work on the project, including completion of punch list work and submittal of record drawings by the Contractor, 100% of the mobilization/demobilization item will be paid.

**2. Clearing and Grubbing (LS)**

This item includes furnishing all labor, materials, tools, and equipment required to clear and grub each site to a satisfactory level, per acre. This bid item consists of, but is not limited to, the following:

- Stripping and clearing.
- Temporary site drainage.
- Removal of unwanted soil and vegetation.
- Dust control.
- Quality control.

**3. Earthwork (LS)**

Work included in this section shall include furnishing of all materials and labor necessary to complete Onsite grading as indicated, specified herein or on the Plans. The work of this item includes, but is not necessarily limited to, the following:

- Scarifying and re-compaction of native soils.
- Excavation for footings.
- Engineered fill and backfill as needed.
- Base fill under concrete flatwork.
- Finish site grading.
- Temporary site drainage.
- Dust Control.
- Quality Control.
- Offhaul/Import.

**4. Concrete Lined Inlet and Spillway (SF)**

This bid item includes furnishing all labor, materials, tools and equipment required to complete the work. This bid item consists of, but is not limited to, the following:

- Compacting top 6" of subgrade to 90% compaction.
- Installing 6" Type 2, Class B Aggregate Base at 95% compaction.
- Pouring 6" concrete with appropriate rebar and finish.
- Keying in edges with 2' stem wall.

**Exhibit G – Technical Specifications**

**Section 01150-3**



**5. Wire Fence (LF)**

This bid item includes furnishing all labor, materials, tools and equipment required to complete the work. This bid item consists of, but is not limited to, the following:

- Place 6" posts/footings.
- Install Galvanized Barbed Wire.
- Place braces.
- Install Mortise's with 60d ring-shank nail.

**6. 18" RCP Outlet Piping (LF)**

This bid item includes furnishing all labor, materials, tools and equipment required to complete the work. This bid item consists of, but is not limited to, the following:

- Place Class A Backfill and compact.
- Place 18" Reinforced Concrete Pipe.
- Place Warning Tape.

**7. 24" RCP Outlet Piping (LF)**

This bid item includes furnishing all labor, materials, tools and equipment required to complete the work. This bid item consists of, but is not limited to, the following:

- Place Class A Backfill and compact.
- Place 18" Reinforced Concrete Pipe.
- Place Warning Tape.

**8. Class 300 Riprap (LS)**

This bid item includes furnishing all labor, materials, tools and equipment required to complete the work. This bid item consists of, but is not limited to, the following:

- Placing geotextile fabric.
- Placing appropriately sized rip-rap to specified depth and dimensions.
- Laying bedding course.

**9. Class 400 Riprap (LS)**

This bid item includes furnishing all labor, materials, tools and equipment required to complete the work. This bid item consists of, but is not limited to, the following:

- Placing geotextile fabric.
- Placing appropriately sized rip-rap to specified depth and dimensions.
- Laying bedding course.

**10. Class 550 Riprap (LS)**

This bid item includes furnishing all labor, materials, tools and equipment required to complete the work. This bid item consists of, but is not limited to, the following:

- Placing geotextile fabric.
- Placing appropriately sized rip-rap to specified depth and dimensions.

**Exhibit G – Technical Specifications**

**Section 01150-4**

- Laying bedding course.
- 11. Class 700 Riprap (LS)**  
This bid item includes furnishing all labor, materials, tools and equipment required to complete the work. This bid item consists of, but is not limited to, the following:
- Placing geotextile fabric.
  - Placing appropriately sized rip-rap to specified depth and dimensions.
  - Laying bedding course.
- 12. 6" Type 2, Class B Aggregate Base Access Road (SF)**  
This bid item includes furnishing all labor, materials, tools and equipment required to complete the work. This bid item consists of, but is not limited to, the following:
- Compacting top 6" of subgrade to 90% compaction.
  - 6" Type 2, Class B Aggregate Base at 95% compaction.
- 13. Concrete Apron at Basin Inlet (SF)**  
This bid item includes furnishing all labor, materials, tools and equipment required to complete the work. This bid item consists of, but is not limited to, the following:
- Compacting top 6" of subgrade to 90% compaction.
  - Installing 6" Type 2, Class B Aggregate Base at 95% compaction.
  - Pouring 6" concrete with appropriate rebar and finish.
  - Keying in edges with 2' stem wall.
- 14. Concrete Weir at Emergency Spillway (SF)**  
This bid item includes furnishing all labor, materials, tools and equipment required to complete the work. This bid item consists of, but is not limited to, the following:
- Compacting top 6" of subgrade to 90% compaction.
  - Installing 6" Type 2, Class B aggregate Base at 95% compaction.
  - Pouring 6" concrete with appropriate rebar and finish.
  - Keying in edges with 2' stem wall.
- 15. Type 3R Catch Basin/Manhole (EA)**  
This bid item includes furnishing all labor, materials, tools and equipment required to complete the work. This bid item consists of, but is not limited to, the following:
- Compacting top 6" of subgrade to 90% compaction.
  - 6" Minimum of Drain Rock underneath structure.
  - Catch basin/Manhole Structure.
  - Drilling orifices.
  - Connecting to Outlet Pipe.
  - Adding Beehive Grate to top.

- 2' ring of concrete surrounding catch-basin at 6" deep.
- 16. 18" Flared End Section (EA)**  
This bid item includes furnishing all labor, materials, tools and equipment required to complete the work. This bid item consists of, but is not limited to, the following:
- Compacting top 6" of subgrade to 90% compaction.
  - 6" Minimum of Drain Rock underneath structure.
  - Install Flared Section.
- 17. 24" Flared End Section (EA)**  
This bid item includes furnishing all labor, materials, tools and equipment required to complete the work. This bid item consists of, but is not limited to, the following:
- Compacting top 6" of subgrade to 90% compaction.
  - 6" Minimum of Drain Rock underneath structure.
  - Install Flared Section.
- 18. 6" Concrete Access Road on 6" Agg Base (SF)**  
This bid item includes furnishing all labor, materials, tools and equipment required to complete the work. This bid item consists of, but is not limited to, the following:
- Grading to subgrade.
  - Compacting top 6" of subgrade to 90% compaction.
  - Installing 6" Type 2, Class B aggregate Base at 95% compaction.
  - Installing 6" concrete slab with appropriate rebar and finish.
  - Including  $\frac{3}{4}$ " chamfer around all edges and corners.
- 19. Native Vegetation Finish and Erosion Control (LS)**  
This item includes furnishing all labor, materials, tools, and equipment required to clear and grub each site to a satisfactory level, per acre. This bid item consists of, but is not limited to, the following:
- Final site drainage.
  - Laying revegetation mixture.
  - Installing permanent erosion control measures.
  - Dust control.
  - Quality control.

**20. Survey Staking (LS)**

This item includes furnishing all labor, tools, and equipment required to survey stake all items during construction. This bid item consists of, but is not limited to, the following:

- Control Verification Survey
- Rough Grade Staking and NEPA Boundary
- Access Road Staking
- Stake Storm Drain Improvements
- Final Grade Staking
- Rip Rap Staking
- Fence Staking
- Stake all items during construction as necessary for the contractor to complete the work required for the project.

**21. Force Account (EA.)**

Force account work is any additional work that may be required by the OWNER that is beyond the scope of work depicted in the Bid Schedule. The estimated, fixed cost for force account work will be added to the CONTRACTOR'S base bid.

**— END SECTION 01150 —**

## **SECTION 01300 - SUBMITTAL PROCEDURES**

### **PART 1 – GENERAL**

#### **1.1 SUMMARY**

- A. All equipment and materials shall be submitted to the Engineer for approval prior to purchase. The information that is required to be submitted shall include, but not be limited to, drawings, specifications, descriptive data, certificates and samples as required by the Engineer.
- B. Related Sections:
  - 1. General Conditions.
  - 2. Supplementary Conditions.

#### **1.2 CONTRACTOR'S RESPONSIBILITY**

- A. The Contractor shall be held responsible for the accuracy and completeness of each submittal. Prior to submitting any submittal for review, the Contractor shall review the submittal, indicate any deviations from the Contract Documents, cross out any information that does not directly relate to the item being submitted and sign the document certifying it has been reviewed by his Company.

#### **1.3 TRANSMITTAL PROCEDURE**

- A. The Contractor shall submit a minimum of four (4) copies of each submittal (unless additional copies are desired by the Contractor). In lieu of hard copies, the Contractor may submit electronic versions of all submittals and shop drawings for review. Electronic return of submittals will be the standard for all electronic version submittals. If no hard copies are submitted, no hard copies will be returned to the Contractor. The submittal will be reviewed for completeness and certified by the Engineer with one of the following.
  - 1. Approved.
  - 2. Approved as Noted.
  - 3. Rejected.
- B. If the Engineer finds the submittal in substantial compliance with the specification, he will certify the submittal "Approved". In this event, the Contractor may begin to implement the work method or incorporate the material or equipment covered by the submittal.
- C. If the Engineer marks the submittal "Approved as Noted", the Contractor may begin implementing the work method or incorporating the material and equipment covered by the submittal with the noted corrections.
- D. If the Engineer finds the submittal is not within the requirements of the specifications, it will be marked "Rejected" and annotated as to why it was

not approved. The Contractor must then revise his submittal to meet specifications and resubmit for approval.

- E. Only one hard copy of each submittal will be returned to the Contractor, unless submittals are made electronically. If the Contractor desires additional hard copies of reviewed submittals he shall provide them to the Engineer.
- F. Allow seven (7) days for the Engineer's initial review of each submittal. Where processing must be delayed to permit coordination with subsequent submittals, allow additional time. The Engineer will advise the Contractor promptly when a submittal being processed must be delayed for any reason.

**— END SECTION 01300 —**

## **SECTION 01310 - CONSTRUCTION SCHEDULES**

### **PART 1 – GENERAL**

#### **1.1 SUMMARY**

- A. General work included in this Section:
  - 1. Construction schedules.

#### **1.2 CONSTRUCTION SCHEDULES: GENERAL**

- A. Prepare and submit to the Engineer estimated progress schedules for the Work, with sub-schedules of related activities that are essential to its progress.
- B. The Contractor shall submit revised progress schedules based upon revisions in the progress and/or scheduling of Work, or as required by the Engineer.
- C. Owner may require Contractor to add to his plant, equipment, or construction forces, as well as increase working hours if operations fall behind schedule at any time during the construction period.

#### **1.3 FORM OF SCHEDULES**

- A. Prepare schedules in the form of a horizontal bar chart:
  - 1. Provide separate horizontal bar for each trade or operation.
  - 2. Horizontal time scale: Identify the first work day of each week.
  - 3. Scale and spacing: To allow space for notations and future revisions.
  - 4. Minimum sheet size: 8.5" x 11".
- B. Format of listings:
  - 1. The chronological order of the start of each item of work.

#### **1.4 CONTENT OF SCHEDULES**

- A. Show on construction progress schedule:
  - 1. The complete sequence of construction by activity.
  - 2. The dates for the beginning and completion of each major element of construction.
  - 3. Show for submittal schedules for shop drawings and product data.
  - 4. The dates for Contractor's submittals.
  - 5. The dates that submittals will be required from Engineer. Extensions of time for delays in submittal approval shall only be allowed as provided in Section 1340.
- B. Product delivery schedules:

1. Show the delivery dates for all major items of materials and equipment.

## **1.5 PROGRESS REVISIONS**

- A. Indicate progress of each activity to date of submission.
- B. Show changes occurring since previous submission of schedule:
  1. Major changes in scope.
  2. Activities modified since previous submission.
  3. Revised projections of progress and completion.
  4. Other identifiable changes.
- C. Provide a narrative report as needed to define:
  1. Problem areas, anticipated delays, and the impact on the schedule.
  2. Corrective action recommended, and its effect.
  3. The effect upon the schedule of other activities.

## **1.6 SUBMISSIONS**

- A. Submit initial schedules by the time of the preconstruction meeting.
- B. Submit revised progress schedules with each Application of Payment, or as required by the Engineer.
- C. The Contractor shall provide four copies of the schedule with each submittal.
- D. The Engineer shall review and comment on the submittal within seven days. If required, the Contractor shall resubmit within seven days after return of the review copy.

**— END SECTION 01310 —**



## **SECTION 01340 - SHOP DRAWINGS**

### **PART 1 – GENERAL**

#### **1.1 SUMMARY**

- A. General:
  - 1. This Section addresses submittal requirements for shop drawings, samples, and operation and maintenance materials.

#### **1.2 SUBMITTALS: GENERAL**

- A. Transmit all submittals to:  
  
Lumos & Associates  
800 East College Parkway  
Carson City, NV 89706  
Phone: (775) 883-7077  
Fax: (775) 883-7114  
Attn: Tim Russell
- B. All submittals shall contain a cover sheet or cover letter clearly representing the purpose and the item(s) submitted.
- C. Submittal information defining equipment and materials shall be specific to the products proposed. Generalized product information that does not clearly define specific equipment or materials to be used will be rejected. Submittals shall contain the manufacturer's recommendations for installation, where applicable or required.
- D. All shop drawings and material and equipment submittals shall contain an approval stamp from the Contractor.
  - 1. The stamp shall state that "[*Contractor name*] has examined and verified all field dimensions and measurements, field construction criteria, materials, and similar data, and that the Contractor has checked with the requirements of the Work and Contract Documents."
  - 2. All transmittals shall be made by the Contractor. Transmittals received from subcontractors and suppliers will receive no action.
- E. The submittal of shop drawings and samples shall comply with Section 6.17 of the General Conditions.
- F. Each transmittal shall contain two copies of a transmittal cover sheet clearly indicating the following:
  - 1. The Project Name.
  - 2. The Owner.
  - 3. The Engineer.
  - 4. Date transmitted.
  - 5. The transmittal identification number for each item.

6. A description of each item.
  7. Action requested.
- G. The Contractor shall submit a sample of the proposed transmittal cover sheets to the Engineer for comment, prior to submittal proceedings.

### **1.3 SHOP DRAWINGS SUBMITTALS**

- A. The requirements for shop drawing transmittals are as follows:
1. Cover sheets shall contain the information depicted in Section 1.2F.
  2. Each item transmitted shall be numbered consecutively beginning with "1".
  3. Resubmittals shall retain the original transmittal number, but be accompanied with a suffix letter starting with letter "A".
  4. Each transmittal cover sheet shall contain items within only one Specification Section or construction detail.
  5. Submit four copies of the submittal materials for the Engineer, plus the number of copies required by the Contractor.
  6. The first page of each item's submittal materials shall contain a 2" x 3" clear space for the Engineer's stamp.
  7. The Contractor's marks shall be on each copy of the transmittal.
  8. The contents of transmittals shall be coordinated and identified so that all items can be easily verified by the Engineer.
  9. Provide sufficient information together with technical cuts and technical data to allow an evaluation to be made to determine that the item is in compliance with the Contract Documents.
  10. Wherever possible, submit product data information on 8½" x 11" sheets.
  11. Indicate exact item or model, and all proposed items on product information sheets.
  12. Submittal information shall include legible scale details, sizes, dimensions, performance characteristics, capacities, test data, installation instructions, storage and handling instructions, color charts, layout drawings, parts catalogs, rough-in diagrams, wiring diagrams, controls, weights, and other pertinent data.
  13. If proposed products deviate from the specifications or drawings in any way, clearly note and justify the deviation, in detail, in a supplemental letter to the submittal. If an explanation is not provided, the shop drawing will be returned without action.

### **1.4 SAMPLE SUBMITTALS**

- A. Identify the sample as to manufacturer, item, use, type, project designation, tag number, specification section or drawing detail, color, texture, finish, and other pertinent data.
- B. Include specific installation and application instructions.

- C. Provide the Contractor's stamp of approval on samples as an indication of his checking and verification of dimensions and coordination with interrelated work.

## **1.5 OPERATION AND MAINTENANCE MANUALS AND EQUIPMENT MAINTENANCE SUBMITTALS**

- A. Operation and Maintenance Manuals are required for:
  - 1. Major equipment.
  - 2. Equipment with electric motors.
  - 3. Specialized equipment including control valves, instrumentation, control systems, meters, recorders, variable frequency drives, transmitters, etc.
- B. Transmittals for Operation and Maintenance Manuals shall be identified with consecutive numbers, starting with "1". The prefix OM shall be provided for the transmittal of O&M Manuals (i.e. "OM - #").
- C. Submit three (3) hard copies and one electronic copy of the Operation and Maintenance Manual.
- D. An acceptable O&M submittal will be retained by the Engineer. The transmittal cover sheet will be returned with a request for three additional copies.
- E. Deficient submittals will be returned along with the transmittal sheet. The deficient areas will be noted.
- F. O&M Manuals shall include, but are not necessarily limited to the following:
  - 1. Equipment function, normal operating characteristic, and limiting operations.
  - 2. Assembly, disassembly, installation, alignment, adjustment, and checking instructions.
  - 3. Operating instructions for start-up, routine and normal operations, regulation and control, shutdown, and emergency conditions.
  - 4. Lubrication and maintenance instructions.
  - 5. A guide to "troubleshooting".
  - 6. Parts list and predicted life of parts subject to wear.
  - 7. Outline, cross-section, and assembly drawings.
  - 8. Engineering data.
  - 9. Electrical diagrams, including elementary diagrams and interconnection diagrams.
  - 10. Test data and performance curves.
  - 11. A list of recommended spare parts.
  - 12. Copies of installation instructions, parts lists or other documents packed with equipment when it is delivered.
  - 13. Equipment record sheets recommended by the manufacturer.

## **PART 2 – EXECUTION**

### **2.1 SUBMITTALS: APPROVAL OR REJECTION**

- A. Submittals shall be reviewed for completeness and shall receive one of the following actions:
  - 1. “Approved”.
  - 2. “Approved As Noted”.
  - 3. “Rejected”.
- B. If the Engineer finds the submittal in substantial compliance with the Contract Documents, he will stamp the item submittal as “Approved”. The Contractor may begin to implement the work method or incorporate the products for shop drawings and sample submittals that are stamped as “Approved”.
- C. If the Engineer marks the submittal as “Approved As Noted”, the Contractor may begin implementing the work method or incorporating the material and equipment covered by the submittal with the noted corrections.
- D. If the Engineer finds the submittal is not within the requirements of the Contract Documents, it will be marked “Rejected” and annotated as to why it was not approved. The Contractor shall revise the submittal to be in compliance with the Contract Documents as resubmit for approval.
  - 1. Resubmittal shall be identified with the original identification number and shall include a suffix in accordance with Section 1.3A.
- E. Transmittals that are not stamped by the Contractor in accordance with Section 1.2 D will not be reviewed and will be returned with no action.
- F. Transmittals that are “Approved” or “Approved As Noted” will be distributed to the Owner’s field personnel. If for any reason the Contractor resubmits an approved item, the Contractor shall assure that previously approved documents are superseded by the resubmittal.

Transmittals that are “Rejected” will not be distributed. One copy of the transmittal will be marked up and returned to the Contractor.

**— END SECTION 01340 —**

## **SECTION 01550 – CONSTRUCTION TRAFFIC CONTROL**

### **PART 1 – GENERAL**

#### **1.1 DESCRIPTION OF WORK**

- A. The work to be performed in accordance with this section includes providing flagging services and pilot vehicles, furnishing, controlling, maintaining, moving, and removing barricades, warning signs, lights, signals, and pavement markings as required to provide safe and efficient vehicular and pedestrian passage through the work zone.

This consists of all work related to traffic control, including but not limited to: 1) preparation and submittal of traffic control plans; 2) providing traffic control during the project for all operations within the project area; and, 3) notification of residents and businesses that will have limited access during the work.

#### **1.2 QUALITY ASSURANCE**

- A. Related Documents:
1. MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION (MUTCD).
  2. Nevada Department of Transportation (NDOT) Standard Specifications for Road and Bridge Construction, latest edition.
  3. NDOT Signing and Marking Standard Drawings.
  4. NDOT Construction Standard Drawings.
- B. Related Sections
1. Supplemental General Conditions Section 17.08.

#### **1.3 SUBMITTALS**

- A. Traffic control plan. Supplemental conditions 17.08 outlines the requirements for any road closures or traffic control. A separate plan shall be submitted for each construction area.

The CONTRACTOR shall comply with the approved traffic control plan at all times. If an alternate traffic control plan is requested by the CONTRACTOR, the CONTRACTOR must prepare the necessary plans, submit to the necessary agency or agencies for approval, receive approval in writing, and provide ENGINEER with a copy of the approval before working in areas associated with the modified traffic control plan.

- B. Schedule. Provide complete traffic control plan schedule showing dates and times for traffic control changes that will be performed in conjunction with the work schedule.
- C. Responsible Employee(s). Provide the name(s) and after hours phone number(s) for the employee(s) responsible for implementation and maintenance of the traffic control plan to the OWNER and local law enforcement agency. The employee(s) shall be available at all times to make necessary changes and/or repairs to the traffic control facilities as required to maintain safe traffic control in and around construction areas.

## **PART 2 – MATERIALS**

### **2.1 GENERAL**

- A. All products, procedures and facilities shall be per MUTCD latest edition. All traffic control devices shall be high intensity.

### **2.2 SIGNS, BARRICADES, CHANNELIZING DEVICES AND LIGHTING DEVICES**

- A. MUTCD, part VI. Lighted barricades shall be properly maintained.

### **2.3 FLAGMEN**

- A. Competent, trained, and supplied with a combination STOP/SLOW sign, orange vest, and orange hard hat. Provide adjacent barricading devices where required. Flagmen shall be certified as required by State law and/or local codes and ordinances.

## **PART 3 – EXECUTION**

### **3.1 GENERAL**

- A. Provide adequate protection of all vehicular and pedestrian traffic and workmen through any and all portions of the construction zone where the construction operations interfere with, obstruct, or create a hazard to the normal movement of traffic.
  - 1. Where possible, two (2) lanes of traffic shall remain open at all times unless otherwise indicated.
  - 2. During Emergency situations, the OWNER may provide traffic control. The cost of any traffic control provided by the OWNER shall be borne by the CONTRACTOR.
  - 3. In the event that any employees of the OWNER are required to correct, repair, or modify any in-place traffic control by the

CONTRACTOR, it shall be the responsibility of the CONTRACTOR to reimburse the OWNER for any incurred costs.

### **3.2 PUBLIC NOTIFICATION**

- A. Public and Services. Notification procedures shall be per Supplemental General Conditions Section 17.08, and Section 1.02.C of Section 01900.

### **3.3 TRAFFIC CONTROL DEVICES**

- A. Place all necessary traffic control devices before any work is started. Move devices as necessary to keep up with the advancing operation. Place devices at the locations indicated on the traffic plan and in accordance with plan details and the MUTCD and as specified herein. Maintain devices; keep free from dirt, mud and roadway grime. Promptly replace all damaged devices.

### **3.4 FLAGMEN**

- A. Locate flagmen as indicated on the traffic control plan. Provide flagmen where traffic is required to stop and/or slow. Provide additional flagmen as required for site-specific traffic control conditions.

### **3.5 STOPPING TRAFFIC**

- A. Traffic shall not be stopped and held longer than absolutely necessary. Traffic shall not be stopped long enough to interrupt traffic at the nearest intersection or longer than 5 minutes unless otherwise approved by the OWNER.

### **3.6 ADJUSTMENT TO THE TRAFFIC CONTROL PLAN**

- A. At any time, the OWNER may request that adjustments be made to the traffic control plan layout or signage. The CONTRACTOR shall immediately make all adjustments and provide all signage required. No additional compensation or payments will be made for adjustments to the traffic control plan.

**END SECTION – 01550**

## **SECTION 01610 - DELIVERY, STORAGE, AND HANDLING**

### **PART 1 – GENERAL**

#### **1.1 SUMMARY**

- A. This Section includes:
  - 1. Scheduling of product delivery.
  - 2. Packaging of products for delivery.
  - 3. Protection of products from damage for:
    - a. Handling.
    - b. Exposure to element or harsh environments.
- B. Payment:
  - 1. No payment will be made to Contractor for equipment or materials not properly stored and insured or without approved shop drawings.
  - 2. Previous payments for items will be deducted from subsequent progress estimates if proper storage procedures are not observed.

#### **1.2 DELIVERY**

- A. Scheduling:
  - 1. Schedule delivery of products or equipment as required to allow timely installation and to avoid prolonged storage.
- B. Packaging:
  - 1. Deliver products or equipment in manufacturer's original unbroken cartons or other containers designed and constructed to protect the contents from physical or environmental damage.
- C. Identification:
  - 1. Clearly and fully mark and identify as to manufacturer, item, and installation location.
- D. Protection and Handling:
  - 1. Provide manufacturer's instructions for storage and handling.

### **PART 2 – OWNER PURCHASED MATERIALS**

#### **2.1 GENERAL**

- A. The Owner will not purchase any materials directly as it relates to this project, any provisions related to the acceptance, review, inspection, etc of Owner supplied materials will not be enforced.

#### **2.2 INSTALLATION CONTRACTOR RESPONSIBILITIES**

- A. The Contractor shall be prepared to remove all coverings, containers, or crate, as necessary from new materials.



- B. The Contractor shall store all Owner provided materials in accordance with Manufacture recommendations. The Contractor's insurance shall cover the cost of the owner furnished equipment after a delivery acceptance inspection has been completed.
- C. The Contractor shall install Owner-furnished materials as shown and specified and in accordance with the Supplier-provided installation instructions.
- D. The Contractor shall test and commission the owner furnished materials.
- E. The Contractor shall oversee the troubleshooting of any problems identified in the owner furnished materials installation during testing and commissioning. The Contractor shall request assistance directly from the Supplier if problems occur with the owner furnished materials.

### **2.3 CONTRACTOR DELIVERY ACCEPTANCE**

- A. At the time of delivery of Owner supplied materials by the Supplier, the Contractor and the Project Inspector (or Project Engineer), shall jointly inspect all materials. The Contractor shall record the condition of the received materials and shall take pictures of the materials as warranted. Unless the Inspector, Contractor, or Engineer determines that the materials are damaged, or otherwise unacceptable for installation, the materials shall become part of the contract at the conclusion of delivery acceptance inspections as if it has been furnished by the Contractor. Contractor shall be responsible for the care and protection of the furnished materials until final acceptance.
- B. The Contractor will be responsible for and coordinate shipment, delivery, storage requirements, and all other arrangements necessary to deliver and install all materials furnished under the contract to the construction site.
- C. The Supplier shall provide the original installation manuals to both the Contractor and Owner. The Supplier shall provide an O&M Manual for all materials associated with the project.
- D. Correcting and repairing any damage resulting from the Contractor's mishandling of the furnished materials shall be the sole responsibility of the Contractor.
- E. The Contractor shall coordinate directly with the Supplier in the troubleshooting of any problems identified during testing and commissioning of the Owner furnished materials. The Supplier will correct any problems identified in the materials identified during installation, testing, or commissioning, provided the problem is not in any way due to the Contractor's actions from installing or testing of the materials.

## **PART 3 – EXECUTION**

### **3.1 PROTECTION, STORAGE AND HANDLING**

- A. Manufacturer's instruction:
  - 1. Protect all products or equipment in accordance with manufacturer's written directions.
    - a. Store products or equipment in location to avoid physical damage to items while in storage.
    - b. Handle products or equipment in accordance with manufacturer's recommendations and instructions.
  - 2. Protect equipment from exposure to elements and keep thoroughly dry.

### **3.1 FIELD QUALITY CONTROL**

- A. Inspect deliveries:
  - 1. Inspect all products or equipment delivered to the site prior to unloading. Reject all products or equipment that are damaged, used, or in any other way unsatisfactory for use on the project.
- B. Contractor shall provide temporary storage facilities, as required, for the protection of stored materials.
- C. Monitor storage area:
  - 1. Monitor storage area to ensure suitable temperature and moisture conditions are maintained.

**— END SECTION 01600 —**

## **SECTION 01710 - CLEANING**

### **PART 1 – GENERAL**

#### **1.1 SUMMARY**

- A. Section includes:
  - 1. Intermediate and final cleaning of Work not including cleaning of systems specified elsewhere.

#### **1.2 STORAGE AND HANDLING**

- A. Store cleaning products and cleaning wastes in containers specifically designed for those materials.

#### **1.3 SCHEDULING**

- A. Schedule cleaning operations so that dust and other contaminants disturbed by cleaning process will not fall on newly painted surfaces.

### **PART 2 – PRODUCTS**

#### **2.1 MATERIALS**

- A. Cleaning agents:
  - 1. Compatible with surface being cleaned.
  - 2. New and uncontaminated.
  - 3. For manufactured surfaces use cleaning materials recommended by the manufacturer.

### **PART 3 – EXECUTION**

#### **3.1 CLEANING – GENERAL**

- A. Prevent accumulation of wastes that create hazardous conditions.
- B. Conduct cleaning and disposal operations to comply with laws and safety orders of governing authorities.
- C. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains or sewers.
- D. Dispose of degradable debris and non-degradable debris at an approved solid waste disposal site.
- E. On completion of work, leave area in a clean, natural looking condition. Remove all signs of temporary construction activities incidental to construction of required permanent Work.
- F. Do not burn on-site.

### **3.2 INTERIOR CLEANING**

- A. Cleaning during construction:
  - 1. Keep work areas clean so as not to hinder health, safety or convenience of personnel at the project site.
  - 2. As a minimum, dispose of waste materials, debris, and rubbish on a weekly basis.
  - 3. Vacuum clean interior areas when ready to receive finish painting. Continue vacuum cleaning on an as-needed basis, until substantial completion.
- B. Final Cleaning:
  - 1. Remove grease, mastic, adhesives, dust, dirt, stains, labels, and other foreign materials from sight-exposed surfaces.
  - 2. Wipe all lighting fixture reflectors, lenses, lamps and trims clean.
  - 3. Polish glossy surfaces to a clear shine.
  - 4. Ventilation systems:
    - a. Clean permanent filters and replace disposable filters if units were operated during construction.
    - b. Clean ducts, blowers and coils if units were operated without filters during construction.
  - 5. Replace all burned out lamps.
  - 6. Broom clean and/or mop floor areas.

### **3.3 EXTERIOR CLEANING**

- A. Cleaning during construction:
  - 1. Construction debris:
    - a. Confine in strategically located container(s).
    - b. Cover containers to prevent blowing of debris.
    - c. Haul containers from site a minimum of once per week.
  - 2. Dispose debris to container(s) daily.
  - 3. Take special precautions to dispose of loose debris under windy or adverse weather conditions.
  - 4. Vegetation on the project site will shall be maintained and trimmed as necessary.
  - 5. Soils, sand, and gravel shall be removed from paved and sidewalk areas, as necessary, to prevent muddy, dusty, or nuisance conditions. Materials shall not be flushed into storm sewer systems.
- B. Final cleaning:
  - 1. Remove trash and debris containers from site.
  - 2. Clean paved roadways.

### **3.4 FIELD QUALITY CONTROL**

- A. Routine monitoring of site conditions shall be conducted by the field representative. Deviations from requirements shall be promptly rectified by the Contractor.

- B. The project superintendent is expected to control conditions that may result in creating nuisance conditions within the developed residential neighborhood.

**— END SECTION 01710 —**

## SECTION 01900 – MOBILIZATION/DEMOBILIZATION

### PART 1 – General

#### 1.1 SCOPE

- A. Mobilization shall consist of preparatory work and operation, including but not limited to, those tasks necessary for the movement of personnel, equipment, supplies, and incidentals to and from the site, for the establishment of offices, buildings and other facilities necessary for work on the project; for premiums on bonds and insurance for the project and for all other work and operations which must be performed or costs incurred before beginning production work on the various contract items.

Demobilization at the finish of the job shall include the removal of all construction equipment, restoration of the site, and removal of all miscellaneous construction debris.

#### 1.2 SUBMITTALS

- A. The CONTRACTOR shall provide a notice to all affected residents and businesses. The CONTRACTOR shall submit a sample of the notice to the Owner for review and approval prior to, but no later than, the time of the preconstruction conference. It shall provide the following information:

PROJECT NAME:

ENGINEER'S NAME: Lumos & Associates.

PROJECT ENGINEER's Contact - 883-7077

CONTRACTOR's Name –

CONTRACTOR's Contact –

CONTRACTOR's Phone# -

Brief description of work, and Tentative Schedule with estimated completion date.

The notice is to be distributed at least 48 hours prior to any construction activities.

The CONTRACTOR shall prepare and distribute revised notices to residents if there are revisions to the construction schedules.

- B. The CONTRACTOR shall provide one (1) copy to the ENGINEER of any written agreements with a property OWNER for the areas used for material and equipment storage or staging if located on private property.
- C. A copy of the approved Notice shall be provided to the Owner at their office.
- D. A copy of the approved Notice shall be provided to the ENGINEER.

## **PART 2 – PRODUCTS**

### **2.1 GENERAL**

- A. Materials shall consist of equipment, buildings, and tools necessary to move to the project site to perform work.

## **PART 3 – EXECUTION**

### **3.1 GENERAL**

- A. Setting up of offices, and the use of private property for storage or work area shall be executed in a legal manner in accordance with local and state codes and ordinances.
- B. Remove all equipment, offices, materials and facilities used for the construction of the PROJECT upon PROJECT completion. Leave areas used in a condition as good as or better than when encountered.

**END SECTION – 01900**

## **SECTION 02200 - EARTHWORK**

### **PART 1 – GENERAL**

#### **1.1 WORK RELATED**

- A. Work included in this section shall include furnishing of all materials and labor necessary to complete Earthwork as indicated, specified herein or on the Plans. The work of this section includes, but is not necessarily limited to, the following:
  - 1. Stripping and clearing.
  - 2. Scarifying and re-compaction of native soils.
  - 3. Excavation for footings.
  - 4. Engineered fill and backfill.
  - 5. Base fill under slabs on grade.
  - 6. Finish site grading.
  - 7. Temporary site drainage.
  - 8. Dust control.
  - 9. Quality control.

#### **1.2 CONTRACTOR'S RESPONSIBILITY**

- A. The CONTRACTOR shall attentively examine the site in such a manner that he can confirm existing surface conditions with those presented in the Soils Report (if one exists). He shall satisfy himself that the quality and quantity of exposed materials and subsurface soil or rock deposits have been satisfactorily represented by the Civil Engineers' drawings. Any discrepancy that may be of prior knowledge to the CONTRACTOR or that is revealed through his investigations shall be made available to the OWNER. The selection of equipment for use of the project and the order of work will similarly be his responsibility such that the requirements included in the following sections have been met.

#### **1.3 REFERENCE STANDARDS**

- A. Standard Specifications: Standard Specifications for Public Works Construction as adopted by Douglas County (Orange Book) most recent edition.

ASTM D2922 – Compaction Testing in Place by Nuclear Methods.  
ASTM D 1557 – Moisture Density Relationship of Compacted Soils.

- B. Where referred to herein, relative compaction shall mean the in-place dry density of soil expressed as a percentage of maximum dry density of the same material, as determined by ASTM D 1557 Moisture Density Relationship Test Procedure. Optimum moisture content shall mean the moisture content corresponding to maximum dry density as determined above.



#### **1.4 QUALITY CONTROL**

- A.) OWNER shall retain and pay a qualified testing laboratory to test all fill or backfill materials to be used by the CONTRACTOR during construction.
- B. OWNER shall retain and pay a qualified testing technician to test compaction of sub-grade and fill materials as directed by the OWNER's representative. Frequency of testing shall be in conformance with Orange Book requirements.
- C. When compacted soils and materials fail to meet the requirements of the specifications, the CONTRACTOR shall pay for any and all retesting of said compacted soils and materials.
- D. If, during the progress of work, tests indicate that compacted materials do not meet specified requirements, or if materials display any adverse conditions, i.e. pumping, excessive or insufficient water content, excessive debris, poor or improper gradation etc. or if materials are determined by the ENGINEER or Technician to be different than those specified, CONTRACTOR shall remove, replace and retest materials and work at no cost to the OWNER.

#### **1.5 SUBMITTALS**

- A. Test Reports: CONTRACTOR shall submit current test reports on all fill or backfill materials for approval, at least 14 days prior to the start of work.

#### **1.6 SITE CONDITIONS**

- A. Information presented in the Contract Documents regarding existing site conditions is believed to be correct, but is not guaranteed. CONTRACTOR shall visit the site for the necessary information and data regarding present ground levels, conditions of the property, location and size of obstructions, and location of adjacent streets, utilities, etc.
- B. CONTRACTOR shall assume all responsibility for damage to buildings, utilities, streets, etc., that may be caused by his work. CONTRACTOR shall refer to drawings and confer with OWNER for the location of existing utilities, etc.

#### **1.7 PROTECTION**

- A. CONTRACTOR shall protect existing streets, utilities, benchmarks, buildings and other features or facilities on or adjacent to the site from damage from the work of this section where such items are to remain. Any damage to the above shall be immediately repaired by the CONTRACTOR in a manner approved by the OWNER's representative.
- B. The CONTRACTOR shall provide, install, and maintain all barricades, shoring, bracing, etc., as required by Federal and State and local codes.

## **1.8 UTILITY SERVICES**

- A. When encountered in the work, the CONTRACTOR shall perform the following:
  - 1. Protect existing active sewer, water, electric, gas, telephone or other utility services or underground improvements. If existing active services are not indicated, but are encountered, request instructions from the OWNER's representative. Do not proceed until instructions are obtained.

## **1.9 DUST ABATEMENT**

- A. CONTRACTOR shall take adequate measures at all times during construction to abate dust on the site. Provide watering from trucks, sprinklers, hoses or the like at sufficiently frequent intervals to preclude dust.

## **1.10 EXCAVATION VARIATIONS**

- A. CONTRACTOR shall notify the OWNER's representative immediately if abnormal or questionable soil conditions are encountered, and shall not proceed with the work until so directed by the OWNER's representative. Procedures are as follows:
  - 1. Additional Excavation: When soil nature is such that good bearing cannot be found at sub-grade levels indicated, additional excavation to good bearing soil may be necessary. Should additional excavation be required, it will be ordered in writing. Additional excavation will be paid for at a price negotiated prior to the start of work.
  - 2. Unauthorized Excavation: Where excess or unauthorized excavation takes place beyond indicated lines, CONTRACTOR shall grade and fill to indicated sub-grades in accordance with the provisions of this section at no extra cost to the OWNER or OWNER's representative.

## **PART 2 – PRODUCTS**

### **2.1 CLASS A**

- A. Class A Bedding shall meet requirements of section 200.03.02 of the Standard Specifications for Public Works Construction.

### **2.2 CLASS C**

- A. Class C Backfill shall meet requirements of section 200.03.04 of the Standard Specifications for Public Works Construction.

### **2.3 AGGREGATE BASE**

- A. Aggregate Base shall meet requirements of section 200.03.01 of the Standard Specifications for Public Works Construction for Type II, Class B, Aggregate Base.

### **2.4 NATIVE BACKFILL**

- A. On-site materials free of organics and debris are allowed. All rocks and cobbles with a diameter greater than 3 inches shall be removed prior to placement of backfill.

## **PART 3 – EXECUTION**

### **3.1 SITE PREPARATION**

- A. CONTRACTOR shall locate all utilities and improvements to remain.

### **3.2 SUB-GRADE SOIL PREPARATION**

- A. Prior to the placement of any compacted backfill, engineered fill, compacted base material, etc., CONTRACTOR shall scarify and moisture condition to within 2% of optimum moisture content, then compact subgrade soils to at least 90% relative density.

### **3.3 EXCAVATION**

- A. CONTRACTOR shall excavate to lines, grades and dimensions indicated or otherwise required to accommodate the work.
- B. Excavation shall extend a sufficient distance from the walls to allow for placing and removal of forms, placing reinforcing, installation of services, and for inspection. Sides of footings must be formed. Remove all loose material immediately before the concrete is placed.

### **3.4 ENGINEERED FILL AND BACKFILL**

- A. CONTRACTOR shall remove water from areas to receive engineered fill and backfill before commencing work and keep areas free of water during filling and compaction. Fill and back-filling operations shall be carried out as follows:
  - 1. Placement of fill, backfilling or compacting of soils during freezing weather shall not occur except by permission of the ENGINEER or his representative. No backfill or fill materials shall be installed on frozen surfaces, nor shall frozen materials, snow, or ice be placed in any backfill. Provide protection as necessary during freezing weather.
  - 2. Place all fill material in lifts of not more than 8 inches loose material thickness, moisture condition material to within 2% of optimum moisture content and compact by approved means to 90% relative density.

### **3.5 SLAB BASE**

- A. CONTRACTOR shall: Provide aggregate base compacted to a depth of no less than 6 inches under all concrete slabs-on-grade, vaults, manholes, and concrete site work. Before placing the fill, smooth and level the surface of the existing soil and thoroughly compact as required for engineered fill. Place base material in one lift, moisture condition to within 2% of optimum moisture content and compact to not less than 95% relative density.

### **3.6 COMPACTION**

- A. Compaction as specified shall be obtained using suitable equipment designed for the work specified. The CONTRACTOR shall be responsible for selecting the type of equipment to be used.
- B. Compaction of each layer shall be continuous over the entire area of the fill. Compaction shall be carried out on lifts placed as level as possible. In areas where finished grade exceeds 5:1 slope lifts shall be "staircased" to ensure a level compacting surface.

### **3.7 FINISH GRADING**

- A. The areas within the grading limits shall be graded to the lines and levels shown on the Plans. Finish grade shall be uniform, smooth, and well compacted, free from trash, debris and rocks over two inches in diameter. Finish grades shall not vary more than one inch from indicated elevations.

### **3.8 CLEANUP**

- A. During the progress of the work, the CONTRACTOR shall keep the entire job site in a clean and orderly condition. Excess or unsuitable backfill material, broken pipe, or other waste material shall be removed from the job site within one week. Spillage resulting from hauling operations along or across existing streets or roads shall be removed immediately by the CONTRACTOR. All gutters and roadside ditches shall be kept clean and free from obstructions. Any deviation from this practice shall have prior approval from the OWNER. In area where excessive dust is a nuisance, the CONTRACTOR shall as often as necessary wet down the area to prevent dusty conditions as specified in the Special Conditions. This includes weekends and holidays.
- B. Before final acceptance of the work, the CONTRACTOR shall carefully clean up the work and the premises, remove all temporary structures, such as portable berms, built by or for him, remove all surplus construction materials and rubbish of all kinds from the grounds which he has occupied, and leave them in a neat condition. All drainage ditches shall be restored to their original condition, free of backfill and excavation material, and fully capable of passing storm runoff as in original condition.

- C. Daily cleanup of trash, paper, and small debris subject to movement with winds will be required.

**— END SECTION 02200 —**

## SECTION 02220 – SALVAGE AND DEMOLITION

## PART 1 – GENERAL

## 1.1 SUMMARY

- A. Section Includes: Sawcut, removal, abandonment and disposal of various existing improvements, such as pavements, structures, existing water lines, pipes, curbs and gutters, landscaping, and other items necessary for completion of the work, not scheduled for salvage.
- B. Related Sections
- |    |                         |               |
|----|-------------------------|---------------|
| 1. | Aggregate Base Course   | Section 02710 |
| 2. | Asphalt Concrete Paving | Section 02740 |
| 3. | Concrete                | Section 03300 |
- C. Applicable Additional Specifications. SSPWC "Orange Book" Section 301 – Removal of Existing Improvements.

## PART 2 – PRODUCTS

## 2.1 MATERIALS

- A. Provide all materials and equipment required to complete the work per SSPWC and included herein.

## PART 3 – EXECUTION

### 3.1 LIMITS OF WORK

- A. Confine limits of existing improvements to the limits of the construction area.

### 3.2 PROTECTION OF PROPERTY

- A. Protect existing improvements, adjacent property, utilities, trees, plants, and any other existing items which are not specifically intended to be removed.
- B. Repair all damage to existing improvements not scheduled for demolition or salvage.

### **3.3 DISPOSAL**

- A. All materials resulting from demolition shall be disposed of in the appropriate manner. Disposal shall meet all state and local codes.

### **3.4 SALVAGE**

- A. Prior to the removal of any piping, structures, pumps, electrical components, or miscellaneous appurtenances, the Project Engineer, an Owner's representative, and the Contractor shall review the items to be removed from the project area and the Project Engineer shall clearly mark each item designated for demolition.
- B. The Owner will identify any items to be salvaged during the walkthrough with the Project Engineer and Contractor. The Contractor shall palletize and stockpile onsite any items designated for salvage by the Owner. The Contractor shall use care when salvaging items for the Owner but shall not be responsible for the replacement of any items accidentally damaged during the salvage operations.
- C. Salvage may include any asphalt grindings or off-haul excess soil. The Owner will notify the Contractor of a location that asphalt grindings or other excess off-haul soil may be disposed of at no additional cost to the Owner, should the Owner desire to retain control and ownership of the grindings or over-haul soil. Should the Owner not desire to retain these materials the Contractor shall disposed of them in an appropriate manner at no cost to the Owner.

### **3.5 CONSTRUCTION METHODS**

- A. Removal of Existing Portland Cement Concrete Curbs, Gutters, Sidewalks, and other pavements. Sawcut concrete to the match-lines as indicated on the plan or as required. Sawcut neat, vertical, true lines in such a manner that the adjoining surface will not be damaged. Sawcut to the full depth of the existing concrete. The existing concrete to be removed shall be disposed off-site in an approved landfill.
- B. Removal of Existing Asphalt Concrete Pavement for Asphalt Concrete Patch Repair. Sawcut asphalt concrete to the match lines shown on the plans, or as required, in accordance with 3.5.A above. Deep milling may also be utilized for asphalt concrete pavement removal in areas where feasible.
- C. Miscellaneous Removals. Perform all miscellaneous removals to construct the new improvements as required.
- D. The demolition of existing utility facilities will need to be coordinated with the Owner to ensure that utility operations are not impacted or are minimized to an extent acceptable to the Owner.

**END SECTION - 02220**

## **SECTION 02221 - TRENCH EXCAVATION, BACKFILLING AND COMPACTION**

### **PART 1 – GENERAL**

#### **1.1 DESCRIPTION**

- A. This section provides addition specifications for materials and work involved in TRENCH EXCAVATION BACKFILLING AND COMPACTION.
- B. Trench excavation shall include the removal of all materials or obstructions of any nature, the installation and removal of all sheeting and bracing and the control of water necessary to construct the work as shown. Unless otherwise indicated on the Plans or permitted by the ENGINEER or his representative, excavation shall be by open cut. Trenching machines may be used, except where their use will result in damage to existing facilities.
- C. Trench excavation work shall be performed in a safe and proper manner with suitable precautions being taken against hazards of every kind. Trench excavations shall provide adequate working space and clearances for the work to be performed therein, and for installation and removal of sheeting and shoring that may be required.
- D. Prior to commencing excavation, the CONTRACTOR shall have materials, labor and equipment on the job site suitable for making emergency repairs to the existing system, should the existing facilities be damaged by the CONTRACTOR's operations.

#### **1.2 RELATED SECTIONS SPECIFIED ELSEWHERE**

- A. Section 2200 – EARTHWORK

#### **1.3 SUBMITTALS**

- A. The CONTRACTOR shall submit testing reports, prepared by a qualified testing laboratory, for all bedding and aggregate base materials, prior to commencement of work, including information on location of the source of material.

### **PART 2 – MATERIALS**

#### **2.1 BEDDING**

- A. The pipe bedding material, within the pipe zone, shall clean, granular material conforming to the following gradation and requirements of Class A Material:

<u>Sieve Size of Opening</u>	<u>Percent Passing</u>
3/8 inch	100
No. 4	90-100



No. 50	10-40
No. 100	3-15
No. 200	0-7

- B. Sieve analysis and a moisture-density curve of bedding material shall be paid for by the CONTRACTOR and a copy of the results provided to the ENGINEER/OWNER before placement commences. In the absence of such excavated select backfill material, suitable bedding material (sand) shall be imported. Sand shall be free from foreign materials such as dirt, clay, rocks, sticks or vegetation.

## **2.2 TRENCH BACKFILL**

- A. All trenches shall be backfilled after pipe fittings and appurtenances have been installed, inspected and approved for backfill.
- B. All wood, debris and waste material shall be removed from excavation preparatory to backfilling. Backfill material shall be approved in all cases by the ENGINEER and shall be free of trash, wood, rocks greater than 3" and any other objectionable debris. Backfilling shall include the refilling and compacting of the fill in trenches or excavations up to the subgrade of the roadway or to the existing ground surface. All backfill above the pipe zone shall not exceed 8-inch maximum lifts of loose material and shall be compacted throughout to a minimum of 90% relative density. Backfill under roadways shall be compacted to 95% relative density except where noted in the plans.

## **PART 3 – EXECUTION**

### **3.1 TRENCH CONFIGURATION AND ALIGNMENT**

- A. Trenches and other excavations shall have the minimum width which the CONTRACTOR can effectively excavate and install the improvements. Excessive widths will not be permitted. Trenches shall have a recommended width between twelve (12) and twenty-four (24) inches greater than the outside diameter of the pipe to be installed. Deviations from this recommended width must be submitted to the ENGINEER in writing for approval.

### **3.2 PIPE BEDDING**

- A. Prior to placement of bedding material, the Contractor shall proof-roll to detect the presence of soft or pumping subgrade soils. The Contractor shall stabilize the subgrade with drain rock or crushed rock in accordance with the Plans, or as directed by the Engineer.
- B. The pipe bedding shall be brought to optimum moisture content and compacted to 90% density. The OWNER shall pay for initial compaction tests. All test reports shall be submitted to the OWNER prior to acceptance of the project.

### **3.3 PROCEDURE AT PIPE ZONE**

- A. After center loading the pipe to prevent lateral movement, select granular excavated material, specified under 2.1 - Bedding, shall be placed in the trench simultaneously on each side of the pipe for the full width of the trench in layers not to exceed the spring line of the pipe. Each layer or lift shall be compacted to at least 90% of maximum density evenly, on each side of the pipe throughout the pipe zone. The pipe zone is to extend from bottom of the excavation to 12 inches above the top of the pipe and shall be backfilled with select material as specified herein.

### **3.4 PROCEDURE ABOVE PIPE ZONE**

- A. From 12 inches above the top of pipe to the top of the trench or pavement structure, pipe backfill shall consist of suitable excavation material or Type 2 base materials, and no oil cake, bituminous pavement, concrete, rock or other unacceptable material shall be used in the backfill unless these materials are scattered and do not exceed 2 inches in any dimension. Material of perishable, spongy or otherwise improper nature shall not be used in backfilling and no material greater than 2 inches in any dimension shall be placed within 1 foot of any pipe, manhole or structure.
- B. Backfill above the pipe zone and within street rights-of-way, except State Highways, shall be compacted in accordance with Section 305.14 of the Standard Specifications for Public Works Construction and the Details provided in the plans.

### **3.5 SHEETING AND SHORING**

- A. Excavation for trenches shall be properly and substantially sheeted, braced, and shored as required by OSHA and State Standards. Sheet piling, bracing, and shoring shall be designed and built to OSHA standards to withstand all loads that might be caused by earth movement or pressure and shall be rigid, maintaining shape and position under all circumstances.
- B. During backfilling, any shoring shall be carefully removed by the CONTRACTOR in such a manner as will result in a minimum of caving, lateral movement, or flowing of the soil. On approval of the ENGINEER, the CONTRACTOR may leave shoring in place, but in such an event, no payment will be made by the OWNER for such materials left in place. Where trench shoring is left in place, it shall not be braced against the pipe.

### **3.6 DISPOSAL OF EXCESS EXCAVATED MATERIALS**

- A. Disposal of excess excavated material shall be the responsibility of the CONTRACTOR.

### **3.7 BLASTING**

- A. No blasting will be permitted without the approval of the ENGINEER. When blasting is permitted, it shall be done only by skilled operators and under the direction of a competent, properly licensed foreman. Blasting will be permitted only when proper precautions are taken for the protection of persons, the work, and existing structures. Any damage done to persons, private property, the work, or existing structures shall be the responsibility of the CONTRACTOR.
- B. Blasting shall be done with explosives of such power and in such quantities and positions as not to make the excavation unduly large, or to shatter the faces of cuts which are to remain open. Excessive blasting or "overshooting" will not be permitted, and any material outside the authorized cross-section which may be shattered or loosened by blasting shall be removed and replaced with earth as herein specified, at the CONTRACTOR's expense. The ENGINEER shall have authority to require the CONTRACTOR to discontinue any method of blasting which leads to overshooting or is dangerous to the public or destructive to property or to natural features.
- C. Permits for blasting shall be obtained and paid for by the CONTRACTOR.

### **3.8 MAXIMUM LENGTH OF OPEN TRENCH**

- A. Open trench at any one time shall be limited to 200 feet in areas readily accessible to the public; any exception to this requirement shall require the ENGINEER's approval with the strict understanding that no trench will remain uncovered at the end of each working day.
- B. Trenching or excavation shall not be allowed to remain open during the hours of darkness or on weekends, holidays or other periods when work is not in progress. During such periods, trenching or excavations shall be backfilled to the surrounding grade or completely covered with steel plating or other suitable material, such as cold road-mix asphalt pavement. With prior concurrence of the ENGINEER that such measures are impracticable, the CONTRACTOR may erect sound and substantial fencing or barricades completely around the periphery of such trenching or excavations to the satisfaction of the ENGINEER, or install adequate trench plates over all open trenching with the approval of the ENGINEER.

### **3.9 CONTROL OF WATER**

- A. When water is encountered, the CONTRACTOR shall furnish, install, maintain and operate all necessary machinery, appliances, and equipment to keep excavations free from water until the placing of the bedding material, laying and jointing of the pipe, pouring of concrete, and placing of the backfill material has been completed, inspected, and approved and all danger of flotation and other damages are removed. Groundwater pumped from the trench shall be disposed of in such a manner as will not cause injury to public or private property, or constitute a nuisance or menace to the public, and shall be subject to the approval of the ENGINEER.

### **3.10 REPAIRS REQUIRED BY TRENCH SETTLEMENT**

- A. If, at any time during a period of one (1) year dating from the date of final acceptance of the project, there shall be any settlement of the trenches requiring repairs to be made, or should any other defect appear in the system due to negligence or carelessness on the part of the CONTRACTOR, the OWNER will notify the CONTRACTOR to immediately make such repairs as may be deemed necessary at the CONTRACTOR's expense.

### **3.11 SPECIAL FOUNDATION TREATMENT**

- A. Whenever the bottom of the trench is soft, yielding, or in the opinion of the ENGINEER otherwise unsuitable as a foundation for the pipe, the unsuitable material shall be removed and replaced with suitable excavated material or crusher run gravel. Payment of this work will be made only if the bottom of the trench has become unstable due to circumstances beyond the control of the CONTRACTOR.

### **3.12 EROSION CONTROL AND DEWATERING**

- A. Sediment barriers shall be installed across the entire construction right of way at all ditch/drainage crossings where necessary to prevent sediment flow into the flow-way. Removable sediment barriers can be removed during actual construction, but must be re-installed after construction has stopped for the day and/or when heavy precipitation is imminent.
- B. Trench dewatering shall be conducted in a manner that does not cause erosion and does not result in heavily silt-laden water flowing into any wetland. Remove the dewatering structures as soon as possible after the completion of dewatering activities.
- C. The Contractor shall conduct activities in accordance with permitting associated with construction dewatering.

- D. The Contractor shall submit a plan outlining proposed dewatering and erosion control prior to construction/implementation of said activities.
- E. A SWPPP will be prepared in coordination with the low bidder and the ENGINEER. The Contractor shall be the responsible party and shall be responsible for adhering to the requirements of the SWPPP and erosion control plans.

**— END SECTION 02221 —**

## SECTION 02280 – UTILITY GRADE ADJUSTMENTS

## PART 1 – GENERAL

## 1.1 SUMMARY

- A. Section Includes: The adjustment of utility boxes and manholes to grade. The work covered shall include the furnishing of all labor, tools, equipment, materials, and performance of required operation to provide a complete item in accordance with the project plans and these specifications.
- B. Related Sections
- |    |                         |               |
|----|-------------------------|---------------|
| 1. | Aggregate Base Course   | Section 02710 |
| 2. | Asphalt Concrete Paving | Section 02740 |
- C. Applicable Additional Specifications. SSPWC “Orange Book” Section 323 – Adjustment of New and Existing Manholes, Catch Basins, Vaults, Water and Gas Valves, and Monuments to Final Grade.
- D. Submittals
- |    |                              |
|----|------------------------------|
| 1. | Manhole grade rings          |
| 2. | Manhole lid frame extensions |

## PART 2 – PRODUCTS

## 2.1 MATERIALS/EQUIPMENT

- A. Manhole Extensions
  - 1. Manhole frames and/or lids shall be adjusted to finish grade with material similar in character to those in the original structure or of equal quality.
- B. Water Valve Boxes
  - 1. Existing water valve boxes shall be replaced in accordance with the detail on the Drawings. The Owner may elect to furnish replacement valve boxes to the CONTRACTOR for replacement of the existing damaged valve boxes.
- C. Survey Monuments Wells
  - 1. Existing survey monument wells shall be raised to finish grade using existing monument wells.

## **PART 3 – EXECUTION**

### **3.1 ADJUSTING UTILITY CASTINGS TO GRADE**

- A. This Section includes the following work consisting of adjusting existing sanitary sewer manhole, water valve and survey monument well castings to finish grade.
1. The CONTRACTOR is responsible to show damaged utility casings to the ENGINEER prior to construction activities. The Owner will furnish replacement castings to the CONTRACTOR. Therefore, any damaged casings at the end of the project will be considered to be damaged during construction and the CONTRACTOR must replace at his expense.
  2. Manhole frames and covers shall be raised to finish grade in accordance with the detail on the Drawings.
  3. If the total height of the grade rings (maximum of three) on a manhole is 12-inches or greater when the frame is raised to finish grade, additional grade rings may not be added to bring the frame and cover to finish grade. Either a new barrel section must be added or an extension ring must be set on the existing frame to adjust the cover to finish grade. In the event a barrel section must be added, and no other alternative is available, such work will be paid for as extra work on a time and material basis.
  4. Water valve boxes and survey monument wells shall be adjusted to finish grade as detailed on the drawings.
  5. The CONTRACTOR shall be responsible for referencing all utility manholes, survey monument wells and water valve boxes prior to resurfacing for relocating after the overlay.
  6. New manhole grade rings, barrel sections, and lid frames shall be grouted in place.
  7. Survey monument pins shall not be disturbed during construction. If it is anticipated that the pins are to be removed or disturbed in any way the CONTRACTOR shall survey the monuments prior to construction activities. Monuments shall be replaced and verified after construction. Initial and final survey data shall be supplied to the ENGINEER prior to acceptance of the survey monuments.

**END SECTION – 02280**

## **SECTION 02301 – BOULDERS AND ROCK MATERIALS**

### **PART 1 – GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. This Section includes the following:
  - 1. Furnishing and placing boulders and rock material as specified in the plans.

#### **1.2 SUBMITTALS**

- A. Product Data: For the following:
  - 1. Boulder for boulder clusters or individual boulder placement.
  - 2. Rock riprap.
  - 3. Rock-lined channel material.
  - 4. Filter fabric or geotextile.
- B. Samples: For the following:
  - 1. Rock sample of adequate size to show color of material to be used.
  - 2. Identification of source of rock.

### **PART 2 – PRODUCTS**

#### **2.1 BOULDERS**

- A. Boulders and rock shall be obtained from a local source and shall be approved by the Engineer prior to delivery or placement. The boulders and rock shall be of the size specified on the construction drawings, and shall be random in size. No specified length to width ratio shall be required. Boulders shall appear natural with a natural weathered surface. No angular, cut, pulverized, or mechanically broken surface shall be accepted on the surface protruding above ground. The surface and coloration shall match the naturally surround boulders existing at the site.

- B. Existing boulders and rocks encountered during excavation of the project improvements may be used onsite upon approval by the Engineer.

#### **2.1 GEOTEXTILE**



- A. All geotextile, used where shown in the Contract Drawings or as directed by the Engineer that is specified as filter fabric, non-woven filter fabric or non-woven geotextile shall be non-woven needle-punched geotextile fabric and shall meet the following requirements:
1. Description: Mirafi 140N, or approved equal.

PROPERTY	TEST METHOD	REQUIREMENT
Grab Tensile Strength	ASTM D4632	115 lbs
Puncture Test	ASTM D4633	65 lbs
UV Resistance	STM D4355	70%
Apparent Opening Size	ASTM D 4751	70 US Std Sieve
Permittivity	ASTM D4491	2.0 Sec <sup>-1</sup>
Permeability	ASTM D4491	0.22 cm/sec

### **PART 3 – EXECUTION**

#### **3.1 ADJUSTING UTILITY CASTINGS TO GRADE**

- A. Make surfaces free from brush, stumps, and other objectionable materials and dress to a smooth surface. Excavate area or trench for boulder or rock placement in close conformity to the construction details.
- B. When shown on the plans, place a bedding layer or filter fabric on the prepared surface as specified before the boulder or rock is placed
- C. Place boulders or rocks on the prepared surface by hand or mechanical means in a manner which will produce a stable mass with a minimum void area under the boulder. Fill in with a suitable native material as shown on the plans. Place the boulders or rocks so as to be in close conformity with the details shown on the plans. Place in one operation and in such a manner as to avoid displacement of the underlying material.
- D. Replace any material displaced by any cause to the lines and grades shown on the plans at no additional cost to the Owner.
- E. Edges of rock areas shall blend with the adjacent non-rocked areas. Existing shrubs and trees not identified for removal shall be retained and protected during boulder and rock placement. Boulders and rocks shall be keyed into and around existing bedrock and vegetation.
- F. Non-woven geotextile fabric shall be laid smooth without wrinkles or folds on the prepared subgrade. Adjacent geotextile fabric rolls shall be overlapped a minimum of two feet. On curves the geotextile shall be inspected to ensure that no damage has occurred during installation. Damaged geotextiles shall be properly repaired. Cover the damaged area with a geotextile patch, which extends an amount equal to the required overlap beyond the damaged area.
- G. Construction equipment shall not be allowed directly on the geotextile.

- H. Geotextile rolls shall be furnished with suitable wrapping for protection against moisture and extended ultraviolet exposure prior to placement. If stored outdoors, they shall be elevated and protected with a waterproof cover. Atmospheric exposure of geotextiles following installation shall be a maximum of 14 days to minimize damage potential.

**END SECTION – 02301**

## **SECTION 02630 – STORM DRAINAGE**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. This Section includes storm drainage.
- B. Related Sections include the following:
  - 1. Division 3 Section "Cast-in-Place Concrete" for concrete structures.
  - 2. Division 2 Section "Earthwork".

#### **1.3 DEFINITIONS**

- A. PVC: Polyvinyl chloride plastic.
- B. RCP: Reinforced concrete pipe
- C. HDPE: Corrugated HDPE pipe

#### **1.4 PERFORMANCE REQUIREMENTS**

- A. Gravity-Flow, Nonpressure-Piping Pressure Ratings: At least equal to system test pressure.

#### **1.5 SUBMITTALS**

- A. Product Data: For the following:
  - 1. Cleanouts.
  - 2. Manhole cover inserts.
  - 3. Pipe
- B. Shop Drawings: Include plans, elevations, details, and attachments for the following:
  - 1. Precast concrete manholes, including frames and covers.
  - 2. Cast-in-place concrete manholes and other structures, including frames and covers.
  - 3. Vaults
- C. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

#### **1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Do not store plastic structures, pipe, and fittings in direct sunlight.

- B. Protect pipe, pipe fittings, and seals from dirt and damage.
- C. Handle precast concrete manholes and other structures according to manufacturer's written rigging instructions.

## **1.7 PROJECT CONDITIONS**

- A. Site Information: Perform site survey, research public utility records, and verify existing utility locations.
- B. Locate existing structures and piping to be closed and abandoned.
- C. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
  - 1. Notify Engineer not less than two days in advance of proposed utility interruptions.

## **PART 2 - PRODUCTS**

### **2.1 PIPES AND FITTINGS**

- A. RCP Pipe – Class III
  - 1. All reinforced concrete pipe shall be the diameter and class specified on the plans. Pipe shall have tongue and groove joints.
  - 2. All reinforced concrete pipe shall conform to the ASTM Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe (C76-03) and Section 203 of the Standard Specifications for Public Works Construction (latest edition).
- B. PVC Pipe and Fittings: According to the following:
  - 1. PVC Pipe and Fittings, NPS 15 (DN375) and Smaller: ASTM D 3034, SDR 35, for gasketed joints.
    - a. Gaskets: ASTM F 477, elastomeric seals.
- C. HDPE Pipe and Fittings: According to the following:
  - 1. Corrugated HDPE Pipe and Fittings:
    - a. Shall conform to AASHTO M252 and minimum cell class ASTM D3350, 315412C.
- D. RCP Joints
  - 1. RCP joints shall be tongue and groove. Joints shall be sealed with pre-formed plastic gaskets conforming with Federal specification SS-S-00210 and AASHTO M-198. The plastic sealing compound shall be packaged in extruded preformed rope-like shape of proper size to completely fill the joint

when fully compressed. The sealing compound shall be impermeable to water, have immediate bonding strength to the primed concrete surface and shall maintain permanent plasticity, resistance to water, acids, and alkalis.

2. All surfaces to the tongue and groove shall be primed with an approved priming compound prior to the installation of the sealing compound. The installation of the priming compound and the sealing compound shall be accomplished in strict accordance with the manufacturer's requirements and recommendations.
3. In addition to gasket requirements, if the average gap exceeds ½ inch, the void shall be filled and trowelled smooth with an approved non-metallic, bagged, pre-mixed non-shrink grout conforming to ASTM C827.

## **2.2 MANHOLES**

- A. Normal-Traffic Precast Concrete Manholes: ASTM C 478 (ASTM C 478M), precast, reinforced concrete, of depth indicated, with provision for rubber gasketed joints.

1. Diameter: 48 inches (1200 mm) minimum, unless otherwise indicated.
2. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.
3. Base Section: 6-inch (150-mm) minimum thickness for floor slab and 4-inch (100-mm) minimum thickness for walls and base riser section, and having separate base slab or base section with integral floor.
4. Riser Sections: 4-inch (100-mm) minimum thickness, and lengths to provide depth indicated.
5. Top Section: Eccentric-cone type, unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
6. Gaskets: ASTM C 443 (ASTM C 443M), rubber.
7. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch (150- to 229-mm) total thickness, that match 24-inch- (610-mm-) diameter frame and cover.
8. Steps: ASTM C 478 (ASTM C 478M), individual steps or ladder or as indicated on Drawings or per local regulatory authority standard details and requirements. Omit steps for manholes less than 60 inches (1500 mm) deep.
9. Pipe Connectors: ASTM C 923 (ASTM C 923M), resilient, of size required, for each pipe connecting to base section.

- B. Cast-in-Place Concrete Manholes: Construct of reinforced-concrete bottom, walls, and top; designed according to ASTM C 478 for H-20 wheel loading, structural loading; of depth, shape, dimensions, and appurtenances indicated.

1. Ballast: Increase thickness of concrete, as required to prevent flotation.
2. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch (150- to 229-mm) total thickness, that match 24-inch- (610-mm-) diameter frame and cover.
3. Steps: Individual steps or ladder per local regulatory authority standard details and requirements. Include width that allows worker to place both feet on one step and is designed to prevent lateral slippage off step. Cast or anchor into sidewalls with steps at 12- to 16-inch (300- to 400-mm) intervals. Omit steps for manholes less than 60 inches (1500 mm) deep.

- C. Manhole Frames and Covers: ASTM 48-30, ductile-iron castings designed for H-20

wheel loading. Include 24-inch (610-mm) ID by 4- to 6-inch (100- to 150-mm) riser with 3 3/4 inch (95-mm) minimum width flange, and 26-inch- (660-mm-) diameter cover. Include indented top design with lettering "STORM SEWER" cast into cover.

## **2.3 CONCRETE**

- A. General: Cast-in-place concrete according to ACI 318, ACI 350R, and the following:
  - 1. Cement: ASTM C 150, Type II.
  - 2. Fine Aggregate: ASTM C 33, sand.
  - 3. Coarse Aggregate: ASTM C 33, crushed gravel.
  - 4. Water: Potable.
- B. Portland Cement Design Mix: 4000 psi (27.6 MPa) minimum, with 0.45 maximum water-cementitious materials ratio.
  - 1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
  - 2. Reinforcement Bars: ASTM A 615/A 615M, Grade 60 (Grade 400), deformed steel.
- C. Structure Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4000 psi (27.6 MPa) minimum, with 0.45 maximum water-cementitious materials ratio. Include channels and benches in manholes.
  - 1. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to crown of outlet pipe. Form curved channels with smooth, uniform radius and slope.
    - a. Invert Slope: Match that of the connecting sewers.
  - 2. Benches: Concrete, sloped to drain into channel.
    - a. Slope: 10 percent.
- D. Ballast and Pipe Supports: Portland cement design mix, 3000 psi (20.7 MPa) minimum, with 0.58 maximum water-cementitious materials ratio.
  - 1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
  - 2. Reinforcement Bars: ASTM A 615/A 615M, Grade 60 (Grade 400), deformed steel.

## **2.4 PROTECTIVE COATINGS**

- A. Description: Dipped in black bituminous paint; factory applied to the following surfaces:
  - 1. Manhole Frames and Covers: On entire surfaces.

## **PART 3 - EXECUTION**

### **3.1 EARTHWORK**

- A. Excavating, trenching, and backfilling are specified in Division 2.

### **3.2 IDENTIFICATION**

- A. Materials and their installation are specified in Division 2. Arrange for installing green warning tapes directly over piping and at outside edges of underground structures.

- 1. Use detectable warning tape.

### **3.3 INSTALLATION, GENERAL**

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground sanitary sewerage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent practical.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for using lubricants, cements, and other installation requirements. Maintain swab or drag in line, and pull past each joint as it is completed.
- C. Use manholes for changes in direction, unless fittings are indicated. Use fittings for branch connections, unless direct tap into existing sewer is indicated.
- D. Use proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- E. Install gravity-flow piping of sizes and in locations indicated. Terminate piping as indicated.
- F. Storm drain construction shall conform to the requirements of Section 306 of the Standard Specifications for Public Works Construction (latest edition.)

### **3.4 PIPE JOINT CONSTRUCTION AND INSTALLATION**

- A. General: Join and install pipe and fittings according to installations indicated.
- B. PVC Pipe and Fittings: As follows:
  - 1. Join pipe and gasketed fittings with gaskets according to ASTM D 2321.
  - 2. Join profile sewer pipe fittings with gaskets according to ASTM D 2321 and manufacturer's written instructions.
  - 3. Install according to ASTM D 2321.
- C. HDPE Pipe and Fittings: As follows:
  - 1. Installation shall be in accordance with ASTM D2321 and ADS recommended installation guidelines, with the exception that minimum cover in trafficked areas for 4- through 48-inch (100 to 1200 mm) diameters shall be one foot (0.3 m) and for 60-inch (1500 mm) diameters, the minimum cover shall be 2 ft. (0.6 m) in single run applications. Backfill for minimum cover situations shall consist of Class 1 (compacted), or Class 2 (minimum 90% SPD) material. Maximum fill heights depend on embedment material and compaction level.

- D. System Piping Joints: Make joints using system manufacturer's couplings, unless otherwise indicated.
- E. Join piping made of different materials or dimensions with couplings made for this application. Use couplings that are compatible with and that fit both systems' materials and dimensions.
- F. Install with top surfaces of components, except piping, flush with finished surface.

### **3.5 MANHOLE INSTALLATION**

- A. General: Install manholes, complete with appurtenances and accessories.
- B. Form continuous concrete channels and benches between inlets and outlet.
- C. Set tops of frames and covers flush with finished surface of manholes that occur in pavements. Set tops 3 inches (76 mm) above finished surface elsewhere, unless otherwise indicated.
- D. Install precast concrete manhole sections with gaskets according to ASTM C 891.

### **3.6 CONCRETE PLACEMENT**

- A. Place cast-in-place concrete according to ACI 318 and ACI 350R.

### **3.7 CLEANOUT INSTALLATION**

- A. Install cleanouts and riser extension from sewer pipe to cleanout at grade. Install piping so cleanouts open in direction of flow in sewer pipe.
- B. Set cleanout frames and covers in earth in cast-in-place concrete block as indicated.
- C. Set cleanout frames and covers in pavement with tops flush with pavement surface.
- D. Refer to Division 3 Section "Cast in Place Concrete" for formwork, reinforcement, and concrete.

### **3.8 FIELD QUALITY CONTROL**

- A. Clear interior of piping and structures of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed.
  - 1. Place plug in end of incomplete piping at end of day and when work stops.
  - 2. Flush piping between manholes and other structures to remove collected debris.

**— END SECTION 02630 —**





## **SECTION 02710 - AGGREGATE BASE COURSE**

### **PART 1 – GENERAL**

#### **1.1 DESCRIPTION**

- A. Description of Work: The work to be performed in accordance with this section includes furnishing, placing, and compacting an aggregate base course to plan grades and cross sections.

This work shall include the furnishing of all labor, tools, equipment, materials and performing all operations required to provide a complete item in accordance with the Project Plans and Specifications.

- B. Related Sections:
- |                            |               |
|----------------------------|---------------|
| 1. Asphalt Concrete Paving | Section 02740 |
| 2. Concrete                | Section 03300 |
- C. Applicable Additional Specifications: SSPWC "Orange Book" Sections 308 – Aggregate Base Course and 302 – Subgrade Preparation.

#### **1.2 QUALITY ASSURANCE**

- A. Reference Test Standards and Specifications: The publication listed in SSPWC "Orange Book" form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. Compliance sampling and testing during construction will be provided by the Owner per SSPWC Section 336.00.
- B. Frequency of Testing
1. Maximum Dry Density and Optimum Moisture Content, ASTM 1557.
    - a. Contractor shall provide documentation that one test for each different class or type of material has been performed, and
    - b. Contractor shall have one test performed when previous test is suspect, due to subtle changes in the material, as determined by the Engineer.
  2. Density of Soil In-Place by Sand Cone or by Nuclear Methods, ASTM D1556 or D2922 by Owner.
    - a. The Engineer requests a minimum of one test per 500 linear feet of embankment or fill.
    - b. The Engineer may test more frequently.
- C. Testing Tolerances
1. Percent Compaction. Not less than as specified on Plans, these Specifications, or the SSPWC.
  2. In-Place Moisture Content. As required to achieve minimum compaction.

3. Soft or Yielding Surfaces. Regardless of the percent compaction obtained by test, areas which are soft and yield under the load of construction equipment are to be removed and replaced at no additional cost.

### **1.3 SUBMITTALS**

- A. Materials Test Report. Report on maximum dry density, optimum moisture content, gradation, and R-value prior to beginning of construction.

## **PART 2 – MATERIALS**

### **2.1 AGGREGATE BASE**

- A. Aggregate Base shall be free from organic matter and other deleterious substances, and shall be of such nature that it can be compacted readily under watering and rolling to form a firm stable base.
- B. Aggregate shall conform to the grading and quality requirements found in Section 200.01.03 Type 2, Class B Aggregate Base.

## **PART 3 – EXECUTION**

### **3.1 PRELIMINARY INVESTIGATION OF THE WORK**

- A. The Contractor is to satisfy himself/herself that all preliminary work including, but not limited to, clearing, grubbing, subgrade preparation and staking has been performed in accordance with these Specifications prior to subgrade preparation.

### **3.2 AGGREGATE BASE PREPARATIONS**

- A. All work shall conform to the following subsections of SECTION 308 – AGGREGATE BASE COURSE, of the SSPWC.
- B. During moisture conditioning of the base material take care so as not to damage the subgrade below. Contractor shall be responsible for over watering of grade during operations.
- C. Deficiencies. Remove and replace deficiencies prior to placement of the pavement. Deficiencies in the base course, covered by asphalt paving or concrete will be removed and replaced at no additional cost to the Owner.
- D. Aggregate base shall be placed to the thickness shown on the drawings.

**— END SECTION 02710 —**

## **SECTION 03300 - CONCRETE**

### **PART 1 – GENERAL**

#### **1.1 DESCRIPTION**

- A. This Section covers all the work necessary for the cast-in-place non-reinforced and reinforced concrete work including, but not limited to: furnishing the materials; proportioning, mixing, transporting, placing, compacting, finishing, curing, and protecting the concrete; setting and fastening embedded items; and all incidental and related work.

The CONTRACTOR shall provide all laboratory and field testing of concrete and materials in accordance with this Specification.

- B. Related Sections:
1. Aggregate Base                      Section 02710
- C. Applicable Additional Specifications: SSPWC "Orange Book" Sections 312 – Concrete Curbs, Gutters, Walks, Driveways, and Alley Returns.

#### **1.2 QUALITY ASSURANCE**

- A. Compliance sampling and testing during construction will be provided by the OWNER per SSPWC Section 336.00.
- B. Testing: The OWNER shall provide testing to determine compliance with the following criteria:
1. Consistency: Tested for slump in accordance with ASTM C143.
  2. Air Content: Determine the percentage of air in accordance with ASTM C231.
  3. Strength: All poured-in-place concrete shall develop a minimum 28-day compressive strength of 4,000 pounds per square inch (PSI) unless otherwise indicated. Take samples for this strength determination at the point of discharge from the ready-mix truck. Obtain a minimum of four (4) test cylinders for each fifty (50) cubic yards of concrete placed or fraction thereof. Test one (1) cylinder at 7 days, and two (2) cylinders at 28 days. Hold the fourth cylinder until the Notice of Completion is given. In the event that the 28-day test fails, the required minimum strength requirement, test the fourth cylinder for compressive strength when directed by the ENGINEER. The ENGINEER may waive concrete cylinder testing requirements for pours less than ten (10) C.Y. for non-structural installations (thrust blocks, etc.). Making and curing the test cylinders shall conform to ASTM C131, and testing shall conform to ASTM C39. Furnish two (2) copies of all test reports to the ENGINEER.
  4. Water Test: Water test gutters having a slope of 0.8 foot per hundred feet or less, or where unusual or special conditions cast

doubt on the capability of the gutters to drain. Establish flow in the length of gutter to be tested by supplying water from a hydrant, tank truck or other source. One hour after the supply of water is shut off, inspect the gutter for evidence of ponding or improper shape. In the event water is found ponded in the gutter to a depth greater than 1/2 inch, or on the adjacent asphalt pavement, the defect or defects shall be corrected in a manner acceptable to the ENGINEER at no additional cost.

C. Tolerances:

1. Tolerances for Formed Surfaces: Conform to ACI 301, Table 4.3.1. and Section 312.10 "Finishing" of the SSPWC.
2. Concrete Quality: Meet or exceed the minimum quality standards as specified.
  - a. Slump. The measured slump shall not exceed the specified design slump by more or less than one inch (1 ").
  - b. Air Content. The measured air content shall range between 4 and 7 percent.
  - c. Compressive Strength - Normal Concrete. The average of the two (2) 28-day compressive strength tests shall not be less than 4,000 PSI. No individual test shall be less than 3,800 PSI.

D. Acceptance

1. Plastic or hardened concrete not meeting acceptable tolerances will be rejected and immediately removed and replaced at the CONTRACTOR's expense.

### 1.3 SUBMITTALS

- A. The following submittals are required in accordance with Section 01340, "Submittals".

Certificates of Compliance:

1. Admixtures
2. Cement
3. Fly Ash
4. Pozzolan
5. Water Stop
6. Reinforcing Steel, or Mesh
7. Fiber Reinforcement

B. Materials Test Reports:

1. Coarse Aggregates
2. Fine Aggregates

- C. Evaporation Retardant
- D. Mix Designs:
  - 1. SSPWC, Section 202. ACI 211 normal weight concrete, including variations for admixtures. Include compressive strength test data and modulus of rupture test data. obtained at the same concrete age which establishes a correlation between the flexural and compressive strength properties of concrete. Establish correlation with statistical procedures outlined by ACI.

## **PART 2 – PRODUCTS**

### **2.1 CONCRETE**

- A. Provide a minimum 28-day comprehensive strength of 4,000 PSI with entrained air ranging from 4 to 7 percent unless otherwise indicated. Use 3/4" inch maximum coarse aggregate, size 67. Provide minimum cement content of 517 pounds per cubic yard. Provide concrete with the minimum required slump to adequately place, densify, and finish. Do not exceed the mix design water cement ratio (W/C) or design slump. Per "Orange Book" concrete in freeze/thaw environments shall have a maximum slump of 4". Min. slump shall be greater than 1". Mix Design shall include fibers.

### **2.2 CEMENT**

- A. Conform to ASTM C150, Type II or V.

### **2.3 WATER**

- A. Use clear water free from objectionable quantities of organic matter, alkali, acids, oil, silt, and other deleterious substances. Maximum water/cement ratio shall be 0.45.

### **2.4 AGGREGATES**

- A. Coarse Aggregate: Conform to the requirements of ASTM C33, Class Designation 4S, grading size number 67.
- B. Fine Aggregate: Conform to ASTM C33.

### **2.5 ADMIXTURES**

- A. Air Entraining Agent: Comply with ASTM C260.
- B. Accelerating Agents: Comply with ASTM D98.
- C. Water Reducing Agents: Conform to ASTM C494, Type A, D, or E.
- D. Fly Ash and Pozzolan: Comply with ASTM C618, Class N or F. Pozzolan may be used to replace up to 15 percent of the weight of the required

Portland cement. The replacement ration shall be 1.2 pounds of Pozzolan per pound of Portland cement.

## **2.6 CURING COMPOUND**

- A. The curing compound shall be transparent and not leave an objectionable discoloration or mottling of the concrete. [Per NDOT 702.03.01].

## **2.7 STEEL REINFORCEMENT**

- A. Conform to the requirements of ASTM A615, Grade 60, unless otherwise specified, and deformations shall conform to ASTM A615, A616, or A617 as applicable. All bars shall be round and deformed. Welded wire fabric or mesh shall conform to the requirements of ASTM A185.

## **2.8 FORMS**

- A. Forms shall be constructed of plywood or an approved equal. Plywood for forms shall be of the grade necessary to provide a neat concrete exterior. Forms shall be of the quality and strength required so that the finished concrete will conform to the plan dimensions. Forms shall be watertight and be filleted at all exposed outside corners.
- B. Form clamps or bolts shall be used. Use of tie wire to hold forms in place will not be permitted.
- C. Plywood form panels shall be placed in four (4) foot widths and eight (8) foot lengths where applicable. All form panels shall be placed in a neat symmetrical pattern.

## **2.9 NON-SHRINK GROUT**

- A. Use non-shrink grout where grout is called for on the Drawings. Provide 3,000 PSI non-metallic grout similar to "Embeco" manufactured by Master Builders Company, or an approved equal, and proportioned and placed in accordance with the manufacturer's recommendations.

## **2.10 CURING MATERIALS**

- A. Provide liquid curing compound in conformance with ASTM C309, type 1 D.

## **2.11 JOINT FILLERS**

- A. Comply with ASTM D1751.

## **2.12 EVAPORATION RETARDANT**

- A. Con-film or approved equal. ACI 302.

## **2.13 FIBER REINFORCEMENT**

- A. Comply with ASTM C1116, Type III, Shall be 100% virgin polypropylene fibrillated, MD Graded, fibers containing no reprocessed olefin materials and specifically manufactured to an optimum gradation for use as a concrete secondary reinforcement, and shall be Fibermesh, or other approved material. Application rate shall be a maximum of 1.5 lbs per cubic yard. The 28-day compressive strength of the mix, prior to adding the fibers, shall meet the required strength.

## **PART 3 – EXECUTION**

### **3.1 GENERAL**

- A. Match existing concrete where noted.
- B. Sawcut and remove existing concrete to the lines indicated on the plan in accordance with Section 02220, Demolition and Salvage. Sawcut, remove and replace sections damaged by construction in accordance with these specifications.

### **3.2 BASE PREPARATION**

- A. Subgrade shall be prepared in accordance with Section 02710, Aggregate Base Course.
- B. CONTRACTOR shall verify, and provide as necessary, a minimum base section for the replacement of existing curb & gutter and valley gutter sections.

### **3.3 FORM CONSTRUCTION/REMOVAL**

- A. Unless otherwise approved, use conventional forms to construct concrete curb, gutter, sidewalk and drives. Secure formwork to line and grade. Thoroughly clean forms before each use and apply a light coat of release agent which will not discolor the concrete.
- B. Do not remove front face form before the concrete has taken in initial set and has sufficient strength to carry its own weight. Do not remove gutter forms or rear forms until concrete has reached sufficient strength to prevent damage. Sawcut, remove and replace damaged sections.

### **3.4 STEEL REINFORCEMENT**

- A. Storage: Store steel reinforcement on blocking and under cover to prevent rusting.
- B. Cleaning: Remove all rust, oil, earth, and coatings before positioning the metal reinforcement. Reinspect and clean the reinforcement immediately before placing the concrete.



- C. Straightening and Rebending: Do not straighten or rebend metal reinforcement in a manner that will injure the material. Remove bars from the job site, which do not have kinks or bends conforming to the Drawings.

### **3.5 MEASURING, MIXING, TRANSPORTATION AND PLACING CONCRETE**

- A. Measure and mix concrete in accordance with ASTM C94. Additional water may be added to bring slump within the required limits provided the design water to cement ratio is not exceeded.
- B. Transportation: Transport concrete in accordance with ACI 301.
- C. Placing Concrete:
  - 1. Place concrete in conformance with ACI 301, except as modified herein. Do not exceed a free vertical drop of 6 feet from the point of discharge. The maximum allowable concrete temperature at the time of discharge shall be 90°F. The maximum allowable concrete age, measured from batch time to time of discharge, shall not exceed one (1) hour 30 minutes. Exceeding the maximum allowable concrete age, temperature, or slump shall be cause for immediate rejection. The minimum revolutions on a batch prior to placement is 30 to 70 revolutions and the maximum is 300 revolutions. Provide 30 revolutions after the addition of water.
  - 2. Retempering the mix after initial slump adjustment will not be allowed.
- D. Machine Formed: Machines shall be designed specifically for such work and approved by the ENGINEER. Machines shall be capable of producing results equal to or better than that produced with forms. If the results are not satisfactory to the ENGINEER, discontinue the use of the machine and make necessary repairs at no additional cost to the Agency. All applicable requirements of construction with forms shall apply to the use of machines.
- E. Densification: Thoroughly spade concrete away from the forms so there will be no rock pockets next to the forms. The concrete may be compacted by mechanical vibrators approved by the ENGINEER. Tamp or vibrate the concrete until the mortar rises to the surface and the coarse aggregate is not exposed.
- F. Cold Weather: Except with authorization, do not place concrete when the ambient temperature is below 40 degrees F or when the concrete is likely to be subjected to freezing temperatures within 24 hours. Cold weather concreting shall follow the recommended practices of ACI 3068, as approved by the ENGINEER.
- G. Hot Weather: Hot weather concreting shall follow the recommended practices of ACI 3058, as approved by the ENGINEER.

### **3.6 BACKFILLING**

- A. Concrete curb and gutter shall be backfilled no earlier than four (4) days after concrete placement. Backfill all curb and gutter as shown on the Contract Drawings and prior to constructing tie-in paving.

### **3.7 FINISHING**

- A. Finish all concrete surfaces smooth, straight and defect free. Provide a light broom finish as approved by the ENGINEER on all surfaces. Finish all exposed edges and joints with a 1/2-inch radius tool.
- B. Evaporation Retardant: Protect against loss of moisture from the surface of the concrete by applying an evaporation retardant. Apply per manufacturer's recommendation. Add during finish of concrete. CONTRACTOR is not permitted to use water in the finishing of the concrete.

### **3.8 CONCRETE CURING**

- A. A curing agent shall be applied to each section as it is finished.
- B. Inadvertently Cured Surfaces: Thoroughly clean advertently cured concrete by sandblasting prior to finishing or placing adjacent concrete.
- C. No equipment causing jarring of the concrete shall be permitted adjacent to concrete curbs, gutters, valley gutters, or driveways until the 4<sup>th</sup> day following placement of the concrete. The placement of bituminous pavement adjacent to concrete curbs, gutters, valley gutters, or driveways shall not be permitted until the 7<sup>th</sup> day following the placement of the concrete.

### **3.9 JOINTS**

- A. Expansion Joints: Construct expansion joints in a straight line and vertical plane perpendicular to the longitudinal line of the sidewalk or curb and gutter, except in cases of curved alignment, when joints will be constructed along the radial lines of the curve. Construct to the full depth and width of the concrete. Match the joints in the adjacent pavement sidewalk or curb and gutter. Expansion joints shall be constructed at intervals not to exceed 40 feet when curb is hand formed, at all radius points, driveways, alley entrances, and adjoining structures.
- B. Contraction Joints: Construct in a straight line and vertical plane perpendicular to the longitudinal line of the sidewalk or curb and gutter, except in cases of curved alignment when joints will be constructed along the radial lines of the curb. Construct to a depth of one (1) inch and at ten (10) foot intervals on side walk widths of five (5) feet and twelve (12) foot intervals on sidewalks of four (4) feet, five (5) feet, or six (6) feet, matching the width of the sidewalk, or as otherwise noted on the plans.

- C. Edges: Shape with a suitable tool so formed as to round the edges to the radius indicated.
- D. Sidewalks. Sidewalks shall have a cross-slope of 1/4 inch per foot or as indicated on the Plans. Unless specified otherwise in the plans, the minimum thickness for concrete walk shall be four (4) inches.

### **3.10 TEMPORARY ACCESS**

- A. Access to driveways/roadways/alleys shall be maintained prior to and after placing concrete curb, gutter, valley gutters, sidewalks, and driveways. Steel plates may be used over valley gutters or driveway sections that are poured to allow for temporary access and must remain in place a minimum 7 days following the placement of concrete. Temporary access shall be maintained until restorations are complete.

### **3.11 DELIVERY TICKETS**

- A. Provide a delivery ticket to the inspector for every load of concrete delivered to the job site. Include the following on the delivery ticket: date, batch time, mix I.D. number, specified strength, air content, job name, water content, and amount of concrete. The tickets are to have the actual batch weights of all aggregates, cement, water, admixtures, and batch plant moisture correction for aggregates. Provide allowance for drum moisture from previous batches. Include the reading of the truck revolution counter at the time of batching.

**— END SECTION 03300 —**

## **SECTION 03400 - MANHOLES, CATCH BASINS, DROP INLETS AND APPURTENANCES**

### **PART 1 – GENERAL**

#### **1.1 DESCRIPTION**

- A. This item shall consist of the construction of manholes, catch basins, drop inlets, and appurtenances complete in place, including the furnishing and installing of frames, grates, rings, covers and all backfilling. The various types of structures are designated on the drawings indicating the particular design of each. Each type of structure shall be constructed in accordance with the details indicated and to the depths required by the profiles given.

### **PART 2 - PRODUCTS**

#### **2.1 CONCRETE**

- A. All concrete shall conform to Section 3300.

#### **2.2 CASTINGS**

- A. Castings, whether Carbon-Steel, Gray Cast Iron or Ductile Iron shall conform to the shape and dimensions indicated and shall be clean substantial castings, free from sand or blowholes or other defects. Surfaces of the castings shall be free from burnt on sand and shall be reasonably smooth. Runners, risers, fins and other cast on pieces shall be removed from the castings and such areas ground smooth. Bearing surfaces between manhole rings and covers or grates and frames shall be cast or machined with such precision that uniform bearing shall be provided throughout the perimeter area of contact. Pairs of machined castings shall be matchmarked to facilitate subsequent identification at installation.
- B. Steel casting shall conform to ASTM A 27, "Mild to Medium Strength Carbon Steel Castings for General Application." Grade 70-36 shall be furnished unless otherwise specified.
- C. Cast iron castings shall conform to ASTM A 48, "Gray Iron Castings," Class 30.
- D. Ductile Iron casting shall conform to ASTM A 536, "Ductile Iron Castings." Grade 60-40-18 shall be used unless otherwise indicated.

#### **2.3 RINGS**

- A. Adjusting rings shall conform to ASTM A 536, "Gray Iron Castings."

#### **2.4 PRECAST**

- A. Precast structures shall be reinforced and conform to ASTM Designation C-478.

## **2.5 CAST IN PLACE**

- A. All cast in place structures shall be reinforced concrete, constructed of the appropriate materials listed above.

## **2.6 MORTAR**

- A. Cement mortar shall conform to the requirements of Section 203, Subsection 10.06.010 of the Standard Specifications.

## **2.7 FLEXIBLE JOINTS**

- A. Flexible o-rings conforming to the specification F477, shall be used at the pipe -manhole interface.

## **2.8 FRAMES AND COVERS**

- A. Provide traffic weight covers with the wording "STORM DRAIN" (or match utility) cast into the covers in letters 2" high and plainly visible.

# **PART 3 - EXECUTION**

## **3.1 EXCAVATING AND BACKFILL.**

- A. Excavation and backfill shall conform to Specification 2220. Compact subgrade below new manhole, catch basin or drop inlet to a relative compaction of at least ninety-five (95) percent prior to placing concrete. Refer to details for the compaction requirements of the backfill in specific cases.

## **3.2 INVERTS.**

- A. Inlet and outlet pipes shall be set prior to placing concrete invert to provide for smooth flow of water.

## **3.3 FORMS.**

- A. All interior cast in place concrete work shall be formed. When the nature of the surrounding material is such that it can be trimmed to a smooth vertical face outside forms may be omitted.

## **3.4 JOINTS.**

- A. Two pipe joints shall be placed within 18" of the entrance to the manhole or a flexible coupling may be used upon approval of engineer.

### **3.5 MANHOLE BASES.**

- A. Pre-cast or cast in place bases may be used upon approval of Engineer. When cast in place bases are used the following criteria shall apply.
  - 1. Use form to create a tongue and groove connection between the barrel and the base. Ram-Nek or approved equal shall be used at this joint.

### **3.6 GRADE RINGS**

- A. Completely fill mortar joints between rings, and leave smooth and free from surplus mortar on the inside of the manhole.

### **3.7 CLEANING.**

- A. All manholes, catch basins and drop inlets shall be thoroughly cleaned prior to the time of final acceptance.

**— End Section 03400 —**