City of Louisville

COLORADO • SINCE 1878

2024 SWQMP PILOT PROJECT

PREPARED BY:
CITY OF LOUISVILLE

APRIL 2024

Table of Contents

Invitation to Bid 1
Instructions to Bidders 3
1. Defined Terms 3
2. Copies of Bidding Documents 3
3. Qualification of Bidders 3
4. Examination of Contract Documents and Site 4
5. Availability of Lands for Work, Etc. 6
6. Interpretations and Addenda 6
7. Bid Security 6
8. Contract Time 7
9. Liquidated Damages 7
10. Substitute and "Or Equal" Items 7
11. Subcontractors, Suppliers, and Others 7
12. Bid Form 8
13. Submission of Bids 9
14. Modification and Withdrawal of Bids 9
15. Opening of Bids 10
16. Bids to Remain Open Subject to Acceptance 10
17. Award of Contract 10
18. Contract Security 12
19. Signing of Agreement 12
20. Special Legal Requirements 12
21. Sales and Use Taxes 13
22. Retainage 13
23. Mistakes in Bidding Instructions 13
Bid Form 14
Schedule of Unit Prices 16
Bid Bond 23
Schedule of Subcontractors 25
Anti-Collusion Affidavit 26
Certification of EEO Compliance 27
Prohibition Against Employing Workers Without Authorization 28
Contractor's Pre-Contract Certification 29
Agreement 30
Article 1. Work 30
Article 2. Contract Times 30
Article 3. Contract Price 31
Article 4. Payment Procedures 31
Article 5. Contractor's Representations 31
Article 6. Contract Documents 32
Article 7. Miscellaneous 33
Article 8. Other Provisions 35
Performance Bond 36
Labor and Material Payment Bond 38
Notice of Award 40
Notice to Proceed 41
Change Order Form 42
Field Order Form 43
Work Change Directive Instructions 44

Work Change Directive Form 45
Application for Payment Form 46
Contractor's Proposal Request Form 47
Contractor's Overtime Request Form 48
Certificate of Substantial Completion Form 49
Final Inspection Report Form 51
Certificate of Final Completion Form 52
Guarantee Period Inspection Report Form 53
Final Claim Release & Acceptance Form 54
Claim Release – Subcontractor/Supplier 56
General Conditions 57
Article 1. Definitions 57
1.0 Abnormal Weather 57
1.1 Addenda 57
1.2 Agreement 57
1.3 Application for Payment 57
1.4 Asbestos 57
1.5 Bid 57
1.6 Bidding Documents 57
1.7 Bidding Requirements 57
1.8 Bonds 57
1.9 Change Order 57
1.10 Contract Day 57
1.11 Contract Documents 58
1.12 Contract Price 58
1.13 Contract Times 58
1.14 CONTRACTOR 58
1.15 Defective 58
1.16 Drawings 58
1.17 Effective Date of the Agreement 58
1.18 ENGINEER 58
1.19 OWNER's Consultant 58
1.20 Field Order 58
1.21 General Requirements 58
1.22 Hazardous Waste 59
1.23 Laws and Regulation: Laws or Regulations 59
1.24 Liens 59
1.25 Milestone 59
1.26 Notice of Award 59
1.27 Notice to Proceed 59
1.28 OWNER 59
1.29 Partial Utilization 59
1.30 PCBs 59
1.31 Petroleum 59
1.32 Plans 59
1.33 Product 59
1.34 Project 59
1.35 Provide 59
1.36 Radioactive Material 59
1.37 Resident Project Representative 59
1.38 Samples 60

1.39 Shop Drawings 60
1.40 Specifications 60
1.41 Subcontractor 60
1.42 Substantial Completion 60
1.43 Supplementary Conditions 60
1.44 Supplier 60
1.45 Underground Facilities 60
1.46 Unit Price Work 60
1.47 Work 60
1.48 Work Change Directive 60
1.49 Written Amendment 61
Article 2. Preliminary Matters 61
Delivery of Bonds 61
Copies of Documents 61
Commencement of Contract Times; Notice to Proceed 61
Proposed Project Schedule 61
Starting the Work 61
Before Starting Construction 62
Preconstruction Conference 62
Initially Acceptable Schedules 62
Article 3. Contract Documents: Intent, Amending, Reuse 62
Intent 63
Reference to Standards & Specifications of Technical Societies; Reporting and Resolving Discrepancies 63
Amending and Supplementing Contract Documents 64
Reuse of Documents 65
Article 4. Availability of Lands; Subsurface and Physical Conditions, Reference Points 65
Availability of Lands 65
Subsurface and Physical Conditions 65
Reports and Drawings 66
Subsurface Conditions 66
Physical Conditions 66
Limited Reliance by CONTRACTOR authorized; Technical Data 66
Physical Conditions - Underground Facilities 67
Shown or Indicated 67
Not Shown or Indicated 68
Reference Points 68
Asbestos, PCBs Petroleum, Hazardous Waste, or Radioactive Material 68
Article 5. Bonds and Insurance 69
Performance, Payment, and Other Bonds 69
Licensed Sureties and Insurers; Certificates of Insurance 70
CONTRACTOR's Liability Insurance 71
OWNER's Liability Insurance 72
Property Insurance 72
Article 6. CONTRACTOR’s Responsibilities 73
Supervision and Superintendence 73
Labor, Materials, and Equipment 73
Progress Schedule 74
Substitutes and "Or-Equal" Items 74
“Or-Equal” 74
Substitute Items 75

CONTRACTOR's Expense 75
Substitute Construction Methods or Procedures 76
ENGINEER's Evaluation 76
Concerning Subcontractors, Suppliers, and Others 76
Patent Fees and Royalties 78
Permits 78
Laws and Regulations 79
Taxes 79
Use of Premises 79
Record Documents 80
Safety and Protection 80
Safety Representative 81
Hazard Communication Programs 81
Emergencies 81
Shop Drawings and Samples 81
Submittal Procedures 82
Continuing the Work 83
CONTRACTOR's General Warranty and Guarantee 83
Indemnification 84
Survival of Obligations 85
Article 7. Other Work 85
Related Work at Site 85
Coordination 86
Article 8. Owner's Responsibilities 86
Article 9. Engineer's Status During Construction 87
OWNER's Representative 87
Visits to Site 87
Project Representative 88
Duties and Responsibilities 88
Schedules 88
Conferences and Meetings 88
Liaison 88
Shop Drawings and Samples 89
Review of Work, Rejection of Defective Work, Inspections, and Tests 89
Interpretation of Contract Documents 89
Modifications 89
Records 90
Reports 90
Payment Requests 90
Certificates, Maintenance, and Operations Manuals 90
Completion 91
Limitation of Authority 91
Clarifications and Interpretations 91
Authorized Variations in Work 92
Rejecting Defective Work 92
Shop Drawings, Change Orders and Payments 92
Determinations for Unit Prices 92
Decisions on Disputes 92
Limitations on ENGINEER's Authority and Responsibilities 93
Article 10. Changes in the Work 94
Article 11. Change of Contract Price 94

Cost of the Work 95
Cash Allowances 99
Unit Price Work 100
Article 12. Change of Contract Times 101
Article 13. Tests and Inspections; Correction, Removal, or Acceptance of Defective Work 102
Notice of Defects 102
Access to Work 102
Tests and Inspections 102
Uncovering Work 103
OWNER May Stop the Work 104
Correction or Removal of Defective Work 104
Correction Period 104
Acceptance of Defective Work 105
OWNER May Correct Defective Work 105
Article 14. Payments to Contractor and Completion 105
Schedule of Values 105
Application for Progress Payment 106
CONTRACTOR's Warranty of Title 106
Review of Applications for Progress Payment 106
Substantial Completion 108
Partial Utilization 109
Final Inspection 110
Final Application for Payment 110
Final Payment and Acceptance 110
Waiver of Claims 111
Article 15. Suspension of Work and Termination 111
OWNER May Suspend Work 111
OWNER May Terminate 111
CONTRACTOR May Stop Work or Terminate 113
Article 16. Miscellaneous 113
Giving Notice 113
Computation of Times 113
Notice of Claim 113
Cumulative Remedies 113
Professional Fees and Court Costs Included 114
Interest 114
Third Parties 114
Severability 114
Equal Opportunity Employer 114
Supplementary Conditions 116
SECTION 01010 - SUMMARY OF WORK 1
SECTION 01025 - MEASUREMENT AND PAYMENT 1
SECTION 01091 - REFERENCE STANDARDS 1
SECTION 01300 - SUBMITTALS 1
SECTION 01410 - TESTING AND INSPECTIONS 1
SECTION 01500 - TEMPORARY FACILITIES, CONTROLS, AND SERVICES 1
SECTION 01700 - CONTRACT CLOSEOUT 1
SECTION 02070 - DEMOLITION ..... **Error! Bookmark not defined.**
SECTION 02400 - CONCRETE AND CONCRETE REPLACEMENT ..... **Error! Bookmark not defined.**
SECTION 02500 - ASPHALT ..... **Error! Bookmark not defined.**
SECTION 02600 - CONSTRUCTION ZONE TRAFFIC CONTROL ..... **Error! Bookmark not defined.**

Invitation to Bid

Sealed Bids will be received by the

CITY OF LOUISVILLE, STATE OF COLORADO

Hereinafter referred to as OWNER, at 749 Main Street, Louisville, Colorado 80027, until **2:00 p.m.**, MST, **May 21**, **2024** for the

2024 SWQMP PILOT PROJECT

At said place and time, all Bids that have been duly received will be publicly opened and read aloud. Bids received after said closing time of 10:00 a.m. MST will not be accepted and be returned unopened. Bids shall be in a sealed envelope plainly marked with the Project Name and Date and addressed to:

City of Louisville
Office of City Engineer
749 Main Street
Louisville, Colorado 80027

The Work for which the Bid is requested consists of demolition, concrete replacement, grading, storm infrastructure adjustments, landscape repairs and traffic control, construction complete, including all work appurtenant thereto, on various streets within the City of Louisville, Colorado.

Digital copies of the Bidding Documents will be available after April 26, 2024, online through Rocky Mountain Bid System located at https://www.bidnetdirect.com/ and also viewable via the City of Louisville's website https://www.louisvilleco.gov/doing-business/bidding-opportunities-requests-for-proposals.

Bids will only be accepted from BIDDERS who are prequalified as a General Contractor by the City of Louisville City Engineer, and who are recorded by Rocky Mountain Bid System and by the City Engineer as having received the Bidding Documents. City Engineer will verify with Rocky Mountain Bid System for Plan Holder list. City of Louisville Pre-qualification forms must be received at the office of the City Engineer by close of business (5:00 p.m.) May 16, 2024. Pre-qualification forms received after this date and time are not guaranteed to be approved by the required date.

Bids will be received on a unit and lump sum price basis as described in the Bidding Documents.

When a BIDDER submits a Bid, that Bid shall include the Schedule of Subcontractors, which shall identify each element of the Work to be subcontracted. Traffic control subcontractors shall be prequalified by the City of Louisville. Other subcontractors whose subcontract exceeds five percent of the Total Bid Price shall be prequalified by the City of Louisville, City Engineer for their specific portion of the Work.

Each Bid shall contain evidence of BIDDER'S qualification to do business in the state of Colorado or covenant to obtain such qualification.

Each Bid must be accompanied by a Bid security consisting of a properly Certified Check, Cashier's Check, or Bid Bond, in the amount of five (5) percent of BIDDER'S Total Bid Price, without conditions, payable to the City of Louisville. Bid security will be retained by the City until the seventh day after the Effective Date of the Agreement whereupon Bid security furnished by such Bidder's will be returned. Bid security with

Bids, which are not competitive, will be returned within fourteen days after the Bid opening. No Bid will be considered unless accompanied by such Bid security.

The successful BIDDER will be required to furnish a performance bond and a labor and material payment bond to the City of Louisville guaranteeing faithful performance and the payment of all bills and obligations arising from the performance of the Contract.

No Bid may be withdrawn within a period of sixty (60) days after the date fixed for opening Bids.

The City of Louisville reserves the right to award the contract by sections, to reject any or all Bids, and to waive any informalities and irregularities therein.

The City of Louisville assumes no responsibility for payment of any expenses incurred by any respondent to this Invitation to Bid.

Preference is hereby given to materials, supplies, and provisions produced, manufactured, or grown in Colorado, quality and price being equal to articles offered by competitors outside of the State.

A mandatory pre-bid conference with representatives of prospective BIDDERS will be held at **2:00 p.m.**, MST, on **April 29, 2024.** This meeting will be held virtually. Representatives of the City will be present to discuss the Project. Prospective BIDDERS are invited to attend and present their questions relative to this Bid at this conference. **Attendance at this pre-bid conference will be required to submit a Bid.** Failure to attend will result in result in the rejection of the bid.

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The City of Louisville is an Equal Opportunity Employer.

City of Louisville, Colorado
City Engineer

1st Publication: April 19, 2024
2nd Publication: April 26, 2024

Instructions to Bidders

1. Defined Terms

Terms used in these Instructions to BIDDERS, which are defined in the General Conditions of this Manual have the meanings assigned to them in the General Conditions.

Certain additional terms used in these Instructions to Bidders have the meanings indicated below which are applicable to both the singular and plural thereof.

1.1 The term "BIDDER" means one who submits a Bid directly to OWNER, as distinct from a sub-bidder, who submits a bid to a BIDDER.

1.2 The term "ISSUING OFFICE" means the office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered.

1.3 The term "SUCCESSFUL BIDDER" means the lowest, qualified, responsible, and responsive BIDDER to whom OWNER (on the basis of OWNER's evaluation as hereinafter provided) makes an award.

1.4 The term "Bidding Documents" includes the Invitation to Bid, Instructions to Bidders, the Bid Form, and the Contract Documents (including all Addenda issued prior to receipt of Bids).

2. Copies of Bidding Documents

2.1 Complete sets of Bidding Documents stated in the Invitation to Bid may be obtained from the Issuing Office. No partial sets will be issued. The Bidding Documents may be examined at the locations identified in the Invitation to Bid.

2.2 Complete sets of Bidding Documents shall be used in preparing Bids; neither OWNER nor ENGINEER assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.3 OWNER and ENGINEER in making copies of Bidding Documents available on the above terms do so only for the purpose of obtaining Bids for the Work and do not confer a license or grant for any other use.

3. Qualification of Bidders

3.1 **Bids will only be accepted from qualified BIDDERs who are prequalified as a General contractor by the City of Louisville, City Engineer, and who are recorded by the City Engineer as having received the Bidding Documents. City of Louisville Prequalification forms must be received at the office of the City Engineer by close of business (5:00 p.m.) on February 26, 2024. Prequalification forms received after this date and time are not guaranteed to be approved by the required date.**

3.2 Each Bid shall contain evidence of BIDDER's qualification to do business in the state of Colorado or covenant to obtain such qualification.

3.3 The apparent low BIDDER shall be required to show that he has handled former work of similar type and that no just claims are pending against such work. No Bid will be awarded to a BIDDER who is engaged in any other work, which would impair his ability to perform or finance this Work.

4. Examination of Contract Documents and Site

4.1 It is the responsibility of each BIDDER before submitting a Bid:

4.1.1 To examine thoroughly the Contract Documents and related data identified in the Bidding Documents;

4.1.2 To visit the site to become familiar with and satisfy BIDDER as to the general, local and site conditions that may affect cost, progress, performance or furnishing of the Work;

4.1.3 To consider federal, state and local Laws and Regulations that may affect cost, progress, performance or furnishing of the Work;

4.1.4 To study and carefully correlate BIDDER's knowledge and observations with the Contract Documents and other related data; and

4.1.5 **To promptly notify ENGINEER of all conflicts, errors, ambiguities or discrepancies, which Bidder has discovered in or between the Contract Documents and such other related documents.**

4.2 BIDDERS are responsible for examining and determining for themselves the location and nature of the proposed Work, the amount and character of the labor and materials required therefor, and the difficulties, which may be encountered. BIDDERS may not rely on oral or written representations made by the OWNER, including any reports and drawings identified pursuant to paragraph 4.2.1 and subparagraphs thereof of the General Conditions, unless the OWNER has guaranteed in writing that such representation is factually accurate, and by submitting a Bid, each Bidder waives all liability for any error in any representation made by the OWNER to the BIDDER. BIDDERS shall, at BIDDER'S own expense, inspect the site and its surroundings and conduct such supplementary examinations, investigations, and tests concerning conditions at or contiguous to the site (including surface, and subsurface) which may affect cost, progress, performance, or furnishing of the Work or which relate to any aspect of the means, methods, techniques, sequences, or procedures of construction to be employed by BIDDER and safety precautions and programs incident thereto for performing the Work in accordance with the Contract Documents. By failing to make such an inspection, the BIDDER waives all rights to claim extra payment or time extensions due to unexpected conditions, which could have been determined had the site been reasonably inspected. If concealed or unknown conditions differ materially from those ordinarily encountered and generally recognized as inherent in the Work or differ materially from the conditions indicated in the Contract Documents, then an equitable adjustment in the Contract Price or in the Contract Time will be allowed by change order as provided in Article 11 or Article 12 respectively of the General Conditions. By submitting a Bid, the BIDDER represents that the BIDDER'S observations at the site are not inconsistent with the requirements of the proposed Contract Documents, unless otherwise noted by the BIDDER.

4.2.1 Refer to General Conditions for identification of those reports of explorations and tests of subsurface conditions at or contiguous to the site, which have been utilized by ENGINEER in preparation of the Contract Documents. BIDDER may not rely upon the general accuracy of the "technical data" contained in such reports or upon non-technical data, interpretations, opinions or information contained in such reports or otherwise relating to the subsurface conditions at the site, nor upon the completeness thereof for the purposes of bidding or construction unless OWNER has guaranteed in writing that such data or representations are accurate.

4.2.2 Refer to General Conditions for identification of those drawings of physical conditions in or relating to existing surface and subsurface conditions (except Underground Facilities) which are at or contiguous to the site that have been utilized by ENGINEER in preparation of the Contract Documents. BIDDER may not rely upon the general accuracy of the "technical data" contained in such drawings or upon other data, interpretations, opinions or information shown or indicated in such drawings or otherwise relating to such structures, nor upon the completeness thereof for the purposes of bidding or construction unless OWNER has guaranteed in writing that such data or representations are accurate.

Copies of such reports and drawings will be made available by OWNER to any BIDDER on request. Those reports and drawings are not part of the Contract Documents, but the technical data contained therein, upon which BIDDER is entitled to rely upon as factually accurate as provided in Paragraphs 4.2.1 of the General Conditions. BIDDER is responsible for any interpretation or conclusion drawn from any "technical data" or any such data, interpretations, opinions, or information.

4.3 Information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the site is based upon information and data furnished to OWNER by OWNERS of such Underground Facilities or others, and OWNER and ENGINEER do not assume responsibility for the accuracy or completeness thereof.

4.4 On request in advance, OWNER will provide each BIDDER access to the site to conduct such examinations, investigations, explorations, tests, and studies as each BIDDER deems necessary for submission of a Bid. BIDDER shall fill all holes, clean up and restore the site to its former conditions upon completion of such explorations, investigations, tests, and studies.

4.5 Reference is made to the General Conditions for the identification of the general nature of work that is to be performed at the site by OWNER or others (such as utilities and other prime contractors) that relates to work for which a Bid is to be submitted. On request, OWNER will provide to each BIDDER for examination access to or copies of Contract Documents (other than portions thereof related to price) for such work.

4.6 The submission of a Bid will constitute an incontrovertible representation by BIDDER that BIDDER has complied with every requirement of this Article 4, that the BIDDER warrants that it is familiar with all provisions of the Contract Documents, that without exception the Bid is premised upon performing and furnishing the Work required by the Contract Documents and applying the specific means, methods, techniques, sequences or procedures of construction that may be shown or indicated in or expressly required by the Contract Documents, **that BIDDER has given ENGINEER written notice of all conflicts, errors, ambiguities and discrepancies that BIDDER has discovered in the Contract Documents and the written**

resolutions thereof by ENGINEER is acceptable to BIDDER, and that the Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing of the Work.

4.7 The provisions of 4.1 through 4.7 of this section, inclusive, do not apply to Asbestos, Polychlorinated biphenyls (PCBs), Petroleum, Hazardous Waste, or Radioactive Material covered by paragraph 4.5 of the General Conditions.

5. Availability of Lands for Work, Etc.

5.1 The lands upon which the Work is to be performed will be in the confines of street rights-of-way and public property. All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be obtained and paid for by CONTRACTOR. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by OWNER unless otherwise provided in the Contract Documents.

6. Interpretations and Addenda

6.1 All questions about the meaning or intent of the Bidding Documents are to be submitted in writing to the ENGINEER. Interpretation or clarifications considered necessary by ENGINEER in response to such questions will be issued only by Addenda mailed or delivered to all parties recorded by ENGINEER as having received Bidding Documents. Questions received less than ten days prior to the date for opening of Bids may not be answered. Only questions answered by formal written Addenda will be binding. **Oral and other interpretations or clarifications will be without legal effect.**

6.2 Addenda may also be issued to modify the Bidding Documents as deemed advisable by ENGINEER.

7. Bid Security

7.1 Each Bid must be accompanied by a Bid Security consisting of a properly Certified Check, Cashier's Check, or Bid Bond on the form enclosed herewith, in the amount of five (5) percent of BIDDER's Total Bid Price, without conditions, payable to the City of Louisville, Colorado. The Bid Bond must be executed by a surety meeting the requirements of Paragraph 5.3 of the General Conditions. The cost of the Bid Security shall be included in the bid. The submission of the Bid and Bid Security is a pledge by the BIDDER that he will enter into an Agreement with the Owner on the terms stated in his Bid and will, if required, furnish required insurance certificates and bonds, covering the faithful performance of the Agreement and the payment of all obligations arising thereunder.

7.2 The Bid Security of the Successful BIDDER will be retained until such BIDDER has executed the Agreement, furnished the required contract security and met the other conditions of the Notice of Award, whereupon the Bid Security will be returned. If the successful BIDDER fails to execute, enter into or deliver an Agreement in accordance with an accepted bid proposal, or fails to furnish the required bonds or certificates, within ten (10) days from the mailing of the Notice of Award, or if the BIDDER has been guilty of collusion with other BIDDERS in submitting the Bid, the OWNER may annul the Notice of Award and the Bid Security shall be forfeited to and retained by the OWNER as liquidated damages and not as a penalty. By submitting the Bid

security with the bid proposal, the BIDDER agrees to liquidated damages in the event the BIDDER fails to enter into the Agreement with the OWNER. The OWNER shall not have to prove actual damages suffered in order to retain the Bid Security as liquidated damages. The OWNER and the BIDDER agree that liquidated damages are appropriate because the anticipated actual damages are uncertain in amount and difficult to forecast accurately. The OWNER and the BIDDER agree that the amount of the Bid Security is a reasonable estimate of damages and not disproportionate to the anticipated loss or injury. The Bid Security of other BIDDER'S whom OWNER believes to have a reasonable chance of receiving the award may be retained by OWNER until the seventh day after the Effective Date of the Agreement whereupon Bid Security furnished by such BIDDER'S will be returned. Bid Security with Bids that are not competitive will be returned within fourteen days after the Bid opening.

8. Contract Time

8.1 The number of days within which, or the dates by which, the Work is to be completed (the Contract Time) is set forth in the Agreement.

9. Liquidated Damages

9.1 Provisions for liquidated damages, if any, are set forth in the Agreement and General Conditions.

10. Substitute and "Or Equal" Items

10.1 The Contract, if awarded, will be on the basis of materials and equipment described on the Drawings or specified in the Specifications without consideration of possible substitute or "or equal" items. Whenever it is indicated on the Drawings or specified in the Specifications that a substitute or "or - equal" item of material or equipment may be furnished or used by CONTRACTOR if acceptable to ENGINEER, application for such acceptance will not be considered by ENGINEER until after the Effective Date of the Agreement. The procedure for submission of any such application by CONTRACTOR and consideration by ENGINEER is set forth in paragraphs 6.7.1, 6.7.2, and 6.7.3 of the General Conditions and may be supplemented in the General Requirements.

11. Subcontractors, Suppliers, and Others

11.1 **When a BIDDER submits a Bid, that Bid shall include the Schedule of Subcontractors, which shall identify each element of the Work to be subcontracted. Traffic control subcontractors shall be prequalified and other Subcontractors whose subcontract exceeds five percent of the Total Bid Price shall be prequalified by the City of Louisville, City Engineer for their specific portion of the Work.**

11.2 If OWNER, who after due investigation has reasonable objection to any proposed Subcontractor, other person or organization, may before the Notice of Award is given, request the apparent Successful BIDDER to submit a substitute Subcontractor acceptable to the City without an increase in Bid price. If the apparent Successful BIDDER declines to make any such substitution, OWNER may award the contract to the next lowest BIDDER that proposes to use acceptable Subcontractors and other persons and organizations. The declining to make requested substitutions will not constitute grounds for sacrificing the Bid security of any BIDDER. Any Subcontractor or other person or organization listed and to whom OWNER does

not make written objection prior to the giving of the Notice of Award will be deemed acceptable to OWNER subject to revocation of such acceptance after the Effective Date of the Agreement as provided in Paragraph 6.8.2. of the General Conditions.

11.3 CONTRACTOR shall not be required to employ any Subcontractor, Supplier, other person, or organization against whom CONTRACTOR has reasonable objection.

11.4 The Contract Documents will take precedence over any nonconforming data submitted. Any Bid specifically conditioned upon furnishing equipment or materials, which are not responsive to the Contract Documents, will not be considered.

12. Bid Form

12.1 The Bid Form is included in the Contract Documents. A spreadsheet is available upon request, but a hard copy must be submitted with the sealed bids.

12.2 All blanks on the Bid Form must be completed by printing in ink or by typewriter. All unit prices including lump sums in the unit price schedule are to be expressed in numerals only.

12.3 Bids by corporations must be executed in the corporate name by the president or a vice-president (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal shall be affixed and attested by the secretary or an assistant secretary. The state of incorporation shall be shown below the corporate name.

12.4 Bids by partnerships must be executed in the partnership name and signed by a duly authorized general partner, whose title must appear under the signature and the official address of the partnership must be shown below the signature. A partnership shall give the full names and addresses of all partners and their interest and role in the partnership business.

12.5 All names must be typed or printed in ink below the signature.

12.6 The Bid shall contain an acknowledgment of receipt of all Addenda (the numbers of which must be filled in on the Bid Form).

12.7 The BIDDER's business address and telephone number for communications regarding the Bid must be shown.

12.8 Each Bid shall contain evidence of BIDDER's qualification to do business in the state of Colorado or covenant to obtain such qualification.

12.9 No alterations in Bids, or in the printed forms therefor, by erasures, interpolations, or otherwise will be accepted unless each such alteration is signed or initialed by the BIDDER; if initialed, OWNER may require the BIDDER to identify any alteration so initialed.

12.10 Bids will be based on a combination of unit price and lump sum schedules including alternatives. Unit price schedules shall be bid as provided in Paragraph 12.10.1 below. Lump sum schedules shall be bid as provided in paragraph 12.10.2 below.

12.10.1 Bids for unit price schedules shall be based on a unit price basis. The Total Bid Price will be determined as the sum of the products of the estimated quantity of each item and the unit price set forth in the Schedule of Unit Prices. The final Contract Price will be subject to adjustment according to final measured, used, or delivered quantities as provided in the Specifications and the unit prices in the Bid Form will apply to such final quantities except that unit prices may be subject to change by Change Order if quantities vary more than 25 percent.

12.10.2 Bids for lump sum schedules shall be based on a lump sum basis for each lump sum item.

13. Submission of Bids

13.1 Bids shall be submitted at the time and place indicated in the Advertisement of Invitation to Bid and shall be enclosed in an opaque sealed envelope, marked with the Project Title (and, if applicable, the designated portion of the Project for which the Bid is submitted) and name and address of the BIDDER, and addressed to the City of Louisville as indicated in the Advertisement of Invitation to Bid accompanied by the Bid Security and other required documents. If the Bid is sent through the mail or other delivery system the sealed Bid shall be enclosed in a separate envelope with the notation "BID ENCLOSED" on the face of the separate sealed envelope.

13.2 Bids shall be deposited at the designated location prior to the time and date for receipt of Bids indicated in the Invitation to Bid, or any extension thereof made by Addendum. Bids received after the time and date for receipt of Bids will be returned unopened. BIDDER shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

13.3 Oral, telephonic, or telegraphic Bids are invalid and will not receive consideration.

13.4 No BIDDER may submit more than one Bid. Multiple Bids under different names will not be accepted from one firm or association.

14. Modification and Withdrawal of Bids

14.1 Bids may be modified or withdrawn by an appropriate document duly executed (in a manner that a Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids.

14.2 Bids may also be modified or withdrawn in person by the BIDDER or an authorized representative provided he can prove his identity and authority.

14.3 Withdrawn Bids may be resubmitted up to the time designated for the receipt of Bids provided that they are then fully in conformance with these Instructions to BIDDERS.

14.4 If, within twenty-four hours after Bids are opened, any BIDDER files a duly signed, written notice with OWNER and promptly thereafter demonstrates to the reasonable satisfaction of OWNER that there was a material and substantial mistake in the preparation of its Bid, that BIDDER may withdraw its Bid and the Bid security will be returned. Thereafter, that BIDDER will be disqualified from further bidding on the Work to be provided under the Contract Documents.

15. Opening of Bids

15.1 Bids will be opened and (unless obviously non-responsive) read aloud publicly as indicated in the Invitation to Bid. An abstract of the amounts of the base Bids and major alternates (if any) will be made available to BIDDERS.

16. Bids to Remain Open Subject to Acceptance

16.1 All Bids shall remain open for sixty (60) days after the day of the Bid opening, but OWNER may, in its sole discretion, release any Bid and return the Bid Security prior to that date.

17. Award of Contract

17.1 OWNER reserves the right to reject any or all Bids, including without limitation the rights to reject any or all irregular, nonconforming, nonresponsive, unbalanced or conditional Bids and to reject the Bid of any BIDDER if OWNER believes that it would not be in the best interest of the Project to make an award to that BIDDER, whether because the Bid is not responsive or the BIDDER is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by OWNER. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

17.2 In evaluating Bids, OWNER will consider the qualifications of the BIDDERS, whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices and other data, as may be requested in the Bid Form or prior to the Notice of Award.

17.3 OWNER will consider the qualifications and experience of Subcontractors and other persons and organizations proposed for those portions of the Work as to which the identity of Subcontractors and other persons and organizations must be submitted. OWNER also will consider the operating costs, maintenance requirements, performance data and guarantees of major items of materials and equipment proposed for incorporation in the Work when such data is required to be submitted prior to the Notice of Award.

17.4 OWNER may conduct such investigations as OWNER deems necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications and financial ability of the BIDDER, proposed Subcontractors and other persons and organizations to perform and furnish the Work in accordance with the Contract Documents to OWNER's satisfaction within the prescribed time.

17.5 If the contract is to be awarded, it will be awarded to the lowest responsible BIDDER based on the combination of Bid Schedules as determined by OWNER and whose evaluation by OWNER indicates to OWNER that the award will be in the best interest of the Project.

17.6 If the contract is to be awarded, OWNER will accept the Bid within sixty days after the Bid opening and will give the Successful BIDDER a Notice of Award within sixty-five days after the day of the Bid opening. The OWNER's acceptance of the Bid proposal shall bind the successful BIDDER to sign the Contract Documents within ten (10) days after the date of the receipt by the BIDDER of the Notice of Award. The rights and obligations set forth in the Contract Documents shall become effective only with the signature of the **MAYOR** on behalf of the City.

17.7 It is the OWNER's intention to award the entire contract as bid. The OWNER reserves the right to award a contract that is in the best interest of the OWNER and within the amount budgeted. The OWNER has or will have prior to award appropriated monies at least equal to the contract amount. The Total Bid Price, subject to the other considerations herein, shall be the basis of award. Quantities may be reduced in order to reach budget amount, in that case the unit prices shall govern to determine the lowest Total Bid Price, which shall then determine the basis of award. If quantity reductions are required, quantities may be reduced from any item. Bid may be awarded by adding (or subtracting) the base bid plus any add alternatives, at the OWNER's sole discretion.

The BIDDER acknowledges that the OWNER has the right to delete any item of the Schedule of Unit Prices or change quantities and locations in any item at OWNER's sole discretion without affecting the contract prices of any item of the Contract so long as the deletion or change does not exceed twenty-five percent (25%) of the Total Bid Price. Notwithstanding the foregoing, if a reduction is made in Unit Price items or quantities, the lump sum cost for traffic control shall be reduced by the same percentage as the percentage change made from the original unit price cost/quantity to the reduced original unit price cost/quantity.

Quantities listed in the Schedule of Unit Prices are approximate and are for the purpose of comparing bids. These quantities have been estimated and are for the general information of the BIDDER. Quantities are not guaranteed.

17.8 In addition to Paragraph 17.1 of the Instructions to Bidders, in evaluating Bids, the OWNER will consider Bids irregular, and intends to reject Bids, for any of the following substantial reasons:

17.8.1 Unsigned Bid Form;

17.8.2 Bid Forms which have items omitted by the BIDDER;

17.8.3 Altering a Bid as to specified time of commencement of completion of Work;

17.8.4 Bid Forms not accompanied by a Bid Security of character indicated or of an amount less than indicated;

17.8.5 If the Bid Form is on a form other than that provided in Contract Documents, or if the Bid Form is altered;

17.8.6 If there are unauthorized additions, conditional or alternate Bids, or discrepancies of any nature that make the Bid Form incomplete, indefinite, or ambiguous as to its meaning;

17.8.7 If the BIDDER adds any provisions reserving the right to accept or reject an award, or to enter into a Contract pursuant to an award;

17.8.8 If the Schedule of Unit Prices in the Bid Form does not contain a unit price for each item number listed; or

17.8.9 Submitting more than one Bid, where there is evidence that any BIDDER has an interest in more than one Bid for the same work, or where there is evidence of collusion or other illegal activities between BIDDERS. In addition to any other

remedies the OWNER may have, the OWNER may retain as liquidated damages for the disruption of the bidding process the Bid Security of all bidders involved in collusion or other illegal activities. The BIDDER and the OWNER agree that the amount of the Bid Security is a reasonable estimate of damages for collusion and other illegal activities on the part of the BIDDER and not disproportionate to the anticipated loss or injury. A person or entity, which has quoted prices to a BIDDER, is not hereby disqualified from quoting prices to other BIDDERS or from submitting a direct bid on its own behalf.

17.8.10 In evaluating Bids, the OWNER may consider Bids informal, and may, in its sole discretion, elect to waive informalities for the following minor reasons:

17.8.11 Omission of dates when signed, or title of person signing;

17.8.12 Failure to acknowledge an addendum, which does not affect quantity, quality, time, or price;

17.8.13 Submission of a Bid in an unsealed envelope;

17.8.14 Unit price Bids which include reconcilable arithmetic errors may be corrected if it does not change the unit price; or

17.8.15 Unit price Bids which include reconcilable arithmetic errors may be corrected, if it does not change the amount on which the award will be based.

18. Contract Security

18.1 Paragraph 5.1 of the General Conditions set forth OWNER's requirements as to performance and payment Bonds. When the Successful BIDDER delivers the executed Agreement to OWNER it shall be accompanied by the required performance and payment Bonds.

19. Signing of Agreement

19.1 When OWNER gives a Notice of Award to the Successful BIDDER, it will be accompanied by the required number of unsigned counterparts of the Agreement with all other written Contract Documents attached. Within ten (10) days after CONTRACTOR's receipt of the Notice of Award, CONTRACTOR shall sign and have notarized the required number of counterparts of the Agreement and attached documents and return them to the OWNER along with the required Bonds, insurance certificates and power of attorney authorizations.

20. Special Legal Requirements

20.1 OWNER's Finances. OWNER has made adequate financial arrangements for the completion of all Work required by the Contract Documents and welcomes inquiries from prospective BIDDERS on the prime contract.

21. Sales and Use Taxes

21.1 OWNER is exempt from Colorado State Sales and Use Taxes on materials and equipment to be incorporated in the Work. Said taxes shall not be included in the Contract Price. Refer to General Conditions 6.15 for additional information.

22. Retainage

22.1 Provisions concerning retainage and CONTRACTORS' rights to deposit securities in lieu of retainage are set forth in the Agreement.

23. Mistakes in Bidding Instructions

23.1 If the OWNER makes a mistake in drafting the Instructions to Bidders or any other Contract Documents, the OWNER reserves the right to reject any or all Bids, or to require that BIDDERS submit an alternate bid proposal with adjustments made to correct the error(s). Such errors will be set forth in an addendum. If the CONTRACTOR has already been selected and has started performing work under the contract, and the OWNER then discovers a mistake in the Contract Documents for which the OWNER is responsible, the OWNER may opt to reform the contract. If the mistake causes the Contractor to receive compensation for materials not used in the Work or for labor, which would not be required for the Work, the Contract Price shall be decreased proportionally. If the mistake causes the CONTRACTOR to fail to bid on work, which must be performed in order to properly complete the contract, the OWNER may increase the Contract Price to equal the proportionate increase in the cost of required materials and labor caused to the CONTRACTOR. In the alternative, the OWNER may solicit bids for such additional work, or the OWNER may reassign such additional work to another CONTRACTOR, as the OWNER deems appropriate. Nothing in this provision shall apply to mistakes made by the CONTRACTOR in completing the Bid Form or in performing the contract.

Bid Form

PROJECT: **2024 SWQMP PILOT PROJECT**
PROJECT NUMBER: **503499-660287**
OWNER: **CITY OF LOUISVILLE, COLORADO**

THIS BID IS SUBMITTED TO: CITY OF LOUISVILLE, COLORADO

1. The undersigned BIDDER proposes and agrees, if this Bid is accepted, to enter into an Agreement with OWNER in the form included in the Contract Documents to perform and furnish all Work as specified or indicated in the Contract Documents for the Contract Price and within the Contract Time indicated in this Bid and in accordance with the other terms and conditions of the Contract Documents.

2. BIDDER accepts all of the terms and conditions of the Invitation to Bid and Instructions to Bidders, including without limitation those dealing with the disposition of Bid Security. This Bid will remain subject to acceptance for sixty days after the day of Bid opening. BIDDER will sign and submit the Agreement with the Bonds and other documents required by the Bidding Requirements within ten days after the date of OWNER's Notice of Award.

3. In submitting this Bid, BIDDER represents, as more fully set forth in the Agreement, that:

   (a) BIDDER has examined copies of all the Bidding Documents and of the following Addenda receipt of all which is hereby acknowledged: (List Addenda by Addendum Number and Date):

Date	Number
_____	_____
_____	_____

   (b) BIDDER has familiarized itself with the nature and extent of the Contract Documents, Work, site, locality, and all local conditions and Laws and Regulations that in any manner may affect cost, progress, performance or furnishing of the Work.

   (c) BIDDER has studied carefully all reports and drawings of subsurface conditions and drawings of physical conditions which are identified in the General Conditions as provided in paragraph 4.2, and accepts the determination set forth in paragraph 4.2 of the General Conditions. BIDDER has inspected the site and has obtained conducted and carefully studied (or assumes responsibility for obtaining and carefully studying) all examinations, investigations, explorations, tests and studies which pertain to the subsurface or physical conditions at the site or otherwise may affect the cost, progress, performance or furnishing of the Work as BIDDER considers necessary for the performance or furnishing of the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of paragraph 4.2 of the General Conditions; and no additional examinations, investigations, explorations, tests, reports, or similar information or data are or will be required by BIDDER for such purpose.(d) BIDDER has reviewed and checked all information and data shown or indicated on the Contract Documents with respect to existing Underground Facilities at or contiguous to the site and assumes responsibility for the accurate location of said Underground Facilities. No additional examinations, investigations, explorations, tests, reports or similar information or data in respect of said Underground Facilities are or will be required by BIDDER in order to perform and furnish the Work at the Contract Price, within the Contract Time and in accordance with the other terms and

conditions of Contract Documents, including specifically the provisions of paragraph 4.3 of the General Conditions.

(e) BIDDER has correlated the results of all such observations, examinations, investigations, explorations, tests, reports and studies with the terms and conditions of the Contract Documents.

(f) BIDDER has given ENGINEER written notice of all conflicts, errors, ambiguities, or discrepancies that BIDDER has discovered in the Contract Documents and the written resolution thereof by ENGINEER is acceptable to BIDDER, and the Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work for which this Bid is submitted.

(g) This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; BIDDER has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; BIDDER has not solicited or induced any person, firm or corporation to refrain from bidding; and BIDDER has not sought by collusion to obtain for himself any advantage over any other Bidder or over OWNER.

4. BIDDER will complete the Work in accordance with Contract Documents for the following price(s):

Schedule of Unit Prices

PROJECT: **2024 SWQMP PILOT PROJECT**
PROJECT NUMBER: **503499-660287**
OWNER: **CITY OF LOUISVILLE, COLORADO**

Pond WW-1 Schedule of Unit Prices						
Bid Item #	**Bid Item Code**	**Description**	**Unit**	**QTY**	**Unit Price**	**Total Cost**
1	GN-02-001	MOBILIZATION	LS	1		
2	GN-03-001	POTHOLING	EA	2		
3	GN-04-001	CONSTRUCTION SURVEYING	LS	1		
4	GN-05-001	TRAFFIC CONTROL	LS	1		
5	ESC-01-001	BMP INSTALLATION AND MAINTENANCE (ESC)	LS	1		
6	RR-06-001	REMOVAL OF FLARED END SECTION	EA	1		
7	RR-06-002	REMOVAL OF RIPRAP	SY	45		
8	RR-06-003	REMOVAL OF CONCRETE CURB (S. PLAY AREA)	LF	162		
9	RR-06-004	REMOVAL OF CONCRETE CURB (N. PLAY AREA-PARKS ITEM)	LF	159		
10	RR-06-005	REMOVE SEDIMENT FROM DRAINPIPE	EA	1		
11	RR-06-006	REMOVAL OF CONCRETE (S. SIDEWALK, TRICKLE CHANNEL)	SY	150		
12	RR-06-007	REMOVAL OF TREE, 6- to 24-Inch in Diameter	EA	6		
13	GG-02-001	GEOTEXTILE FILTER MATERIAL (NON-WOVEN)	SY	287		
14	ESP-02-001	UNCLASSIFIED EXCAVATION (COMPLETE IN PLACE)	CY	194		
15	RW-01-001	AGGREGATE BASE COURSE (CLASS 6)	TON	14		
16	RW-02-001	COBBLE MIX	TON	110		
17	RW-06-001	FEATURE BOULDERS, 24-INCH (PARKS ITEM)	TON	45		
18	RW-07-001	FOREBAY WALL	LF	90		

19	RW-09-001	FILTER MATERIAL, GRANULAR (3/4")	TON	56		
20	SS-08-001	6 INCH PRE-WRAPPED SLOTTED HDPE PIPE UNDERDRAIN	LF	38		
21	SC-04-001	CONCRETE CURB AND GUTTER (MATCH EXISTING)	LF	15		
22	SC-08-001	CONCRETE SIDEWALK (MATCH EXISTING)	SY	8		
23	SC-12-001	CONCRETE FOREBAY	SY	67		
24	SC-20-001	SAFETY GRATE, INCLUDE HEADWALL	EA	1		
25	LS-06-001	IRRIGATION REPLACEMENT/ADJUSTMENTS	SF	8,800		
26	LS-09-001	PLUG, VARIOUS	EA	740		
27	LS-10-001	SEEDING-CHANNEL	SF	4,700		
28	LS-10-002	SEEDING-TURF	SF	4,100		
29	LS-11-001	PLANTINGS (SHRUBS)	EA	67		
30	LS-13-001	TREE, ALDER, 1.5" CAL	EA	6		
31	LS-17-001	SOIL PREP/COMPOST	CY	82		
AA	LS-006-002	RELOCATE IRRIGATION LINE UNDER CHANNEL (ONLY IF NECESSSARY)	EA	1		
AA	RT-06-001	SIGNAGE (NO MOW)	EA	2		
AA	RT-06-002	SIGNAGE (NATIVE GRASSES)	EA	2		

POND WW-1 TOTAL COST (NOT INCLUDING ADD ALTS)	
POND WW-1 ADD ALT ITEMS TOTAL	
POND WW-1 TOTAL PROJECT COSTS (INCLUDING ADD ALTS)	

Pond Q-1 Schedule of Unit Prices						
Bid Item #	**Bid Item Code**	**Description**	**Unit**	**QTY**	**Unit Price**	**Total Cost**
1	GN-02-001	MOBILIZATION	LS	1		
2	GN-03-001	POTHOLING	EA	3		
3	GN-04-001	CONSTRUCTION SURVEYING	LS	1		
4	GN-05-001	TRAFFIC CONTROL	LS	1		
5	ESC-01-001	BMP INSTALLATION AND MAINTENANCE (ESC)	LS	1		
6	RR-06-001	REMOVAL OF RIPRAP	CY	399		
7	RR-06-002	REMOVAL OF SEDIMENT FROM DRAINPIPE	EA	1		
8	RR-06-003	REMOVAL OF CONCRETE (SIDEWALK AND MAIN CHANNEL)	SY	445		
9	GG-02-001	GEOTEXTILE FILTER MATERIAL (NON-WOVEN)	SY	1130		
10	ESP-02-001	UNCLASSIFIED EXCAVATION (COMPLETE IN PLACE)	CY	372		
11	ESP-03-001	EMBANKMENT MATERIAL (COMPLETE IN PLACE)	CY	55		
12	RW-01-001	AGGREGATE BASE COURSE (CLASS 6)	TON	8		
13	RW-02-001	COBBLE MIX	TON	353		
14	RW-06-001	FEATURE BOULDERS, 24-INCH (PARKS ITEM)	TON	75		
15	RW-07-001	FOREBAY WALL	LF	66		
16	RW-09-001	FILTER MATERIAL, GRANULAR (3/4")	TON	261		
17	RW-010-001	BURIED RIPRAP WITH TOPSOIL	CY	68		
18	SS-08-001	6 INCH PRE-WRAPPED SLOTTED HDPE PIPE UNDERDRAIN	LF	104		
19	SC-04-001	CONCRETE CURB AND GUTTER (MATCH EXISTING)	LF	15		
20	SC-08-001	CONCRETE SIDEWALK (MATCH EXISTING)	SY	8		

21	SC-12-001	CONCRETE FOREBAY	SY	39		
22	SC-12-002	ADD WEIR WALLS TO THREE EXISTNG CHANNELS	LS	1		
23	SC-20-001	SAFETY GRATE, INCLUDE HEADWALL	EA	1		
24	LS-06-001	TEMPORARY IRRIGATION	LS	1		
25	LS-10-001	SEEDING-CHANNEL	SF	22,300		
26	LS-11-001	PLANTINGS (SHRUBS)	EA	159		
27	LS-17-001	SOIL PREP/COMPOST	CY	140		
AA	RT-06-001	SIGNAGE (NO MOW)	EA	2		

POND Q-1 TOTAL COST (NOT INCLUDING ADD ALTS)	
POND Q-1 ADD ALT ITEMS TOTAL	
POND Q-1 TOTAL PROJECT COSTS (INCLUDING ADD ALTS)	

THE BASIS OF AWARD MAY BE THE BASE BID PRICE OR BASE BID PRICE PLUS ANY OR ALL ALTERNATES.

BID SUMMARY

A. POND WW-1 & Q-1 BASE BIDS TOTAL: $_____

B. POND WW-1 & Q-1 BASE BIDS & ALTERNATES TOTAL $ _____

Prices have been computed in accordance with paragraph 11.9.2 of the General Conditions.

BIDDER acknowledges that quantities are not guaranteed, and final payment will be based on actual quantities determined as provided in the Contract Documents.

5. BIDDER agrees that the Work;

   Will be substantially complete and completed and ready for final payment in accordance with paragraph 14.13 of the General Conditions on or before the dates or within the number of Contract Days indicated in the Agreement.

   BIDDER accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work within the times specified in the Agreement.

6. The following documents are attached to and made a condition of this Bid:

   (a) Required Bid Security;

   (b) A list of Subcontractors and other persons and organizations proposed to perform the Work are required to be identified on the Schedule of Subcontractors and submitted in this Bid;

   (c) Anti-Collusion Affidavit; and

   (d) If BIDDER is a partnership, a list of all partners, their addresses, and their interest and role in the partnership business.

7. Communications concerning this Bid shall be addressed to:
   The address of BIDDER indicated below.

   _____

   _____

   _____

8. Terms used in this Bid, which are defined in the General Conditions of the Construction Contract included as part of the Contract Documents, have the meanings assigned to them in the General Conditions.

SUBMITTED on _____, 2024.

If BIDDER is:

An Individual

By _____
(Individual's Name)

(SEAL)

doing business as _____

Business address: _____

_____

_____

Phone No.: _____

A Partnership

By _____
(Firm Name)

(SEAL)

_____
(General Partner)

Business address: _____

_____

_____

Phone No.: _____

A Corporation

By _____
(Corporation Name)

_____
(State of incorporation)

By _____
(Name of person authorized to sign)

_____
(Title)

(CORPORATE SEAL)

Attest _____
(Secretary)

Business address: _____

_____

_____

Phone No.:_____

Date of Qualification to do business: _____

A Joint Venture

By _____
(Name)

_____
(Address)

By _____
(Name)

_____
(Address)

Phone Number and Address for receipt of official communications

_____

_____

(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above.)

Bid Bond

BIDDER (Name and Address):

_____
_____
_____

SURETY (Name and Address of Principal Place of Business):

_____
_____
_____

OWNER (Name and Address):

_____
_____
_____

BID:

BID DUE DATE: _____
PROJECT (Brief Description Including Location):

_____
_____
_____

BOND:

BOND NUMBER: _____
DATE: (Not later than Bid Due Date): _____
PENAL SUM: _____

IN WITNESS WHEREOF, Surety and Bidder, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Bid Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

BIDDER	**SURETY**
_____(Seal)	_____(Seal)
Bidder's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	By: _____
Signature and Title	Signature and Title (Attach Power of Attorney)
Attest: _____	Attest: _____
Signature and Title	Signature and Title

Note: (1) Above addresses are to be used for giving requiring notice.
(2) Any singular reference to Bidder, Surety, Owner or other party shall be considered plural where applicable.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents the properly executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents and Contract Documents.

3. This obligation shall be null and void if:

    3.1. Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents and Contract Documents, or

    3.2. All bids are rejected by Owner, or

    3.3. Owner fails to issue a notice of award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by paragraph 5 hereof).

4. Payment under this Bond will be due and payable upon default of Bidder and within thirty (30) calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5. Surety waives notice of and any and all defenses based on or arising out of any time extension to issue notice of award agreed to in writing by Owner and Bidder, provided that the time for issuing notice of award including extensions shall not in the aggregate exceed 120 days from Bid Due Date without Surety's written consent.

6. No suit or action shall be commenced under this Bond prior to thirty (30) calendar days after the notice of default required in paragraph 4 above is received by Bidder and Surety, and in no case later than one year after Bid Due Date.

7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

8. Notice required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent or representative who executed this Bond on behalf of Surety to execute, seal and deliver such Bond and bind the Surety thereby.

10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirements of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of the Bond conflicts with any applicable provision of any applicable statute, then the provision of said statue shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11. The term "bid" as used herein includes a bid, offer or proposal as applicable.

Schedule of Subcontractors

PROJECT: **2024 SWQMP PILOT PROJECT**
PROJECT NUMBER: **503499-660287**
OWNER: **CITY OF LOUISVILLE, COLORADO**

This Bid is based on subcontracting certain portions of the work to subcontractors as listed below.

Name: _____ _ Telephone No. _____
Address:_____ _____ _____
City: _____ State: _____ Zip Code: _____
Services/equipment to be provided: _____
_____
_____

Name: _____ _ Telephone No. _____
Address:_____ _____ _____
City: _____ State: _____ Zip Code: _____
Services/equipment to be provided: _____
_____
_____

Name: _____ _ Telephone No. _____
Address:_____ _____ _____
City: _____ State: _____ Zip Code: _____
Services/equipment to be provided: _____
_____
_____

Name: _____ _ Telephone No. _____
Address:_____ _____ _____
City: _____ State: _____ Zip Code: _____
Services/equipment to be provided: _____
_____
_____

Name: _____ _ Telephone No. _____
Address:_____ _____ _____
City: _____ State: _____ Zip Code: _____
Services/equipment to be provided: _____
_____
_____

Name: _____ _ Telephone No. _____
Address:_____ _____ _____
City: _____ State: _____ Zip Code: _____
Services/equipment to be provided: _____
_____

Anti-Collusion Affidavit

PROJECT: **2024 SWQMP PILOT PROJECT**
PROJECT NUMBER: **503499-660287**
OWNER: **CITY OF LOUISVILLE, COLORADO**

I hereby attest that I am the person responsible within my firm for the final decision as to the price(s) and amount of this Bid or, if not, that I have written authorization, enclosed herewith, from that person to make the statements set out below on his or her behalf of my firm.

I further attest that:

1. The price(s) and amount of this bid have been arrived at independently, without consultation, communication, or agreement for the purpose or with the effect of restricting competition with any other firm or person who is a BIDDER or potential prime BIDDER.

2A. Neither the price(s) nor the amount of this Bid have been disclosed to any other firm or person who is a BIDDER or potential prime BIDDER on this project and will not be so disclosed prior to bid opening.

2B. Neither the prices nor the amount of the Bid of any other firm or person who is a BIDDER or potential prime BIDDER on this project have been disclosed to me or my firm.

3A. No attempt has been made to solicit, cause, or induce any firm or person who is BIDDER or potential prime BIDDER to refrain from bidding on this project, or to submit a Bid higher than the Bid of this firm, or any intentionally high or noncompetitive Bid or other form of complementary Bid.

3B. No agreement has been promised or solicited for any other firm or person who is a BIDDER or potential prime BIDDER on this project to submit an intentionally high, noncompetitive, or other form of complementary bid on this project.

4. The Bid of my firm is made in good faith and not pursuant to any consultation, communication, agreement, or discussion with, or inducement or solicitation by or from any firm or person to submit any intentionally high, noncompetitive, or other form of complementary bid.

5. My firm has not offered or entered into a subcontract or agreement regarding the purchase or sale of materials or services from any firm or person, or offered, promised, or paid cash or anything of value to any firm or person, whether in connection with this or any other project, in consideration for an agreement or promise by any firm or person to refrain from bidding or to submit any intentionally high, noncompetitive, or other form of complementary bid or agreeing or promising to do so on this project.

6. My firm has not accepted or been promised any subcontract or agreement regarding the sale of materials or services to any firm or person, and has not been promised or paid cash or anything of value by any firm or person, whether in connection with this or any other project, in consideration for my firm's submitting any intentionally high, noncompetitive or other form of complementary bid, or agreeing or promising to do so, on this project.

7. I have made a diligent inquiry of all members, officers, employees, and agents of my firm with responsibilities relating to the preparation, approval or submission of my firm's bid on this project and have been advised by each of them that he or she has not participated in any communication, consultation, discussion, agreement, collusion, or other conduct inconsistent with any of the statements and representations made in this affidavit.

8. I understand and my firm understands that any misstatement in this affidavit is and shall be treated as a fraudulent concealment from the OWNER of the true facts relating to submission of bids for this contract.

I DECLARE UNDER PENALTY OF PERJURY IN THE SECOND DEGREE, AND ANY OTHER APPLICABLE STATE OR FEDERAL LAWS THAT THE STATEMENTS MADE ON THIS DOCUMENT ARE TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

CONTRACTOR'S FIRM OR COMPANY NAME	SECOND CONTRACTOR'S FIRM OR COMPANY NAME (IF JOINT VENTURE)
BY: _____	BY: _____
TITLE: _____	TITLE: _____
DATE: _____	DATE: _____

SWORN BEFORE ME THIS _____ DAY OF, _____, 2024

NOTARY PUBLIC: _____ MY COMMISSION EXPIRES: _____

Certification of EEO Compliance

PROJECT: **2024 SWQMP PILOT PROJECT**
PROJECT NUMBER: **503499-660287**
OWNER: **CITY OF LOUISVILLE, COLORADO**

Instructions: BIDDERs and Subcontractors must complete and submit this form with the Bid Form. This is required by the Equal Employment Opportunity Regulations 41 CFR 1.7 (b) (1).

1. ___ Yes ___ No — I have developed and have on file at each establishment an affirmative action program as required by 41 CFR Chapter 60, Part 60-2.

2. ___ Yes ___ No — I have participated in a previous contract/subcontract subject to the equal opportunity clause.

3. ___ Yes ___ No — I have filed with the Joint Reporting Committee, the Director, or the Equal Employment Opportunity Commission all reports due under the applicable filing requirements.

I declare under penalty of perjury in the second degree and any other applicable state or federal laws that the statements made in this document are true and complete to the best of my knowledge.

CONTRACTOR
___ BIDDER **___ PROPOSED SUBCONTRACTOR**

BY: _____

TITLE: _____

DATE: _____

City of Louisville Public Services Contract Addendum

Prohibition Against Employing Workers Without Authorization

PROJECT:	**2024 SWQMP PILOT PROJECT**
PROJECT NUMBER:	**503499-660287**
OWNER:	**CITY OF LOUISVILLE, COLORADO**

Prohibition Against Employing Workers Without Authorization. Contractor shall not knowingly employ or contract with a worker without authorization to perform work under this contract. Contractor shall not enter into a contract with a subcontractor that fails to certify to the Contractor that the subcontractor shall not knowingly employ or contract with a worker without authorization to perform work under this contract.

Contractor will participate in either the E-verify program or the Department program, as defined in C.R.S. § § 8-17.5-101(3.3) and 8-17.5-101(3.7), respectively, in order to confirm the employment eligibility of all employees who are newly hired for employment to perform work under the public contract for services. Contractor is prohibited from using the E-verify program or the Department program procedures to undertake pre-employment screening of job applicants while this contract is being performed.

If Contractor obtains actual knowledge that a subcontractor performing work under this contract for services knowingly employs or contracts with a worker without authorization, Contractor shall:

a. Notify the subcontractor and the City within three days that the Contractor has actual knowledge that the subcontractor is employing or contracting with a worker without authorization; and

b. Terminate the subcontract with the subcontractor if within three days of receiving the notice required pursuant to this paragraph the subcontractor does not stop employing or contracting with the worker without authorization; except that the Contractor shall not terminate the contract with the subcontractor if during such three days the subcontractor provides information to establish that the subcontractor has not knowingly employed or contracted with a worker without authorization.

Contractor shall comply with any reasonable request by the Department of Labor and Employment made in the course of an investigation that the Department is undertaking pursuant to the authority established in C.R.S. § 8-17.5-102(5).

If Contractor violates a provision of this Contract required pursuant to C.R.S. § 8-17.5-102, City may terminate the contract for breach of contract. If the contract is so terminated, the Contractor shall be liable for actual and consequential damages to the City.

Contractor's Pre-Contract Certification

Regarding Employing Workers Without Authorization

PROJECT: **2024 SWQMP PILOT PROJECT**
PROJECT NUMBER: **503499-660287**
OWNER: **CITY OF LOUISVILLE, COLORADO**

The proposer of public services to the City of Louisville identified below (hereafter "the Proposer"), hereby certifies as follows:

That at the time of providing this certification, Proposer does not knowingly employ or contract with an illegal alien; and that Proposer has participated in or attempted to participate in the Basic Pilot Program administered by the United States Department of Homeland Security in order to verify that it does not employ any illegal aliens.

Dated this _____ day of _____, 20____.

Proposer: _____

By: _____

Title: _____

Agreement

THIS AGREEMENT is made and entered into this __ day of _____ in the year 2024 by and between:

CITY OF LOUISVILLE, COLORADO
(hereinafter called OWNER)

and

_____
(hereinafter called CONTRACTOR)

OWNER and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, agree as follows.

Article 1. Work

CONTRACTOR shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

PROJECT: **2024 SWQMP PILOT PROJECT**
PROJECT NUMBER: **503499-660287**

Article 2. Contract Times

2.1. The CONTRACTOR shall substantially complete all work within **80 Contract Days** from the date when the Contract Time commences to run as identified in the Notice to Proceed. The Work shall be completed and ready for final payment in accordance with paragraph 14.13 of the General Conditions.

2.2. LIQUIDATED DAMAGES. The OWNER and the CONTRACTOR agree and recognize that time is of the essence in this contract and that the OWNER will suffer financial loss if the Work is not substantially complete by the date specified in paragraph 2.1 above, plus any extensions thereof allowed in accordance with the Article 12 of the General Conditions. OWNER and CONTRACTOR also agree that such damages are uncertain in amount and difficult to measure accurately. Accordingly, the OWNER and CONTRACTOR agree that as liquidated damages, and not as a penalty, for delay in performance the CONTRACTOR shall pay the OWNER **ONE THOUSAND DOLLARS ($1,000)** for each and every **Contract Day** and portion thereof that expires after the time specified above for substantial completion of the Work until the same is finally complete and ready for final payment. The liquidated damages herein specified shall only apply to the CONTRACTOR's delay in performance, and shall not include litigation or attorneys' fees incurred by the OWNER, or other incidental or consequential damages suffered by the OWNER due to the CONTRACTOR's performance. If the OWNER charges liquidated damages to the CONTRACTOR, this shall not preclude the OWNER from commencing an action against the CONTRACTOR for other actual harm resulting from the CONTRACTOR's performance, which is not due to the CONTRACTOR's delay in performance.

Article 3. Contract Price

3.1. The OWNER shall pay in current funds, and the CONTRACTOR agrees to accept in full payment for performance of the Work, subject to additions and deductions from extra and/or omitted work and determinations of actual quantities as provided in the Contract Documents, the Contract Price of _____dollars $ _____ set forth in the Bid Form of the CONTRACTOR dated _____.

As provided in paragraph 11.9 of the General Conditions estimated quantities are not guaranteed, and determinations of actual quantities and classification are to be made by ENGINEER as provided in paragraph 9.10 of the General Conditions. Unit prices have been computed as provided in paragraph 11.9 of the General Conditions.

Article 4. Payment Procedures

CONTRACTOR shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by OWNER as provided in the General Conditions.

4.1 PROGRESS PAYMENTS. OWNER shall make progress payments on the basis of CONTRACTOR's Applications for Payment as recommended by ENGINEER, on or about the third Wednesday of each month during construction as provided below. All progress payments will be on the basis of the progress of the Unit Price Work based on the number of units completed as provided in the General Conditions.

4.1.1.1 Prior to final completion and acceptance, progress payments will be made in the amount equal to 95 percent of the calculated value of completed Work, and/or 95 percent of materials and equipment not incorporated in the Work (but delivered, suitably stored and accompanied by documentation satisfactory to OWNER as provided in 14.2 of the General Conditions), but in each case, less the aggregate of payments previously made and such less amounts as ENGINEER shall determine, or OWNER may withhold, in accordance with paragraph 14.7 of the General Conditions.

If OWNER finds that satisfactory progress is being made in any phase of the Work, it may, in its discretion and upon written request by the CONTRACTOR, authorize final payment from the withheld percentage to the CONTRACTOR or subcontractors who have completed their work in a manner finally acceptable to the OWNER. Before any such payment may be made, the OWNER must, in an exercise of its discretion, determine that satisfactory and substantial reasons exist for the payment and there must be provided to the OWNER written approval from any surety furnishing bonds for the Work.

Nothing contained in this provision shall preclude the OWNER and CONTRACTOR from making other arrangements consistent with C.R.S. 24-91-105 prior to contract award.

4.2 FINAL PAYMENT. Upon final completion and acceptance of the Work in accordance with paragraph 14.13 of the General Conditions, OWNER shall pay the remainder of the Contract Price as provided in said paragraph 14.13 of the General Conditions.

Article 5. Contractor's Representations

In order to induce OWNER to enter into this Agreement CONTRACTOR makes the following representations:

5.1. CONTRACTOR has examined and carefully studied the Contract Documents, (including the Addenda listed in paragraph 6.10) and the other related data identified in the Bidding Documents including "technical".

5.2. CONTRACTOR has inspected the site and become familiar with and is satisfied as to the general, local

and site conditions that may affect cost, progress, performance or furnishing of the Work.

5.3. CONTRACTOR is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress and furnishing of the Work.

5.4. CONTRACTOR has carefully studied all reports of exploration and tests of subsurface conditions at or contiguous to the site and all drawings of physical conditions relating to surface or subsurface structures at or contiguous to the site (Except Underground facilities) which have been identified in the General Conditions as provided in paragraph 4.2.1 of the General Conditions. CONTRACTOR accepts the determination set forth in paragraph 4.2 of the General Conditions. CONTRACTOR acknowledges that such reports and drawings are not Contract Documents and may not be complete for CONTRACTOR's purposes. CONTRACTOR acknowledges that OWNER and ENGINEER do not assume responsibility for the accuracy or completeness of information and data shown or indicated in the Contract Documents with respect to such reports, drawings or to Underground Facilities at or contiguous to the site. CONTRACTOR has conducted, obtained and carefully studied (or assume responsibility for having done so) all necessary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the site or otherwise which may affect cost, progress, performance or furnishing of the Work or which relate to any aspect of the means, methods, techniques, sequences and procedures of construction to be employed by CONTRACTOR and safety precautions and programs incident thereto. CONTRACTOR does not consider that any additional examinations, investigations, explorations, tests, studies or data are necessary for the performance and furnishing of the Work at the Contract Price, within the Contract Times and in accordance with the other terms and conditions of the Contract Documents.

5.5. CONTRACTOR has reviewed and checked all information and data shown or indicated on the Contract Documents with respect to existing Underground Facilities at or contiguous to the site and assumes responsibility for the accurate location of said Underground Facilities. No additional examinations, investigations, explorations, tests, reports, studies or similar information or data in respect of said Underground Facilities are or will be required by CONTRACTOR in order to perform and furnish the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of paragraph 4.3 of the General Conditions.

5.6. CONTRACTOR is aware of the general nature of work to be performed by OWNER and others at the site that relates to the Work as indicated in the Contract Documents.

5.7. CONTRACTOR has correlated the information known to CONTRACTOR, information and observations obtained from visits to the site, reports and drawings identified in the Contract Documents and all additional examinations, investigations, explorations, tests studies and data with the Contract Documents.

5.8. CONTRACTOR has given ENGINEER written notice of all conflicts, errors, ambiguities, or discrepancies that CONTRACTOR has discovered in the Contract Documents and the written resolution thereof by ENGINEER is acceptable to CONTRACTOR, and the Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing the Work.

Article 6. Contract Documents

The Contract Documents, which constitute the entire agreement between OWNER and CONTRACTOR concerning the Work, are all written documents, which define the Work and the obligations of the Contractor in performing the Work and the OWNER in providing compensation for the Work. The Contract Documents include the following:

6.1. Invitation to Bid.

6.2. Instruction to Bidders.
6.3. Bid Form.
6.4. This Agreement.
6.5. General Conditions.
6.6. Supplementary Conditions.
6.7. General Requirements.
6.8. Technical Specifications.
6.9. Drawings with each sheet bearing the title: **2024 SWQMP PILOT PROJECT .**
6.10. Change Orders, Addenda and other documents which may be required or specified including:
- 6.10.1. Addenda No. __ to __ exclusive
- 6.10.2. Documentation submitted by CONTRACTOR prior to Notice of Award
- 6.10.3. Schedule of Subcontractors
- 6.10.4. Anti-Collusion Affidavit
- 6.10.5. Certification of EEO Compliance
- 6.10.6. Notice of Award
- 6.10.7. Performance Bond
- 6.10.8. Labor and Material Payment Bond
- 6.10.9. Certificates of Insurance
- 6.10.10. Notice to Proceed
- 6.10.11. Contractor's Proposal Request
- 6.10.12. Contractor's Overtime Request
- 6.10.13. Field Order
- 6.10.14. Work Change Directive
- 6.10.15. Change Order
- 6.10.16. Application for Payment
- 6.10.17. Certificate of Substantial Completion
- 6.10.18. Claim Release
- 6.10.19. Final Inspection Report
- 6.10.20. Certificate of Final Completion
- 6.10.21. Guarantee Period Inspection Report

6.11. The following which may be delivered or issued after the Effective Date of the Agreement and are attached hereto: All Written Amendments and other documents amending, modifying, or supplementing the Contract Documents pursuant to paragraphs 3.5 and 3.6 of the General Conditions.

6.12. In the event of conflict between the above documents, the prevailing document shall be as follows:
1. Permits from other agencies as may be required.
2. Special Provisions and Detail Drawings.
3. Technical Specifications and Drawings. Drawings and Technical Specifications are intended to be complementary. Anything shown or called for in one and omitted in another is binding as if called for or shown by both.
4. Supplementary Conditions.
5. General Conditions.
6. City of Louisville Design and Construction Standards.
7. Reference Specifications.

In case of conflict between prevailing references above, the one having the more stringent requirements shall govern.

There are no Contract Documents other than those listed above in this Article 6. The Contract Documents may only be amended, modified, or supplemented as provided in paragraphs 3.5 and 3.6 of the General Conditions.

Article 7. Miscellaneous

7.1. Terms used in this Agreement, which are defined in Article 1 of the General Conditions, shall have the meanings indicated in the General Conditions.

7.2. No assignment by a party hereto of any rights under or interests in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment no assignment will release or discharge that assignor from any duty or responsibility under the Contract Documents.

7.3. OWNER and CONTRACTOR each binds itself, its partners, successors, assigns and legal representatives to the other party hereto, its partners, successors, assigns and legal representatives in respect to all covenants, agreements and obligations contained in the Contract Documents.

7.4. OWNER AND CONTRACTOR consent to the use of electronic signatures on the Contract Documents. This Agreement, and any other Contract Documents requiring a signature hereunder, may be signed electronically by the Parties in the manner specified under the Uniform Electronic Transactions Act, Title 24, Article 71.3, Part 1, C.R.S.; provided that, electronic records of, and electronic signatures on, any required bonds, including required Performance, Labor and Material Payment, and Warranty Bonds, must be acceptable to the Contractor's selected surety. The Parties agree not to deny the legal effect or enforceability of a Contract Document solely because the document is in electronic form or because an electronic record was used in its formation. The Parties agree not to object to the admissibility of a Contract Document in the form of an electronic record, or a paper copy of an electronic document, or a paper copy or electronic record of a document bearing an electronic signature, on the ground that it is an electronic record or electronic signature or that it is not in its original form or is not an original.

Article 8. Other Provisions

IN WITNESS WHEREOF, OWNER, and CONTRACTOR have signed this Agreement in duplicate. One counterpart each has been delivered to OWNER and CONTRACTOR. All portions of the Contract Documents have been signed, initialed, or identified by OWNER and CONTRACTOR.

This Agreement will be effective on _____, 2024.

OWNER: CITY OF LOUISVILLE, COLORADO

By: _____
Christopher M. Leh, Mayor

(CORPORATE SEAL)

Attest: _____
Meredyth Muth, City Clerk

Address for giving notices:

749 Main Street
Louisville, Colorado
80027

Attention: City Engineer

CONTRACTOR: _____

By: _____

(CORPORATE SEAL)

Attest: _____

Address for giving notices:

_____

_____

_____

Performance Bond

_____ , as Principal, hereinafter called the Contractor, and

_____, as Surety, with general offices in

_____
a Corporation organized under the laws of the State of _____, and authorized to transact business in the State of Colorado, are hereby bound unto the City of Louisville, Colorado, as Obligee, hereinafter called the City, in the penal sum of _____ ($_____) in the United States currency, for the payment of which sum the Contractor and Surety bind themselves, their heirs, executors, administrators, successors, and assigns, jointly and severally.

WHEREAS, the Contractor has entered into a written contract with the City dated _____, 2024, for _____ in accordance with plans and specifications contained in the Contract, a copy of which Contract is attached hereto and made a part hereof and is hereinafter referred to as the Contract;

NOW, THEREFORE, the conditions of this performance bond are such that, if the Contractor shall satisfactorily perform the Contract, then this bond shall be null and void; otherwise, the Surety shall promptly remedy the default, or shall promptly 1) Complete the Contract in accordance with its terms and conditions, or 2) Obtain a Bid or Bids for completing the contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible bidder, or if the City elects, upon determination by the City and the Surety jointly of the lowest responsible bidder, arrange for a Contract between such Bidder and the City, and make available as work progresses (even though there should be a default or a succession of defaults under the Contract or Contracts of completion arranged under this paragraph) sufficient funds to pay the costs of completion plus liquidated damages additional costs pursuant to Section 12.2 of the General Conditions of the Contract less the balance of the contract price, but not exceeding the amount set forth in the first paragraph hereof. The term "balance of the contract price", as used in this paragraph, shall mean the total amount payable by the City to the Contractor under the Contract and any amendments thereto, less the amount paid by the City to Contractor.

In addition, if the Contractor or a subcontractor shall fail to duly pay for any labor, materials, team hire, sustenance, provisions, provender, or other supplies used or consumed by such Contractor or subcontractor in performance of the Contract, or shall fail to duly pay any person who supplies rental machinery, tools, or equipment, all amounts due as the result of the use of such machinery, tools or equipment in the prosecution of the Work, then the Surety shall pay the same in the amount not exceeding the sum specified in the bond together with interest at a rate of eight percent per annum.

In addition to the other conditions hereof, this bond shall include all provisions set forth in Section 38-26-106, C.R.S.

THE UNDERSIGNED SURETY for value received hereby agrees that no extension of time, change in, addition to, or other modification of the terms of the Contract of Work to be performed thereunder or the specifications of the Contract Documents shall in any way affect its obligation on this bond and the Surety does hereby waive notice of any such extension of time, change, addition, or modifications.

SIGNED AND SEALED this day of_____ , 20____.

_____	_____
(Contractor)	**(Surety Company)**
By: _____ (President)	Address: _____
_____ (Attest)	By: _____ (Attorney-in-fact)

Labor and Material Payment Bond

BOND NUMBER:

KNOW ALL MEN BY THESE PRESENCES: that

(Firm) _____
(Address) _____
(an Individual), (a Partnership), (a Corporation), hereinafter referred to as "the Principal", and

(Firm) _____
(Address) _____
hereinafter referred to as "the Surety", are held and firmly bound unto the
CITY OF LOUISVILLE, 749 MAIN STREET, LOUISVILLE, COLORADO a Municipal Corporation, hereinafter referred to as "the Owner", in the penal sum of
_____ Dollars
($_____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITIONS OF THIS OBLIGATION are such that whereas the Principal entered into a certain Agreement with the Owner, dated the _____ day of _____, 2024, a copy of which is hereto attached and made a part hereof for the performance of

---

NOW, THEREFORE, if the Principal shall make payment to all persons, firms, subcontractors, and corporations furnishing materials for or performing labor in the prosecution of the Work provided for in such Agreement, and any authorized extension or modification thereof, including all amounts due for materials, lubricants, repairs on machinery, equipment and tools, consumed, rented or used in connection with the construction of such work, and all insurance premiums on said Work, and for all labor, performed in such Work whether by Subcontractor or otherwise, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Agreement or to the Work to be performed thereunder or the specifications accompanying the same shall in any way affect its obligation on this Bond; and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Agreement or to the Work or to the Specifications.

PROVIDED, FURTHER, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.
In addition to the other conditions hereof, this bond shall include all provisions set forth in Section 38-26-105, C.R.S.

IN WITNESS WHEREOF, this instrument is executed in (3) counterparts, each one of which shall be deemed an original, this _____ day of _____, 20____.

IN THE PRESENCE OF:

PRINCIPAL

_____

_____

PRINCIPAL:

BY: _____

_____
(Title)

(Corporate Seal)

Address:

_____

_____

_____

IN THE PRESENCE OF:

_____

_____

OTHER PARTNERS:

By: _____

By: _____

IN THE PRESENCE OF:

_____

_____

SURETY:

By: _____
(Attorney-in fact)

(Surety Seal)

Address:

_____

_____

NOTE: Date of Bond must not be prior to date of Agreement.
If Contractor is a Partnership, all partners must execute Bond.

IMPORTANT: Surety Company must be authorized to transact business in the state of Colorado and be acceptable to the Owner.

Notice of Award

DATED: _____

TO: _____
_____
_____

PROJECT: **2024 SWQMP PILOT PROJECT**
PROJECT NUMBER: **503499-660287**
OWNER: **CITY OF LOUISVILLE, COLORADO**

Please be advised that on _____, the City of Louisville, Colorado City Council awarded the 2024 SWQMP PILOT PROJECT to your company in the amount of $_____ per your low unit price bid. In accordance with the Contract Documents, you are required to execute two copies of the Agreement and return both copies with the required bonds and certificates of insurance within **10 days** of the date of this Notice of Award by _____.

Failure to comply with these conditions within the time specified will entitle OWNER to consider your bid abandoned, to annul this Notice of Award and to declare your Bid Security forfeited.

CITY OF LOUISVILLE, COLORADO	ACCEPTANCE OF NOTICE
By: _____	By: _____
Tyler Trojan, P.E.	
Title: Civil Engineer III _____	Title: _____

Notice to Proceed

DATED: _____

TO: _____
_____
_____

PROJECT: **2024 SWQMP PILOT PROJECT**
PROJECT NUMBER: **503499-660287**
OWNER: **CITY OF LOUISVILLE, COLORADO**

You are hereby notified that the Contract Time under the above Contract will commence to run on _____. On that date, you are to begin performing the Work in accordance with the Contract Documents and you are to complete the Work within _____ **Contract Days** thereafter. The date of substantial completion of all Work is therefore _____**.**

CITY OF LOUISVILLE, COLORADO

By: _____
Tyler Trojan, P.E.

Title: Civil Engineer III

ACKNOWLEDGEMENT

Receipt of the above Notice to Proceed is hereby acknowledged.

CONTRACTOR: _____

By: _____

Title: _____

Date: _____

Change Order Form

CHANGE ORDER NO. _____

DATED: _____

PROJECT: 2024 SWQMP PILOT PROJECT **AGREEMENT DATE: _____**

PROJECT NUMBER: 503499-660287 **OWNER: CITY OF LOUISVILLE, COLORADO**

The following changes are hereby made to the Contract Documents:
Description: _____

			Unit S	$ COST
	TOTAL			

Attachments: _____

ADJUSTMENT TO CONTRACT PRICE:

Original contract price	$_____
Set change previous Change Orders No. 0 to 0	$_____
Contract price prior to this Change Order	$_____
Net adjustment resulting from this Change Order (+/-)	$_____
Current contract price including this Change Order	$_____

ADJUSTMENT TO CONTRACT TIME:

Original contract time (days or date)	_____
Net change previous Change Orders No. __ to __ (days)	_____
Contract time prior to this Change Order (days or date)	_____
Net Adjustment Resulting from this Change Order (days)	_____
Current contract time including this Change Order (days or date)	_____

The Contractor's signature below indicates acceptance of full settlement for the work described, both direct and indirect costs. Any claims for additional costs associated with this Change Order will not be considered.

Recommended:	Approved:	Accepted:
_____	CITY OF LOUISVILLE, COLORADO	_____
ENGINEER	OWNER	CONTRACTOR
By: _____	By: _____	By: _____
Date: _____	Date: _____	Date: _____

Field Order Form

FIELD ORDER NO. _____

TO: _____

PROJECT:	**2024 SWQMP PILOT PROJECT**
PROJECT NUMBER:	**503499-660287**
OWNER:	**CITY OF LOUISVILLE, COLORADO**

DATE ISSUED: _____

You are hereby directed and instructed to execute promptly minor variations in the Work by this Field Order as follows:

Attachments:

This form shall be used to authorize minor variations in the Work from the requirements of the Contract Documents, which do not include an adjustment in the Contract Price or the Contract Times.

CITY OF LOUISVILLE		**ACCEPTED BY CONTRACTOR**	
BY:	_____	BY:	_____
TITLE:	_____	TITLE:	_____
DATE:	_____	DATE:	_____

Work Change Directive Instructions

A. GENERAL INFORMATION

This document was developed for use in situations involving changes in the Work that, if not processed expeditiously, might delay the Project. These changes are often initiated in the field and may affect the Contract Price or the Contract Times. This is not a Change Order, but only a directive to proceed with Work that may be included in a subsequent Change Order.

For supplemental instructions and minor changes not involving a possible change in the Contract Price or the contract Times a Field Order may be used.

B. COMPLETING THE WORK CHANGE DIRECTIVE FORM

Engineer initiates the form, including a description of the items involved and attachments.

Based on conversations between Engineer and Contractor, Engineer completes the following:

METHOD OF DETERMINING CHANGE, IF ANY, IN CONTRACT PRICE. Mark the method to be used in determining the final cost of Work involved and the estimated net effect on the Contract Price. If the change involves an increase in the Contract Price and the estimated amount is approached before the additional or changed Work is completed, another Work Change Directive must be issued to change the estimated price or Contractor may stop the changed Work when the estimated price is reached. If the Work Change Directive is not likely to change the Contract Price, the space for estimated increase (decrease) should be marked “Not Applicable”.

METHOD OF DETERMINING CHANGE, IF ANY, IN CONTRACT TIMES: Mark the method to be used in determining the change in Contract Times and the estimated increase or decrease in Contract Times. If the change involves an increase in the Contract Times and the estimated times are approached before the additional or changed Work is completed, another Work Change Directive must be issued to change the times or Contractor may stop the changed Work when the estimated times are reached. If the Work Change Directive is not likely to change the Contract Times, the space for estimated increase (decrease) should be marked “Not Applicable”.

Once authorized by Engineer a copy will be sent to Contractor. Price and Times may only be changed by Change Order signed by Owner and Contractor.

Once the Work covered by this directive is completed or final cost and times are determined, Contractor should submit documentation for inclusion in a Change Order.

THIS IS A DIRECTIVE TO PROCEED WITH A CHANGE THAT MAY AFFECT THE CONTRACT PRICE OR THE CONTRACT TIMES. A CHANGE ORDER, IF ANY, SHOULD BE CONSIDERED PROMPTLY.

Work Change Directive Form

WORK CHANGE DIRECTIVE NO. _____

PROJECT: **2024 SWQMP PILOT PROJECT**
PROJECT NUMBER: **503499-660287**
OWNER: **CITY OF LOUISVILLE, COLORADO**

DATE ISSUED: _____ EFFECTIVE DATE: _____

You are directed to proceed promptly with the following change(s):

Description:

_____
_____
_____

Purpose of Work Change Directive:

_____
_____
_____

Attachments (List documents supporting change):

_____
_____
_____

If a claim is made that the above change(s) have affected Contract Price of Contract Times any claim for a Change Order based thereon will involve one or more of the following methods of determining the effect of the change(s).

Method of determining change in Contract Price:

____ Unit Prices
____ Lump Sum
____ Other _____
_____
_____

Method of determining change in Contract Times:

____ Contractor's Records
____ Engineer's Records
____ Other _____
_____
_____

Estimated increase (decrease) in Contract Price:
$_____
If the change involves an increase, the estimated amount is not to be exceeded without further authorization.

Estimated increase (decrease) in Contract Times
Substantial Completion: _____days;
Ready for final payment: _____days.
If the change involves an increase, the estimated times are not to be exceeded without further authorization.

RECOMMENDED:

_____
ENGINEER

BY: _____

ACCEPTED:

_____
CONTRACTOR

BY: _____

Application for Payment Form

APPLICATION FOR PAYMENT

PROGRESS PAYMENT NO. _____ FOR WORK THROUGH THE DATE OF: _____, 20___
PROJECT: CONCRETE REPLACEMENT PROJECT
PROJECT NUMBER: 301312-660022

DATE SUBMITTED: _____, 20___

OWNER: CITY OF LOUISVILLE
749 MAIN STREET
LOUISVILLE, CO 80027

CONTRACTOR: _____

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL PRICE	QUANTITY PREVIOUS PERIOD	QUANTITY THIS PERIOD	QUANTITY TOTAL TO DATE	AMOUNT PREVIOUS PAYMENT	AMOUNT THIS PAYMENT	AMOUNT TOTAL PAYMENT	PERCENT (%) COMPLETE
				$_____	$_____				$_____	$_____	$_____	
				$_____	$_____				$_____	$_____	$_____	
				$_____	$_____				$_____	$_____	$_____	
				$_____	$_____				$_____	$_____	$_____	
				$_____	$_____				$_____	$_____	$_____	
				$_____	$_____				$_____	$_____	$_____	
				$_____	$_____				$_____	$_____	$_____	
				$_____	$_____				$_____	$_____	$_____	
				$_____	$_____				$_____	$_____	$_____	
				$_____	$_____				$_____	$_____	$_____	
TOTAL BID PRICE					$_____							

TOTAL AMOUNT TO DATE		$_____
AMOUNT PREVIOUS PAYMENT(S)	$_____	
RETAINAGE TO DATE		$_____
PROGRESS PAYMENT NO. ____ AMOUNT TO CONTRACTOR THIS INVOICE	$_____	

CONTRACTOR'S CERTIFICATION:

The undersigned CONTRACTOR certifies that:

1. All previous progress payments received from OWNER on account of Work completed under the Contract referred to above have been applied to discharge in full all obligations of CONTRACTOR incurred in connection with Work covered by prior Applications for Payment numbered 1 through _____ inclusive.
2. Title to all Work, materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to OWNER at time of payment free and clear of all liens, claims, security interest and encumbrances (except such as are covered by Bond acceptable to OWNER indemnifying OWNER against any such claim, security interest or encumbrance.)
3. Work covered by this Application for Payment is in accordance with the Contract Documents and not DEFECTIVE as that term is defined in the Contract Documents.

CONTRACTOR: _____
TOTAL AMOUNT ACCEPTED FOR COMPLETED WORK DESCRIBED ABOVE.

OWNER: CITY OF LOUISVILLE
APPROVED FOR PAYMENT

NAME: _____ DATE: _____

TITLE: _____

NAME: _____ DATE: _____

TITLE: _____

Contractor's Proposal Request Form

(Not a Change Order)

Date Submitted: _____ No. _____

TO: _____

PROJECT: **2024 SWQMP PILOT PROJECT**
PROJECT NUMBER: **503499-660287**
OWNER: **CITY OF LOUISVILLE, COLORADO**

We hereby request the cost of the following proposed change in the Contract. A breakdown of the proposed cost is attached.

Description of the proposed change:

_____

_____

_____

_____

_____

_____

_____

All work shall be in accordance with the terms, stipulations, and conditions of the Contract Documents. If the Work herein requested is approved by Change Order, the time of completion will be (increased), (decreased), (unchanged) by _____ calendar days.

New Substantial Completion Date: _____, 2024.

This change will:

___ Increase the Contract by $ _____
___ Decrease the Contract by $ _____
___ No change in the Contract

SUBMITTED BY CONTRACTOR

BY: _____

DATE: _____

DATE: _____

CITY OF LOUISVILLE

___ Contractor's Proposal Request Accepted

___ Contractor's Proposal Request Not Accepted

BY: _____

DATE: _____

TITLE: _____

Contractor's Overtime Request Form

Date Submitted: _____, 2024

TO: _____

PROJECT: **2024 SWQMP PILOT PROJECT**
PROJECT NUMBER: **503499-660287**
OWNER: **CITY OF LOUISVILLE, COLORADO**

We hereby request to perform work on overtime in accordance with the terms, stipulations, and conditions of the Contract Documents.

Requested date of overtime work: _____, 2024

Requested hours of overtime work: _____ (a. m./p. m.) to _____ (a. m./p. m.)

Description of proposed overtime work:

No extra payment will be paid to the CONTRACTOR by the OWNER due to labor overtime or other increased costs of performing the Work on Friday afternoons, Saturdays, or at night. Should the CONTRACTOR desire to work on Friday afternoons or at night between the hours of 5:00 p.m. and 8:00 p.m., Monday-Thursday, or from 3:30 p.m. to 8:00 p.m. Friday, the CONTRACTOR shall submit a written request to the ENGINEER 24 hours prior. If approval is given by ENGINEER to CONTRACTOR for authorized overtime work, ENGINEER and ENGINEER's authorized personnel will charge overtime and other incidental administrative expenses necessary for performing inspections on Friday afternoons, or at night between the hours of 5:00 p.m. and 8:00 p.m., Monday-Thursday and 3:30 p.m. to 8:00 p.m. Friday, the CONTRACTOR will be responsible to pay for all such rates and charges, and shall not be granted a Contract Price increase for such charges.

Hours of overtime work shall only be allowed from 5:00 p.m. to 8:00 p.m. Monday thru Thursday, and from 3:30 p.m. to 8:00 p.m. Friday.

SUBMITTED BY CONTRACTOR

BY: _____

TITLE: _____

DATE: _____

CITY OF LOUISVILLE

_____ Contractors Proposal Request Accepted

_____ Contractors Proposal Request Not Accepted

BY: _____

DATE: _____

TITLE: _____

Certificate of Substantial Completion Form

TO: _____

PROJECT: **2024 SWQMP PILOT PROJECT**
PROJECT NUMBER: **503499-660287**
OWNER: **CITY OF LOUISVILLE, COLORADO**

This Certificate of Substantial Completion applies to all Work under the Contract Documents or to the following specified parts thereof:

The Work to which this Certificate applies has been inspected by authorized representatives of OWNER, and that Work is hereby declared to be substantially complete in accordance with the Contract Documents on

_____
DATE OF SUBSTANTIAL COMPLETION

A tentative list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include an item in the list does not alter the responsibility of CONTRACTOR to complete all the Work in accordance with the Contract Documents. The items in the tentative list shall be completed or corrected by CONTRACTOR within **twenty (20)** days of the issuance of this Certificate of Substantial Completion.

CONTRACTOR shall maintain all contractual responsibilities until Final Acceptance.

The following documents are attached to and made a part of this Certificate of Substantial Completion:

Attachments:

(For items to be attached see definition of Substantial Completion as supplemented and other specifically noted conditions precedent to achieving Substantial Completion as required by the Contract Documents.)

This certificate does not constitute an acceptance of Work or start of the guarantee period nor its release of CONTRACTOR's obligation to complete the Work in accordance with the Contract Documents. Issuance of Substantial Completion does not commence the guarantee period with this certificate.

CITY OF LOUISVILLE, COLORADO		**ACCEPTED BY CONTRACTOR**	
BY:	_____	BY:	_____
TITLE:	_____	TITLE:	_____
DATE:	_____	DATE:	_____

Final Inspection Report Form

DATE: _____, 2024

TO: _____

PROJECT: **2024 SWQMP PILOT PROJECT**
PROJECT NUMBER: **503499-660287**
OWNER: **CITY OF LOUISVILLE, COLORADO**

The ENGINEER has performed final inspection of the Work, and accepts the Work subject to the Contractor's performance and completion of the following repairs, corrections and/or replacements:

_____

_____

_____

_____

_____

_____

_____

The ENGINEER does / does not (circle) hereby finally accept the work, and hereby certifies that the Contractor is eligible to receive final payment of the Work.

CITY OF LOUISVILLE, COLORADO

BY: _____

TITLE: _____

DATE: _____

CONTRACTOR

BY: _____

TITLE: _____

DATE: _____

Certificate of Final Completion Form

DATE: _____, 2024

TO: _____

PROJECT: **2024 SWQMP PILOT PROJECT**
PROJECT NUMBER: **503499-660287**
OWNER: **CITY OF LOUISVILLE, COLORADO**

This Certificate of Final Completion applies to all Work under the Contract Documents, or to the following specified parts thereof:

(specify) _____

_____

_____

The Work to which this Certificate applies has been inspected by authorized representatives of the ENGINEER and the Work is hereby declared to be complete in accordance with the Contract Documents on

_____
DATE OF FINAL COMPLETION

In consideration therefor, the OWNER agrees to make Final Payment to Contractor of all amounts retained by OWNER, except such amounts that are subject to verified claims pursuant to Section 38-26-107, C.R.S, if any.

CITY OF LOUISVILLE, COLORADO		**CONTRACTOR**	
BY:	_____	BY:	_____
TITLE:	_____	TITLE:	_____
DATE:	_____	DATE:	_____

Guarantee Period Inspection Report Form

DATE: _____, 2024

TO: _____

PROJECT: **2024 SWQMP PILOT PROJECT**
PROJECT NUMBER: **503499-660287**
OWNER: **CITY OF LOUISVILLE, COLORADO**

The ENGINEER's authorized representative performed the guarantee period inspection on _____, 20 ___, which guarantee was originally due to expire on _____, 20___.

The ENGINEER hereby determines that the project has ___/ has not ___ satisfactorily met the conditions required to pass the guarantee period inspection.

The identified following items of Work are defective and must be repaired, corrected, and/or replaced:

_____

_____

_____

_____

_____

The guarantee period shall be extended for the items listed above until the following date:

_____, 2024

CITY OF LOUISVILLE, COLORADO		**CONTRACTOR**	
BY:	_____	BY:	_____
TITLE:	_____	TITLE:	_____
DATE:	_____	DATE:	_____

Final Claim Release & Acceptance Form

PROJECT: **2024 SWQMP PILOT PROJECT**
PROJECT NUMBER: **503499-660287**
OWNER: **CITY OF LOUISVILLE, COLORADO**

Application for Payment Number: _____
Application for Payment Amount: _____
Application for Payment Date: _____

For valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the undersigned hereby releases the City of Louisville, Colorado, and waives all rights of the undersigned to file a claim for material, equipment, tools, machinery, or services heretofore furnished for use in and for labor heretofore performed upon the construction, alteration, addition to or repair of the structure or improvements described in the Contract Documents as:

Project: 2024 SWQMP PILOT PROJECT

Description of Property: VARIOUS LOCATIONS, CITY OF LOUISVILLE

Owner: CITY OF LOUISVILLE, COLORADO

We acknowledge that the foregoing is an adequate description of the real property and improvements to which this Claim Release pertains inasmuch as the foregoing description is the description given in the Contract Documents, which govern the performance of the Work for which consideration has been received.

In executing this release, we certify that all claims for labor or materials, or both, furnished or performed by the undersigned or on our behalf by our material suppliers or subcontractors have been paid or that satisfactory arrangements for payment have been made and we hereby waive and release any and all rights, claims and liens which the undersigned may now or hereafter have, claim or assert against the project, the Owner, or any funds in Owner's possession or control concerning the project, or against all land and any improvements and appurtenances to the land improved by the project.

In consideration of the final payment made or to be made to the undersigned and to induce said payment, we hereby further release and forever discharge the City of Louisville, its officers and employees, from any and all liability, actions, causes of action, claims, demands, damages, costs, loss of services, loss of properties, expenses, compensation and any and all consequential damages or injuries, which the undersigned may now or hereafter have, claim or assert on account of, relating to, or in any way arising out of the above described project.

In further consideration of the payment made or to be made to the undersigned and to induce said payment, we agree to defend and indemnify the City of Louisville, its officers and employees from any claim or claims on the part of our material suppliers, laborers, employees, servants, and agents, or subcontractors arising from our work on this project, and we further agree to fully satisfy any such claim brought against the City of Louisville and reimburse the City of Louisville for any and all costs, including reasonable attorney fees, which it may incur as a result of such claims.

FINAL CLAIM RELEASE & ACCEPTANCE CONTINUED

As contactor on the above described project, we further accept the pay quantities and final payment indicated on the final payment application as correct. The above noted final payment of $_____ results in total cumulative payment of $_____ for this project. By accepting this final payment, we accept that the final payment application is full and complete, that no other or further amounts are due to the undersigned, and we hereby waive and release all rights, claims, and liens arising from the completion of work under the Contract Documents.

The undersigned representative certifies to have full authority to execute this instrument and to bind the contractor to all statement and provisions herein contained.

PRIME CONTRACTOR

By: _____

President

Date: _____

Claim Release – Subcontractor/Supplier

PROJECT: **2024 SWQMP PILOT PROJECT**
PROJECT NUMBER: **503499-660287**
OWNER: **CITY OF LOUISVILLE, COLORADO**

For valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the undersigned hereby releases the City of Louisville, Colorado, and waives all rights of the undersigned to file a claim for material, equipment, tools, machinery, or services heretofore furnished for use in and for labor heretofore performed upon the construction, alteration, addition to or repair of the structure or improvements described in the Contract Documents as:

Project: 2024 SWQMP PILOT PROJECT

Description of Property: VARIOUS LOCATIONS, CITY OF LOUISVILLE

Owner: CITY OF LOUISVILLE, COLORADO

We acknowledge that the foregoing is an adequate description of the real property and improvements to which this Claim Release pertains inasmuch as the foregoing description is the description given in the Contract Documents, which govern the performance of the Work for which consideration has been received.

In executing this release, we certify that all claims for labor or materials, or both, furnished or performed by the undersigned or on our behalf by our material suppliers or subcontractors have been paid or that satisfactory arrangements for payment have been made, and we hereby waive and release any and all rights, claims and liens which the undersigned may now or hereafter have, claim or assert against the project, the Owner, or any funds in Owner's possession or control concerning the project, or against all land and any improvements and appurtenances to the land improved by the project.

In consideration of the final payment made or to be made to the undersigned and to induce said payment, we hereby further release and forever discharge the City of Louisville, its officers and employees, from any and all liability, actions, causes of action, claims, demands, damages, costs, loss of services, loss of properties, expenses, compensation and any and all consequential damages or injuries, which the undersigned may now or hereafter have, claim or assert on account of, relating to, or in any way arising out of the above described project.

In further consideration of the payment made or to be made to the undersigned and to induce said payment, we agree to defend and indemnify the City of Louisville, its officers and employees from any claim or claims on the part of our material suppliers, laborers, employees, servants, and agents, or subcontractors arising from our work on this project, and we further agree to fully satisfy any such claim brought against the City of Louisville and reimburse the City of Louisville for any and all costs, including reasonable attorney fees, which it may incur as a result of such claims.

SUPPLIER OR SUBCONTRACTOR	**PRIME CONTRACTOR**
By: _____	By: _____
President	President
Date: _____	Date: _____

General Conditions

Article 1. Definitions

Wherever used in these General Conditions or in the other Contract Documents the following terms have the meanings indicated which are applicable to both the singular and plural thereof:

1.0 **Abnormal Weather** - Snowfall, rainfall, freezing temperatures, or wind conditions, in excess of those encountered in the project area of Boulder County during the past 10 years that necessitates cessation of Work and causes consequence to the project.

1.1 **Addenda** - Written or graphic instruments issued prior to the opening of Bids, which clarify, correct or change the Bidding Requirements or the Contract Documents.

1.2 **Agreement** - The written contract between OWNER and CONTRACTOR covering the Work to be performed; other Contract Documents are attached to the Agreement and made a part thereof as provided therein.

1.3 **Application for Payment** - The form accepted by ENGINEER which is to be used by CONTRACTOR in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

1.4 **Asbestos** - Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

1.5 **Bid** - The offer or proposal of the Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

1.6 **Bidding Documents** - The advertisement or invitation to Bid, instructions to Bidders, the Bid form, and the proposed Contract Documents (including all Addenda issued prior to receipt of Bids).

1.7 **Bidding Requirements** - The advertisement or invitation to Bid, instructions to bidders, and the Bid form.

1.8 **Bonds** - Performance and Payment bonds and other instruments of security.

1.9 **Change Order** - A document recommended by ENGINEER, which is signed by CONTRACTOR and OWNER and authorizes an addition, deletion, or revision in the Work, or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

1.10 **Contract Day** - A Contract Day specifies that construction will be completed Monday through Sunday, excluding OWNER-observed holidays and Abnormal Weather days.

1.11 **Contract Documents** - The Agreement, Addenda (which pertain to the Contract Documents), CONTRACTOR's Bid (including documentation accompanying the Bid and any post Bid documentation submitted prior to the Notice Award) when attached as an exhibit to the Agreement, the Notice to Proceed, the Bonds, these General Conditions, the Supplementary Conditions, the Specifications and the Drawings as the same are more specifically identified in the Agreement, together with all Written Amendments, Change Orders, Work Change Directives, Field Orders, and ENGINEER's written interpretations and clarifications issued pursuant to paragraphs 3.5, 3.6.1, and 3.6.3 on or after the Effective Date of the Agreement. Shop Drawing submittals approved pursuant to paragraphs 6.26 and 6.27 and the reports and drawings referred to in paragraphs 4.2.1.1 and 4.2.2.2 are not Contract Documents.

1.12 **Contract Price** - The monies payable by OWNER to CONTRACTOR for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of paragraph 11.9.1 in the case of Unit Price Work).

1.13 **Contract Times** - The numbers of days or the dates stated in the Agreement: (i) to achieve Substantial Completion, and (ii) to complete the Work so that it is ready for final payment as evidenced by ENGINEER's written recommendation of final payment in accordance with paragraph 14.13.

1.14 **CONTRACTOR** - The person, firm, or corporation with whom OWNER has entered into the Agreement.

1.15 **Defective** - An adjective which when modifying the work refers to Work that is unsatisfactory, faulty or deficient, in that it does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents, or has been damaged prior to ENGINEER's recommendation of final payment (unless responsibility for the protection thereof has been assumed by OWNER at Substantial Completion in accordance with paragraph 14.8 or 14.10).

1.16 **Drawings** - The drawings that show the scope, extent, and character of the Work to be furnished and performed by CONTRACTOR and which have been prepared or approved by ENGINEER and are referred to in the Contract Documents. Shop drawings are not Drawings as so defined.

1.17 **Effective Date of the Agreement** - The date indicated in the Agreement on which it becomes effective, but if no such date is indicated it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

1.18 **ENGINEER** - The word "ENGINEER" refers to the City of Louisville, Director of Public Works or his authorized representative, designated by the OWNER as its Engineering representative.

1.19 **OWNER's Consultant** - A person, firm, or corporation having a contract with OWNER to furnish services as OWNER's independent professional associate or consultant with respect to the Project and who is identified as such in the Supplementary Conditions.

1.20 **Field Order** - A written order issued by ENGINEER which orders minor changes in the Work in accordance with paragraph 9.5 but which does not involve a change in the Contract Price or the Contract Times.

1.21 **General Requirements** - Sections of Division 1 of the Specifications.

1.22 **Hazardous Waste** - The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

1.23 **Laws and Regulation: Laws or Regulations** - Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

1.24 **Liens** - Liens, charges, security interests, or encumbrances upon real property or personal property.

1.25 **Milestone** - A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

1.26 **Notice of Award** - The written notice by OWNER to the apparent successful bidder stating that upon compliance by the apparent successful bidder with the conditions precedent enumerated therein, within the time specified, OWNER will sign and deliver the Agreement.

1.27 **Notice to Proceed** - A written notice given by OWNER to CONTRACTOR (with a copy to ENGINEER) fixing the date on which the Contract Times will commence to run and on which CONTRACTOR shall start to perform CONTRACTOR's obligations under the Contract Documents.

1.28 **OWNER** - The public body or authority, corporation, association, firm, or person with whom CONTRACTOR has entered into the Agreement and for whom the Work is to be provided.

1.29 **Partial Utilization** - Use by OWNER of a substantially completed part of the Work for the purpose for which it is intended (or a related purpose) prior to Substantial Completion of all the Work.

1.30 **PCBs** - Polychlorinated biphenyls.

1.31 **Petroleum** - Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Wastes and crude oils.

1.32 **Plans** - The term plans as used in these Contract Documents shall have the same meaning as Drawings.

1.33 **Product** - Includes materials, equipment, and systems.

1.34 **Project** - The total construction of which the Work to be provided under the Contract Documents may be the whole, or a part as indicated elsewhere in the Contract Documents.

1.35 **Provide** - Furnish and install specified materials and equipment unless the context requires otherwise.

1.36 **Radioactive Material** - Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

1.37 **Resident Project Representative** - The authorized representative of ENGINEER who may be assigned to the site or any part thereof.

1.38 **Samples** - Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.

1.39 **Shop Drawings** - All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for CONTRACTOR and submitted by CONTRACTOR to illustrate some portion of the Work.

1.40 **Specifications** - Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards, and workmanship as applied to the Work and certain administrative details applicable thereto.

1.41 **Subcontractor** - An individual, firm, or corporation having a contract with CONTRACTOR or with any other Subcontractor for the performance of a part of the Work at the site.

1.42 **Substantial Completion** - The Work (or a specified part thereof) has progressed to the point where, in the opinion of ENGINEER as evidenced by ENGINEER's definitive certificate of Substantial Completion, it is sufficiently complete, in accordance with the Contract Documents, so that the Work (or specified part) can be utilized for the purposes for which it is intended; or if no such certificate is issued, when the Work is complete and ready for final payment as evidenced by ENGINEER's written recommendation of final payment in accordance with paragraph 14.13. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

1.43 **Supplementary Conditions** - The part of the Contract Documents which amends or supplements these General Conditions.

1.44 **Supplier** - A manufacturer, fabricator, supplier, distributor, material man, or vendor having a direct contract with CONTRACTOR or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by CONTRACTOR or any Subcontractor.

1.45 **Underground Facilities** - All pipeline, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities which have been installed underground to furnish any of the following services or materials: electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, sewage and drainage removal, traffic or other control systems, or water.

1.46 **Unit Price Work** - Work to be paid for on the basis of unit prices.

1.47 **Work** - The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work includes and is the result of performing or furnishing labor and furnishing and incorporating materials and equipment into the construction, and performing or furnishing services and furnishing documents, all as required by the Contract Documents.

1.48 **Work Change Directive** - A written directive to CONTRACTOR, issued on or after the Effective Date of the Agreement and signed by OWNER and recommended by ENGINEER, ordering an addition, deletion or revision in the Work, or responding to differing or unforeseen physical conditions under which the Work is to be performed as provided in paragraph 4.2 or 4.3 or emergencies under paragraph 6.23. A Work Change Directive will not change the Contract Price or the Contract

Times, but is evidence that the parties expect that the change directed or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times as provided in paragraph 10.2.

1.49 Written Amendment - A written amendment of the Contract Documents, signed by OWNER and CONTRACTOR on or after the Effective Date of the Agreement and normally dealing with the non-engineering or non-technical rather than strictly construction-related aspects of the Contract Documents.

Article 2. Preliminary Matters

Delivery of Bonds

2.1 When CONTRACTOR delivers the executed Agreement to OWNER, CONTRACTOR shall also deliver to OWNER such Bonds and Certificates of Insurance as CONTRACTOR may be required to furnish in accordance with Article 5.

Copies of Documents

2.2 OWNER shall furnish to CONTRACTOR up to four copies of the contract documents for the execution of the Work. Additional copies will be furnished, upon request, at the cost of reproduction.

Commencement of Contract Times; Notice to Proceed

2.3 The Contract Times will commence to run on the day indicated in the Notice to Proceed. Timing and completion of the **2024 SWQMP PILOT PROJECT** is based on 53 contract days, assuming a notice to proceed issued on March 29, 2024. The OWNER has set the proposed project schedule and plans to implement the following schedule for this project. The CONTRACTOR shall be required to start construction on or before the start date listed below:

Proposed Project Schedule

Advertisement..... .....April 19 & April 26, 2024
Pre-Bid Conference .....April 29, 2024
Bid Opening..... May 21, 2024
Contract Award by City Council .....June 18, 2024
Notice of Award Issued .....June 19, 2024
Pre-Construction Conference .....June 24, 2024
Bonds & Insurance Certificates due.....June 28, 2024
Contract Agreement Executed.....June 28, 2024
Notice to Proceed Issued ..... July 1, 2024
Contract Time Commences to run ..... July 1, 2024
Substantial Completion..... September 20, 2024

Starting the Work

2.4 CONTRACTOR shall start to perform the Work on the date when the Contract Times commence to run, but no Work shall be done at the site prior to the date on which the Contract Times commence to run.

Before Starting Construction

2.5 Before undertaking each part of the Work, CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and all applicable field measurements. CONTRACTOR shall promptly report in writing to ENGINEER any conflict, error, ambiguity or discrepancy which CONTRACTOR may discover and shall obtain a written interpretation or clarification from ENGINEER before proceeding with any Work affected thereby; however, CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents, unless CONTRACTOR knew or reasonably should have known thereof.

2.6 Within ten days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), CONTRACTOR shall submit to ENGINEER for review:

2.6.1 A preliminary progress schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestone specified in the Contract Documents;

2.6.2 A preliminary schedule of Shop Drawing and Sample submittals which will list each required submittal and the times for submitting, reviewing and processing such submittal.

Preconstruction Conference

2.7 Before any Work at the site is started, a conference attended by CONTRACTOR, ENGINEER, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in paragraph 2.6, procedures for handling Shop Drawings and other submittal(s), processing Applications for Payment, and maintaining required records.

Initially Acceptable Schedules

2.8 Unless otherwise provided in the Contract Documents, at least ten days before submission of the first Application for Payment a conference attended by CONTRACTOR, ENGINEER, and others as appropriate will be held to review the Application for Payment for acceptability to ENGINEER. No progress payment shall be made to CONTRACTOR until the schedules are submitted to and acceptable to ENGINEER as provided below. The progress schedule will be acceptable to ENGINEER as providing an orderly progression of the Work to completion within any specified Milestones and the Contract Times, but such acceptance will neither impose on ENGINEER responsibility for the sequencing, scheduling, or progress of the Work nor interfere with or relieve CONTRACTOR from CONTRACTOR's full responsibility therefor. CONTRACTOR's schedule of Shop Drawing and Sample submissions will be acceptable to ENGINEER as providing a workable arrangement for reviewing and processing the required submittals.

Article 3. Contract Documents: Intent, Amending, Reuse

Intent

3.1 The Contract Documents comprise the entire agreement OWNER and CONTRACTOR concerning the Work. The Contract Documents are complementary; what is called for by one is as binding as if called for by all. The Contract Documents will be construed in accordance with the law of the place of the Project.

3.2 It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any Work, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be furnished and performed whether or not specifically called for. When words or phrases, which have a well-known technical or construction industry or trade meaning, are used to describe Work, materials or equipment, such words or phrases shall be interpreted in accordance with that meaning. Clarifications and interpretations of the Contract Documents shall be issued by ENGINEER as provided in paragraph 9.4.

Reference to Standards & Specifications of Technical Societies; Reporting and Resolving Discrepancies
3.3

3.3.1. Reference to standards, specifications, manuals, or codes of any technical society, organization or association, or to the Laws or Regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

3.3.2 If, during the performance of the Work, CONTRACTOR discovers any conflict, error ambiguity or discrepancy within the Contract Documents or between the Contract Documents and any provision of any such Law or Regulation applicable to the performance of the Work or of any such standard, specification, manual or code or of any instruction of any Supplier referred to in paragraph 6.5, CONTRACTOR shall report it to ENGINEER in writing at once, and, CONTRACTOR shall not proceed with the Work affected thereby (except in an emergency as authorized by paragraph 6.23) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in paragraph 3.5 or 3.6; provided, however, that CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any such conflict, error, ambiguity or discrepancy unless CONTRACTOR knew or reasonably should have known thereof. Upon notification to the ENGINEER, the CONTRACTOR shall proceed with other parts of the Work not affected by the conflict, error, ambiguity, or discrepancy.

3.3.3 Except as otherwise specifically stated in the Contract Documents or as may be provided by amendment or supplement thereto issued by one of the methods indicated in paragraph 3.5 or 3.6, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity or discrepancy between the provisions of the Contract Documents and:

3.3.3.1 The provisions of any such standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or

3.3.3.2 The provisions of any such Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

No provision of any such standard, specification, manual, code, or instruction shall be effective to change the duties and responsibilities of OWNER, CONTRACTOR, or ENGINEER, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents, nor shall it be effective to assign to OWNER, ENGINEER, or any of ENGINEER's Consultants, agents or employees any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of paragraph 9.13 or any other provision of the Contract Documents.

3.4 Whenever in the Contract Documents the terms "as ordered", "as directed", "as required", "as allowed", "as approved", or terms of like effect or import are used, or the adjectives "reasonable", "suitable", "acceptable", "proper", or "satisfactory" or adjectives of like effect or import are used to describe a requirement, direction, review, or judgment of ENGINEER as to the Work, it is intended that such requirement, direction, review, or judgment will be solely to evaluate, in general, the completed Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective shall not be effective to assign to ENGINEER any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.13 or any other provision of the Contract Documents.

Amending and Supplementing Contract Documents

3.5 The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof in one or more of the following ways:

3.5.1 a formal Written Amendment,

3.5.2 a Change Order (pursuant to paragraph 10.4), or

3.5.3 a Work Change Directive (pursuant to paragraph 10.1).

3.6 In addition, the requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, in one or more of the following ways:

3.6.1 a Field Order (pursuant to paragraph 9.5),

3.6.2 ENGINEER's approval of a Shop Drawing or Sample (pursuant to paragraphs 6.26 and 6.27), or

3.6.3 ENGINEER's written interpretation or clarification (pursuant to paragraph 9.4).

Reuse of Documents

3.7 CONTRACTOR, and any Subcontractor or Supplier or other person or organization performing or furnishing any of the Work under a direct or indirect contract with OWNER (i) shall not have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or Engineer's Consultant, and (ii) shall not reuse any of such Drawings, Specifications, other documents or copies on extensions of the Project or any other project without written consent of OWNER and ENGINEER and specific written verification or adaption by ENGINEER.

Article 4. Availability of Lands; Subsurface and Physical Conditions, Reference Points

Availability of Lands

4.1 OWNER shall furnish, as indicated in the Contract Documents, the lands upon which the Work is to be performed, rights-of-way and easements for access thereto, and such other lands which are designated for the use of CONTRACTOR. OWNER shall identify any encumbrances or restrictions not of general application but specifically related to use of lands so furnished with which CONTRACTOR will have to comply in performing the Work. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by OWNER, unless otherwise provided in the Contract Documents. If CONTRACTOR and OWNER are unable to agree on entitlement to or the amount or extent of any adjustments in the Contract Price or the Contract Times as a result of any delay in OWNER's furnishing these lands, rights-of-way or easements, CONTRACTOR may make a claim therefor as provided in Articles 11 and 12. CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

Subsurface and Physical Conditions

4.2 BIDDERs are responsible for examining and determining for themselves the location and nature of the proposed Work, the amount and character of the labor and materials required therefor, and the difficulties, which may be encountered. BIDDERs may not rely on oral or written representations made by the OWNER, including reports and drawings identified pursuant to 4.2.1 and subparagraphs thereof, unless the OWNER has guaranteed in writing that such representation is factually accurate, and by submitting a Bid, each BIDDER waives all liability for any error in any representation made by the OWNER to the BIDDER. BIDDERs shall inspect the site and its surroundings and conduct such supplementary examinations, investigations, and tests concerning conditions at or contiguous to the site (including surface, and subsurface) which may affect cost, progress, performance, or furnishing of the Work or which relate to any aspect of the means, methods, techniques, sequences, or procedures of construction to be employed by BIDDER and safety precautions and programs incident thereto for performing the Work in accordance with the Contract Documents. By failing to make such an inspection, the BIDDER waives all rights to claim extra payment or time extensions due to unexpected conditions, which could have been determined had the site been reasonably inspected. If concealed or unknown conditions differ materially from those ordinarily encountered and generally recognized as inherent in the Work, or differ materially from the conditions indicated in the Contract Documents, then an equitable adjustment in the Contract Price or in the Contract Time will be

allowed by change order as provided in Article 11 or Article 12 respectively. By submitting a Bid, the BIDDER represents that the BIDDER's observations at the site are not inconsistent with the requirements of the proposed Contract Documents, unless otherwise noted by the BIDDER.

Reports and Drawings

4.2.1 Reference is made to the Supplementary Conditions for identification of:

The following reports of explorations and tests of subsurface conditions at the site of the Work:

Subsurface Conditions

4.2.1.1 Those reports of explorations and tests of subsurface conditions at or contiguous to the site that have been utilized by ENGINEER in preparing the Contract Documents; and

Report dated **N/A**, prepared by **N/A** entitled: **N/A**. The technical data contained in such report upon which CONTRACTOR may rely is **N/A**.

Copies of these reports that are not included with Bidding Documents may be examined at ENGINEER's office during regular business hours. Please call for appointment. Copies of such reports are not available for distribution. These reports and drawings are not part of the Contract Documents, but the technical data contained therein upon which CONTRACTOR is entitled to rely as provided in GC-4.2 and as identified and established above are incorporated therein by reference.

Physical Conditions

4.2.1.2 Those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the site (except Underground Facilities) that have been utilized by ENGINEER in preparing the Contract Documents.

Limited Reliance by CONTRACTOR authorized; Technical Data

4.2.2 Reports and drawings identified pursuant to paragraph 4.2 are not Contract Documents. Unless otherwise set forth in the Contract Documents or OWNER has otherwise guaranteed in writing that such representation is factually accurate, CONTRACTOR may not rely upon or make any claim against the OWNER, ENGINEER, or ENGINEER's consultants with respect to the accuracy of any "technical data" contained in reports and drawings and CONTRACTOR may not rely upon or make any claim against the OWNER, ENGINEER, or ENGINEER's consultants with respect to:

4.2.2.1 The completeness of such reports and drawings for CONTRACTOR's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by CONTRACTOR and safety precautions and programs incident thereto, or

4.2.2.2 other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings, or

4.2.2.3 any CONTRACTOR interpretation of or conclusion drawn from any "technical data" or any such data, interpretations, opinions, or information.

4.2.3 CONTRACTOR shall not be entitled to any adjustment in the Contract Price or Times if:

4.2.3.1 CONTRACTOR knew of the existence of such conditions at the time CONTRACTOR made a final commitment to OWNER in respect of Contract Price and Contract Times by the submission of a bid or becoming bound under a negotiated contract; or

4.2.3.2 the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for CONTRACTOR prior to CONTRACTORs making such final commitment.

If OWNER and CONTRACTOR are unable to agree on entitlement to or as to the amount or length of any such equitable adjustment in the Contract Price or Contract Times, a claim may be made therefor as provided in Articles 11 and 12. However, OWNER, ENGINEER, and ENGINEER's Consultants shall not be liable to CONTRACTOR for any claims, costs, losses, or damages sustained by CONTRACTOR on or in connection with any other project or anticipated project.

Physical Conditions - Underground Facilities
4.3

Shown or Indicated
4.3.1 The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the site is based on information and data furnished to OWNER or ENGINEER by the owners of such Underground Facilities or by others.

4.3.1.1 OWNER and ENGINEER shall not be responsible for the accuracy or completeness of any such information or data; and

4.3.1.2 The cost of all of the following will be included in the Contract Price and CONTRACTOR shall have full responsibility for: (i) reviewing and checking all such information and data, (ii) locating all Underground Facilities shown or indicated in the Contract Documents, (iii) coordination of the Work with the owners of such Underground Facilities during construction, and (iv) the safety and protection of all such Underground Facilities as provided in paragraph 6.20 and repairing any damage thereto resulting from the Work.

Not Shown or Indicated

4.3.2 If an Underground Facility is uncovered or revealed at or contiguous to the site which was not shown or indicated in the Contract Documents, CONTRACTOR shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by paragraph 6.23), identify the owner of such Underground Facility and give written notice to that owner and to OWNER and ENGINEER. CONTRACTOR shall be responsible for the safety and protection of such Underground Facility as provided in paragraph 6.20. CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, to the extent that they are attributable to the existence of any Underground Facility that was not shown or indicated in the Contract Documents and that CONTRACTOR did not know of and could not reasonably have been expected to be aware of or to have anticipated. If OWNER and CONTRACTOR are unable to agree on entitlement to or the amount or length of any such adjustment in Contract Price or Contract Times, CONTRACTOR may make a claim therefor as provided in Articles 11 and 12. However, OWNER, ENGINEER, and ENGINEER's Consultants shall not be liable to CONTRACTOR for any claims, costs, losses, or damages incurred or sustained by CONTRACTOR on or in connection with any other project or anticipated project.

Reference Points

4.4 OWNER shall provide engineering surveys to establish baseline and benchmarks for construction, which in ENGINEER's judgment are necessary to enable CONTRACTOR to proceed with the Work. CONTRACTOR shall be responsible for laying out the Work, shall protect and preserve the established reference points, and shall make no changes or relocations without the prior written approval of OWNER. CONTRACTOR shall report to ENGINEER whenever any reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations and shall be responsible for the accurate replacement or relocation of such reference points by professionally qualified personnel.

OWNER shall provide survey reference points, construction stakes, lines and grades required for the completion of the work specified in the specifications, on the plans, or in the Special Conditions. Additional staking requested by the Contractor will be at the CONTRACTOR's expense. When the CONTRACTOR requires staking, he shall notify the OWNER of his requirements in writing a reasonable length of time in advance of starting work that require construction staking. Under no circumstances shall a notice of less than 2 contract days be considered a reasonable length of time. Failure of the CONTRACTOR to provide 2 contract days written notice to the OWNER of his staking requests shall relieve the OWNER from any responsibility for additional costs or delays caused by such failure. The CONTRACTOR shall carefully preserve stakes set by the OWNER. When stakes are destroyed or damaged, the CONTRACTOR will be charged for the cost of necessary replacement or restoration of stakes. The charge for replacement and restoration of stakes will be deducted from any moneys due or to become due the CONTRACTOR.

Asbestos, PCBs Petroleum, Hazardous Waste, or Radioactive Material

4.5

4.5.1 OWNER shall be responsible for any Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material uncovered or revealed at the site which was not

shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work and which may present a substantial danger to persons or property exposed thereto in connection with the Work at the site. OWNER shall not be responsible for any such materials brought to the site by CONTRACTOR, Subcontractor, Suppliers, or anyone else for whom CONTRACTOR is responsible.

4.5.2 CONTRACTOR shall immediately: (i) stop all Work in connection with such hazardous condition and in any area affected thereby (except in an emergency as required by paragraph 6.23), and (ii) notify OWNER and ENGINEER (and thereafter confirm such notice in writing). OWNER shall promptly consult with ENGINEER concerning the necessity for OWNER to retain a qualified expert to evaluate such hazardous condition or take corrective action, if any. CONTRACTOR shall not be required to resume Work in connection with such hazardous condition or in any such affected area until after OWNER has obtained any required permits related thereto and delivered to CONTRACTOR special written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (ii) specifying any special conditions under which such Work may be resumed safely. If OWNER and CONTRACTOR cannot agree as to entitlement to or the amount or extent of an adjustment, if any, in Contract Price or Contract Times as a result of such Work stoppage or such special conditions under which Work is agreed by CONTRACTOR to be resumed, either party may make a claim therefor as provided Articles 11 and 12.

4.5.3 If after receipt of such special written notice CONTRACTOR does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then OWNER may order such portion of the Work that is in connection with such hazardous condition or in such affected area to be deleted from the Work. If OWNER and CONTRACTOR cannot agree as to entitlement to or the amount or extent of an adjustment, if any, in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a claim therefor as provided in Articles 11 and 12. OWNER may have such deleted portion of the Work performed by OWNER's own forces or others in accordance with Article 7.

4.5.4 The provisions of paragraphs 4.2 and 4.3 are not intended to apply to Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material uncovered or revealed at the site.

Article 5. Bonds and Insurance

Performance, Payment, and Other Bonds

5.1 CONTRACTOR shall furnish Performance and Payment Bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all CONTRACTOR's obligations under the Contract Documents. These Bonds shall remain in effect at least until one year after the date when final payment becomes due, except as provided otherwise by Laws or Regulations or by the Contract Documents. CONTRACTOR shall also furnish such other Bonds as are required by the Supplementary Conditions. All Bonds shall be in the form prescribed by the

Contract Documents except as provided otherwise by Laws or Regulations and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff, Bureau of Government Financial Operations, U.S. Treasury Department. All Bonds signed by an agent must be accompanied by a certified copy of such agent's authority to act. The CONTRACTOR shall furnish the performance and payment bond in the form provided in the Contract Documents or approved by the OWNER; the earlier of ten (10) days after the OWNER has issued the notice of award or delivery of the executed Agreement. The OWNER reserves the right to exclude any Surety Company on any ground it deems appropriate. The cost of the bonds shall be included in the bid.

5.2 If the surety on any Bond furnished by CONTRACTOR is declared a bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of paragraph 5.1, CONTRACTOR shall within ten days thereafter substitute another Bond and surety, both of which must be acceptable to OWNER.

Licensed Sureties and Insurers; Certificates of Insurance

5.3

5.3.1 All Bonds and insurance required by the Contract Documents to be purchased and maintained by CONTRACTOR shall be obtained from surety or insurance companies acceptable to OWNER that are duly licensed to transact business in the State of Colorado and to issue Bonds or insurance policies for the limits and coverage so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.3.2 CONTRACTOR shall deliver to OWNER, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by OWNER or any other additional insured) which CONTRACTOR is required to purchase and maintain accordance with paragraph 5.4. The certificates shall be reviewed and approved by OWNER prior to execution of the Agreement. The OWNER shall have the right to request and obtain copies of any insurance policies required under paragraph 5.4 of the General Conditions. The completed certificates of insurance shall be sent to: City of Louisville, 749 Main Street, Louisville, Colorado 80027, ATTN: City Engineer.

CONTRACTOR's Liability Insurance

5.4 (a) The CONTRACTOR agrees to procure and maintain, at its own cost, a policy or policies of insurance sufficient to insure against all liability, claims, demands, and other obligations assumed by the CONTRACTOR pursuant to paragraphs 6.12, 6.16, 6.31, 6.32 and 6.33, and 6.5 in addition to any other insurance requirements imposed by the Contract Documents or by law. The CONTRACTOR shall not be relieved of any liability, claims, demands, or other obligations assumed pursuant to paragraphs 6.12, 6.16, 6.31, and 6.33 by reason of its failure to procure or maintain insurance, or by reason of its failure to procure or maintain insurance in sufficient amounts, durations, or types.

(b) CONTRACTOR shall procure and maintain, and shall cause any Subcontractor or Supplier of the CONTRACTOR to procure and maintain or insure the activity of his Subcontractors and Suppliers in his own policy, the minimum insurance coverages listed below. Such coverages shall be procured and maintained with forms and insurers acceptable to the OWNER. All coverages shall be continuously maintained from the date of commencement of the Work to cover all liability, claims, demands, and other obligations assumed by the CONTRACTOR pursuant to paragraphs 6.31 and 6.33. In the case of any claims-made policy, the necessary retroactive dates and extended reporting periods shall be procured to maintain such continuous coverage.

(1) Workers' Compensation insurance to cover obligations imposed by the Workers' Compensation Act of Colorado and any other applicable laws for any employee engaged in the performance of Work under this contract, and Employers' Liability insurance with minimum limits of FIVE HUNDRED THOUSAND DOLLARS ($500,000) each accident, FIVE HUNDRED THOUSAND DOLLARS ($500,000) disease - policy limit, and FIVE HUNDRED THOUSAND DOLLARS ($500,000) disease - each employee. Evidence of qualified self-insured status may be substituted for the Workers' Compensation requirements of this paragraph.

(2) Comprehensive General Liability insurance with minimum combined single limits of ONE MILLION DOLLARS ($1,000,000) each occurrence and TWO MILLION DOLLARS ($2,000,000) aggregate. The policy shall be applicable to all premises and operations. The policy shall include coverage for bodily injury, broad form property damage (including completed operations), personal injury (including coverage for contractual and employee acts), blanket contractual, independent contractors, products, and completed operations. The policy shall include coverage for explosion, collapse, and underground hazards. The policy shall contain a severability of interests' provision.

(3) Comprehensive Automobile Liability insurance with minimum combined single limits for bodily injury and property damage of not less than ONE MILLION DOLLARS ($1,000,000) each occurrence and ONE MILLION DOLLARS ($1,000,000) aggregate with respect to each of CONTRACTOR's owned, hired or non-owned vehicles assigned to or used in performance of the services. The policy shall contain a severability of interests' provision.

(4) The CONTRACTOR shall provide and maintain builder's risk insurance upon the entire project equal to one hundred percent (100%) of the insurable value thereof. Such insurance shall cover any and all physical damage including, without limitation, damage caused by fire, vandalism, malicious mischief, blasting, excessive surface

runoff or storm water, high winds, and other occurrences covered in a standard extended coverage endorsement. The policy shall remain in effect until the Work is accepted as substantially complete.

(c) The policy required by paragraph (2) above, by paragraph (3) and by (4) above shall be endorsed to include the OWNER, the ENGINEER and its consultants, and each of their officers, agents, and employees as additional insureds. Every policy required above shall be primary insurance, and any insurance carried by the OWNER, its officers, or its employees, shall be excess and not contributory insurance to that provided by CONTRACTOR. No additional insured endorsement to the policy required by paragraph (1) above shall contain any exclusion for bodily injury or property damage arising from completed operations. The CONTRACTOR shall be solely responsible for any deductible losses under any policy required above.

(d) The certificate of insurance provided to OWNER shall be completed by the CONTRACTOR's insurance agent as evidence that policies providing the required coverages, conditions, and minimum limits are in full force and effect, and shall be reviewed and approved by the OWNER prior to commencement of the contract.

(e) Failure on the part of the CONTRACTOR to procure or maintain policies providing the required coverages, conditions, and minimum limits shall constitute a material breach of contract upon which the OWNER may immediately terminate this contract, or at its discretion may procure or renew any such policy or any extended reporting period thereto and may pay any and all premiums in connection therewith, and all monies so paid by the OWNER shall be repaid by CONTRACTOR to the OWNER upon demand, or the OWNER may offset the cost of the premiums against any monies due to CONTRACTOR from the Owner.

(f) The OWNER reserves the right to request and receive a certified copy of any policy and any endorsement thereto.

(g) The parties hereto understand and agree that the OWNER, the City of Louisville, is relying on, and does not waive or intend to waive by any provision of this contract, the monetary limitations (presently $150,000 per person and $600,000 per occurrence) or any other rights, immunities, and protections provided by the Colorado Governmental Immunity Act, § 24-10-101 et seq., 10 C.R.S., as from time to time amended, or otherwise available to the City of Louisville, its officers, or its employees.

OWNER's Liability Insurance

5.5 In addition to the insurance required to be provided by CONTRACTOR under paragraph 5.4, OWNER, at OWNER's option, may purchase and maintain at OWNER's expense OWNER's own liability insurance as will protect OWNER against claims which may arise from operations under the Contract Documents.

Property Insurance

5.6 The OWNER shall be responsible for maintaining its own property insurance and, at its option, may maintain such insurance as will protect it against claims which may arise from operations under the Contract Documents.

Supervision and Superintendence

6.1 CONTRACTOR shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction, but CONTRACTOR shall not be responsible for the negligence of others in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents. CONTRACTOR shall be responsible to see that the completed Work complies accurately with the Contract Documents.

6.2 CONTRACTOR shall keep on the Work at all times during its progress a competent resident superintendent, who shall not be replaced without written notice to OWNER and ENGINEER except under extraordinary circumstances. The superintendent will be CONTRACTOR's representative at the site and shall have authority to act on behalf of CONTRACTOR. All communications to the superintendent shall be as binding as if given to CONTRACTOR.

Labor, Materials, and Equipment

6.3 CONTRACTOR shall provide competent, suitably qualified personnel to survey, layout, and construct the Work as required by the Contract Documents. CONTRACTOR shall at all times maintain good discipline and order at the site. Except as otherwise required for the safety or protection of persons or the Work or property at the site or adjacent thereto, and except as otherwise indicated in the Contract Documents, all Work at the site shall be performed during regular working hours and CONTRACTOR will not permit overtime work or the performance of Work on Saturday, Sunday or any legal holiday without OWNER's written consent given after prior written notice to ENGINEER. No extra payment will be paid to the CONTRACTOR by the OWNER due to labor overtime or other increased costs of performing the Work on Saturdays, Sundays, OWNER-observed holidays, or at night. Should the CONTRACTOR desire to work on Saturdays, Sundays, OWNER-observed holidays, or at night between the hours of 5:00 p.m. and 7:00 a.m. on **Contract Days** the CONTRACTOR shall submit a written request to the ENGINEER 24 hours prior. If approval is given by ENGINEER to CONTRACTOR for authorized overtime work, ENGINEER's and ENGINEER's authorized personnel will charge overtime and other incidental administrative expenses necessary for performing inspections on Saturdays, Sundays, OWNER-observed holidays, or at night between the hours of 5:00 p.m. and 7:00 a.m., the CONTRACTOR will be responsible to pay for all such rates and charges, and shall not be granted a Contract Price increase for such charges. Overtime and other incidental administrative expenses for Engineer and Engineer's authorized personnel are as follows:

DESCRIPTION	HOURLY RATE
Engineer	$60.00
Construction Inspector	$45.00
Operations Supervisor	$45.00
Maintenance Worker	$30.00
Clerical	$25.00
Vehicle	$15.00

6.4 Unless otherwise specified in the General Requirements, CONTRACTOR shall furnish and assume full responsibility for all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the furnishing, performance, testing, start-up, and completion of the Work.

6.5 All materials and equipment shall be of good quality and new, except as otherwise provided in the Contract Documents. All warranties and guarantees specifically called for by the Specifications shall expressly run to the benefit of OWNER. If required by ENGINEER, CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise provided in the Contract Documents.

Progress Schedule

6.6 CONTRACTOR shall adhere to the progress schedule established in accordance with paragraph 2.8 as it may be adjusted from time to time as provided below:

6.6.1 CONTRACTOR shall submit to ENGINEER for acceptance (to the extent indicated in paragraph 2.8) proposed adjustments in the progress schedule that will not change the Contract Times (or Milestones). Such adjustments will conform generally to the progress schedule then in effect and additionally will comply with any provisions of the General Requirements applicable thereto.

6.6.2 Proposed adjustments in the progress schedule that will change the Contract Times (or Milestones) shall be submitted in accordance with the requirements of paragraph 12.1. Such adjustments may only be made by a Change Order or Written Amendment in accordance with Article 12.

Substitutes and "Or-Equal" Items

6.7

6.7.1 Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment of other Suppliers may be accepted by ENGINEER under the following circumstances:

“Or-Equal”

6.7.1.1 If in ENGINEER's sole discretion an item of material or equipment proposed by CONTRACTOR is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by ENGINEER as an "or-equal" item, in which case review and approval of the proposed item may, in ENGINEER's sole discretion, be accomplished without

compliance with some or all of the requirements for acceptance of proposed substitute items.

Substitute Items

6.7.1.2 If in ENGINEER's sole discretion an item of material or equipment proposed by CONTRACTOR does not qualify as an "or-equal" item under subparagraph 6.7.1.1, it will be considered a proposed substitute item. CONTRACTOR shall submit sufficient information as provided below to allow ENGINEER to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. The procedure for review by the ENGINEER will include the following as supplemented in the General Requirements and as ENGINEER may decide is appropriate under the circumstances. Requests for review of proposed substitute items of material or equipment will not be accepted by ENGINEER from anyone other than CONTRACTOR. If CONTRACTOR wishes to furnish or use a substitute item of material or equipment, CONTRACTOR shall first make written application to ENGINEER for acceptance thereof, certifying that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar in substance to that specified and be suited to the same use as that specified. The application will state the extent, if any, to which the evaluation and acceptance of the proposed substitute will prejudice CONTRACTOR's achievement of Substantial Completion on time, whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with OWNER for work on the Project) to adapt the design to the proposed substitute and whether or not incorporation or use of the substitute in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute from that specified will be identified in the application and available maintenance, repair, and replacement service will be indicated. The application will also contain an itemized estimate of all costs or credits that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors affected by the resulting change, all of which will be considered by ENGINEER in evaluating the proposed substitute. ENGINEER may require CONTRACTOR to furnish additional data about the proposed substitute.

CONTRACTOR’s Expense

6.7.1.3 All data to be provided by CONTRACTOR in support of any proposed "or-equal" or substitute item will be at CONTRACTOR's expense.

Substitute Construction Methods or Procedures

6.7.2 If a specific means, method, technique, sequence, or procedure of construction is shown or indicated in and expressly required by the Contract Documents, CONTRACTOR may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction acceptable to ENGINEER. CONTRACTOR shall submit sufficient information to allow ENGINEER, in ENGINEER's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The procedure for review by ENGINEER will be similar to that provided in subparagraph 6.7.1.2.

ENGINEER's Evaluation

6.7.3 ENGINEER will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to paragraphs 6.7.1.2 and 6.7.2. ENGINEER will be the sole judge of acceptability. No "or-equal" or substitute will be ordered, installed, or utilized without ENGINEER's prior written acceptance, which will be evidenced by either a Change Order or an approved Shop Drawing. OWNER may require CONTRACTOR to furnish at CONTRACTOR's expense a special performance guarantee or other surety with respect to any "or-equal" or substitute. ENGINEER will record time required by ENGINEER and ENGINEER's Consultants in evaluating substitutes proposed or submitted by CONTRACTOR pursuant to paragraphs 6.7.1.2 and 6.7.2 and in making changes in the Contract Documents (or in the provisions of any other direct contract with OWNER for work on the Project) occasioned thereby. Whether or not ENGINEER accepts a substitute item so proposed or submitted by CONTRACTOR, CONTRACTOR shall reimburse OWNER for the charges of ENGINEER and ENGINEER's Consultants for evaluating each such proposed substitute item.

Concerning Subcontractors, Suppliers, and Others

6.8

6.8.1 CONTRACTOR shall not employ any Subcontractor, Supplier, or other person or organization, whether initially or as a substitute, against whom OWNER or ENGINEER may have reasonable objection. CONTRACTOR shall not be required to employ any Subcontractor, Supplier, or other person or organization to furnish or perform any of the Work against whom CONTRACTOR has reasonable objection.

6.8.2 The Contract Documents require the identity of certain Subcontractors, Suppliers, or other persons or organizations (including those who are to furnish the principal items of materials or equipment) to be submitted to OWNER with the Bid in the Bid Form prior to the Effective Date of the Agreement for acceptance by OWNER and ENGINEER, and if CONTRACTOR has submitted a list thereof in accordance with the Contract Documents, OWNER's or ENGINEER's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in Contract Documents) of any such Subcontractor, Supplier, or other person or organization so identified may be revoked on the basis of reasonable objection after due investigation, in which case CONTRACTOR shall submit an acceptable substitute. No acceptance by OWNER or ENGINEER of any such Subcontractor, Supplier, or other person or organization shall constitute a waiver of any right of OWNER or ENGINEER to reject defective Work.

6.8.3 Subletting of Contract. The Contractor shall not sublet, sell, transfer, assign, or dispose of the Contract or Contracts, or any portion thereof without written consent of the Engineer. The Contractor will be permitted to sublet a portion of the Contract, however, the Contractor's organization shall perform work amounting to not less than 50 percent of the total contract cost.

The calculation of the percentage of subcontracted work shall be based on the prime contract unit prices rather than subcontract unit prices. Proportional value for a subcontracted partial contract item shall be verified by the Engineer. For the purpose of calculating the value of subcontracted work, the cost of procuring materials and manufactured products can be included in either the prime contract or subcontract. However, when a firm both sells material to a prime contractor and performs the work of incorporating the materials into the project, these two phases shall be considered in combination and as constituting a single subcontract.

Subcontracts, or transfer of Contract shall not release the Contractor of liability under the Contract and bonds.

6.8.4 CONTRACTOR shall be fully responsible to OWNER and ENGINEER for all acts and omissions of the Subcontractors. Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR just as CONTRACTOR is responsible for CONTRACTOR's own acts and omissions. OWNER or ENGINEER may furnish to any such Subcontractor, Supplier, or other person or organization, to the extent practicable, evidence of amounts paid to CONTRACTOR in accordance with CONTRACTOR's Applications for Payment. Nothing in the Contract Documents shall create for the benefit of any such Subcontractor, Supplier, or other person or organization any contractual relationship between OWNER or ENGINEER and any such Subcontractor, Supplier, or other person or organization, nor shall it create any obligation on the part of OWNER or ENGINEER to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other person or organization except as may otherwise be required by Laws and Regulations.

6.8.5 CONTRACTOR shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR. CONTRACTOR shall require all Subcontractors, Suppliers, and such other persons and organizations performing or furnishing any of the Work to communicate with the ENGINEER through CONTRACTOR.

6.9 The divisions and sections of the Specifications and the identifications of any Drawings shall not control CONTRACTOR in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

6.10 All Work performed for CONTRACTOR by a Subcontractor or Supplier will be pursuant to an appropriate agreement between CONTRACTOR and the Subcontractor or Supplier, which specifically binds the Subcontractor or Supplier to the applicable terms and, conditions of the Contract Documents for the benefit of OWNER and ENGINEER.

Patent Fees and Royalties

6.11 CONTRACTOR shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of OWNER or ENGINEER its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by OWNER in the Contract Documents. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultants and the officers, directors, employees, agents, and other consultants of each and any of them from and against all claims, costs, losses, and damages arising out of or resulting from any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

Permits

6.12 Unless otherwise provided in the Supplementary Conditions, CONTRACTOR shall obtain and pay for all construction permits and licenses. OWNER shall assist CONTRACTOR, when necessary, in obtaining such permits and licenses. CONTRACTOR shall pay all governmental charges and inspection fees necessary for the prosecution of the Work, which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. CONTRACTOR shall pay all charges of utility owners for connections to the Work, and OWNER shall pay all charges of such utility owners for capital costs related thereto such as plant investment fees.

6.12.1 Prior to the commencement date for the Work set forth in the Notice to Proceed, The CONTRACTOR, and all subcontractors shall be or shall become a CONTRACTOR licensed in accordance with the applicable ordinance of the City of Louisville, Colorado.

6.12.2 If water is required for the project, CONTRACTOR shall obtain a bulk water permit from the City of Louisville, Public Works Department in accordance with the permit requirements.

6.12.3 CONTRACTOR shall obtain a Right-of-Way Permit from the City of Louisville, Public Works Department for all Work to be completed within the City right-of-way.

6.12.4 CONTRACTOR shall obtain and pay for all other necessary construction permits and licenses.

Laws and Regulations

6.13

6.13.1 CONTRACTOR shall give all notices and comply with all Laws and Regulations applicable to furnishing and performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither OWNER nor ENGINEER shall be responsible for monitoring CONTRACTOR's compliance with any Laws or Regulations.

6.13.2 If CONTRACTOR performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, CONTRACTOR shall bear all claims, costs, losses, and damages caused by, arising out of, or resulting therefrom; however, it shall not be CONTRACTOR's primary responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve CONTRACTOR of CONTRACTOR's obligations under paragraph 3.3.2.

Taxes

6.14 CONTRACTOR shall pay all sales, consumer, use, and other similar taxes required to be paid by CONTRACTOR in accordance with the Laws and Regulations of the place of the Project, which are applicable during the performance of the Work. City of Louisville municipal taxes shall be waived upon application for and acceptance of "tax exemption".

The CONTRACTOR shall apply for and receive a Certificate of Exemption from the Colorado Department of Revenue for construction materials to be physically incorporated into the Work. This Certificate of Exemption provides that the CONTRACTOR shall neither pay nor include in his bid prices Sales and Use Taxes collected by the State of Colorado on those building and construction materials physically incorporated into the Work. Sales and Use Taxes of the State of Colorado, RTD, and the County are collected by the State of Colorado. All applicable Sales and Use Taxes (including State collected taxes) on any items other than construction and building materials physically incorporated into the Work are to be paid by the Contractor and are to be included in the appropriate bid items. CONTRACTOR and any Subcontractor assume all liability for the nonpayment of taxes, or the payment of exempt taxes resulting from a failure to use the Certificate of Exemption required by this paragraph.

Use of Premises

6.15 CONTRACTOR shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the site and land and areas identified in and permitted by the Contract Documents and other land and areas permitted by Laws and Regulations, rights-of-way, permits and easements, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. CONTRACTOR shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof or of any adjacent land or areas, resulting from the performance of the Work. Should any claim be made by any such owner or occupant because of the performance of the Work, CONTRACTOR shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law. CONTRACTOR shall, to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultant, and anyone directly or indirectly employed by any of them from and against all claims, costs, losses,

and damages arising out of or resulting from any claim or action, legal or equitable, brought by any such owner or occupant against OWNER, ENGINEER, or any other party indemnified hereunder to the extent caused by or based upon CONTRACTOR's performance of the Work.

6.16 During the progress of the Work, CONTRACTOR shall keep the premises free from accumulations of waste materials, rubbish, and other debris resulting from the Work. At the completion of the Work, CONTRACTOR shall remove all waste materials, rubbish, and debris from and about the premises as well as all tools, appliances, construction equipment and machinery, and surplus materials. CONTRACTOR shall leave the site clean and ready for occupancy by OWNER at Substantial Completion of the Work. CONTRACTOR shall restore to original condition all property not designated for alteration by the Contract Documents.

6.17 CONTRACTOR shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall CONTRACTOR subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

Record Documents

6.18 CONTRACTOR shall maintain in a safe place at the site one record copy of all Drawings, Specifications, Addenda, Written Amendments, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications (issued pursuant to paragraph 9.4) in good order and annotated to show all changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to ENGINEER for reference. Upon completion of the Work, these record documents, Samples and Shop Drawings will be delivered to ENGINEER for OWNER.

Safety and Protection

6.19 CONTRACTOR shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. CONTRACTOR shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:

6.19.1 all persons on the Work site or who may be affected by the Work;

6.19.2 all the Work and materials and equipment to be incorporated therein, whether in storage on or off the site; and

6.19.3 other property at the site or adjacent thereto, including but not limited to trees, shrubs, lawns, walks, pavements, roadways, structures, fences, gates, ditches, utilities, and underground facilities not designated for removal, relocation, or replacement in and during the course of construction.

6.19.4 The CONTRACTOR shall take all measures necessary to mitigate the impact of weather so that the project may continue on schedule. In no event shall OWNER be liable for extra costs incurred on materials and any part of the Work due to CONTRACTOR's failing to take all measures necessary protect the Work from weather and CONTRACTOR shall not be entitled to such claims. Also, no extension of the Contract Time shall be allowed if the CONTRACTOR is able, notwithstanding the weather, to proceed with other Work of the Contract.

CONTRACTOR shall comply with all applicable Laws and Regulations of any public body having jurisdiction for safety of persons or property or to protect them from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. CONTRACTOR shall notify owners of adjacent property and of Underground Facilities and utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property. All damage, injury or loss to any property referred to in paragraph 6.20.2 or 6.20.3 caused, directly or indirectly, in whole or in part, by CONTRACTOR, any Subcontractor, Supplier, or any other person or organization directly or employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, shall be remedied by CONTRACTOR. CONTRACTOR's duties and responsibilities for safety and for protection of the work shall continue until such time as all the Work is completed and ENGINEER has issued a notice to OWNER and CONTRACTOR in accordance with paragraph 14.13 that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

Safety Representative

6.20 CONTRACTOR shall designate a qualified and experienced safety representative at the site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

Hazard Communication Programs

6.21 CONTRACTOR shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the site in accordance with Laws or Regulations.

Emergencies

6.22 In emergencies affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, CONTRACTOR, without special instruction or authorization from OWNER or ENGINEER, is obligated to act to prevent threatened damage, injury or loss. CONTRACTOR shall give ENGINEER prompt written notice if CONTRACTOR believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby. If ENGINEER determines that a change in the Contract Documents is required because of the action taken by CONTRACTOR in response to such an emergency, a Work Change directive or Change order will be issued to document the consequences of such action.

Shop Drawings and Samples

6.23

6.23.1 After checking and verifying all field measurements, CONTRACTOR shall submit to ENGINEER for review and approval in accordance with the accepted schedule of shop drawings and sample submittal (see paragraph 2.8), three copies (or at ENGINEER’s option, one reproducible copy) of all shop drawings, which shall have been checked and approved by the CONTRACTOR. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show ENGINEER the materials and equipment CONTRACTOR proposes to provide and to enable ENGINEER to review the information for the limited purposes required by paragraph 6.26.

6.23.2 CONTRACTOR shall also submit Samples to ENGINEER for review and approval in accordance with said accepted schedule of Shop Drawings and Sample submittals. Each Sample will be identified clearly as to material, Supplier, pertinent data such as catalog numbers and the use for which intended and otherwise as ENGINEER may require to enable ENGINEER to review the submittal for the limited purposes required by paragraph 6.24. The numbers of each Sample to be submitted will be as specified in the Specifications.

Submittal Procedures

6.24

6.24.1 Before submitting each Shop Drawing or Sample, CONTRACTOR shall have determined and verified:

6.24.1.1 all field measurements, quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

6.24.1.2 all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work, and

6.24.1.3 all information relative to CONTRACTOR's sole responsibilities in respect of means, methods, techniques, sequences, and procedures of construction and safety precautions and programs incident thereto.

CONTRACTOR shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.

6.24.2 Each submittal will bear a stamp or specific written indication that CONTRACTOR has satisfied CONTRACTOR's obligations under the Contract Documents with respect to CONTRACTOR's review and approval of that submittal.

6.24.3 At the time of each submission, CONTRACTOR shall give ENGINEER specific written notice of such variations, if any, that the Shop Drawing or Sample submitted may have from the requirements of the Contract Documents, such notice to be in a written communication separate from the submittal; and, in addition, shall cause a specific notation to be made on each Shop Drawing and Sample submitted to ENGINEER for review and approval of each such variation.

6.25 ENGINEER will review and approve Shop Drawings and Samples in accordance with the schedule of Shop Drawings and Sample submittals accepted by ENGINEER as required by paragraph 2.8. ENGINEER's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. ENGINEER's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is

specifically and expressly called for by the Contract documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions. CONTRACTOR shall make corrections required by ENGINEER, and shall return the required number of corrected copies of Shop Drawings and submit as required new Samples for review and approval. CONTRACTOR shall direct specific attention in writing to revisions other than the corrections called for by ENGINEER on previous submittals.

6.26 ENGINEER's review and approval of Shop Drawings or Samples shall not relieve CONTRACTOR from responsibility for any variation from the requirements of the Contract Documents unless CONTRACTOR has in writing called ENGINEER's attention to each such variation at the time of submission as required by paragraph 6.24.3 and ENGINEER has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample approval; nor will any approval by ENGINEER relieve CONTRACTOR from responsibility for complying with the requirements of paragraph 6.24.1.

6.27 Where a Shop Drawing or Sample is required by the Contract Documents or the schedule of Shop Drawings and Sample submissions accepted by ENGINEER as required by paragraph 2.8, any related Work performed prior to ENGINEER's review and approval of the pertinent submittal will be at the sole expense and responsibility of CONTRACTOR.

Continuing the Work

6.28 CONTRACTOR shall carry on the Work and adhere to the progress schedule during all disputes or disagreements with OWNER. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by paragraph 15.5 or as OWNER and CONTRACTOR may otherwise agree in writing.

CONTRACTOR's General Warranty and Guarantee

6.29

6.29.1 CONTRACTOR warrants and guarantees to OWNER, ENGINEER, and ENGINEER's Consultants that all Work will be in accordance with the Contract Documents and will not be **defective**. CONTRACTOR's warranty and guarantee hereunder excludes defects or damage caused by:

6.29.1.1 abuse, modification, or improper maintenance or operation by persons other than CONTRACTOR, Subcontractors, or Suppliers; or

6.29.1.2 normal wear and tear under normal usage.

6.29.2 CONTRACTOR's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of CONTRACTOR's obligation to perform the work in accordance with the Contract Documents:

6.29.2.1 observations by ENGINEER;

6.29.2.2 recommendation of any progress or final payment by ENGINEER;

6.29.2.3 the issuance of a certificate of Substantial Completion or any payment by OWNER to CONTRACTOR under the Contract Documents;

6.29.2.4 use or occupancy of the Work or any part thereof by OWNER;

6.29.2.5 any acceptance by OWNER or any failure to do so;

6.29.2.6 any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by ENGINEER pursuant to paragraph 14.13;

6.29.2.7 any inspection, test, or approval by others; or

6.29.2.8 any correction of **defective** Work by OWNER.

6.29.3 The CONTRACTOR warrants that, unless otherwise specified in the Contract Documents, the materials and equipment installed in the Work will be new, merchantable, and fit for the purpose for which they are intended, and that the Work will be performed in a workmanlike manner. The CONTRACTOR also warrants the workers who perform the Work will be sufficiently skilled to produce a high quality product which is free of blemishes (surface defects) and flaws (internal defects).

The CONTRACTOR is under a continuing duty to warn the OWNER and ENGINEER of any possible defect in the design of the Work and materials incorporated in the Work and against potentially unsafe uses of products incorporated in the Work which may cause personal injury or property damage as soon as the CONTRACTOR discovers the possible defect or has notice that the product may be unsafe. The CONTRACTOR's duty under this paragraph shall be continuing and shall not expire when the OWNER accepts the Work or when the CONTRACTOR's guarantee expires. If the CONTRACTOR fails to warn the Owner of a design or product defect of which the CONTRACTOR is aware, and if personal or property damage thereafter results from such design or product defect, the CONTRACTOR shall be liable jointly and severally with any other party responsible at law for all damages resulting from such defect.

Indemnification

6.30

The CONTRACTOR agrees to indemnify and hold harmless the OWNER (City of Louisville), ENGINEER, ENGINEER's consultants, and their officers, employees, agents, and insurers, from and against all liability, claims, and demands, on account of injury, loss, or damage, including without limitation claims arising from bodily injury, personal injury, sickness, disease, death, property loss or damage, or any other loss of any kind whatsoever, which arise out of or are in any manner connected with this contract, if such injury, loss, or damage is caused in whole or in part by, or is claimed to be caused in whole or in part by, the act, omission, error, professional error, mistake, negligence, or other fault of the CONTRACTOR, any Subcontractor of the CONTRACTOR, or any

officer, employee, representative, or agent of the CONTRACTOR or of any Subcontractor of the CONTRACTOR, or which arise out of any workers' compensation claim of any employee of the CONTRACTOR or of any employee of any subcontractor of the CONTRACTOR. The CONTRACTOR agrees to investigate, handle, respond to, and to provide defense for and defend against, any such liability, claims or demands at the sole expense of the CONTRACTOR. The CONTRACTOR also agrees to bear all other costs and expenses related thereto, including court costs and attorney fees, whether or not any such liability, claims, or demands alleged are groundless, false, or fraudulent.

6.31 In any and all claims against OWNER or ENGINEER or any of their respective consultants, agents, officers, directors, or employees by any employee (or the survivor or personal representative of such employee) of CONTRACTOR, any Subcontractor, any Supplier, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under paragraph 6.30 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for CONTRACTOR or any such Subcontractor, Supplier, or other person or organization under workers' compensation acts, disability benefit acts, or other employee benefit acts.

Survival of Obligations

6.32 All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the work and termination or completion of the Agreement.

Article 7. Other Work

Related Work at Site

7.1 OWNER may perform other work related to the Project at the site by OWNER's own forces, or let other direct contracts therefor which shall contain General Conditions similar to these, or have other work performed by utility owners. If the fact that such other work is to be performed was not noted in the Contract Documents, then: (i) written notice thereof will be given to CONTRACTOR prior to starting any such other work, and (ii) CONTRACTOR may make a claim therefor as provided in Articles 11 and 12 if CONTRACTOR believes that such performance will involve additional expense to CONTRACTOR or requires additional time and the parties are unable to agree as to the amount or extent thereof.

7.2 CONTRACTOR shall afford each other contractor who is a party to such a direct contract and each utility owner (and OWNER, if OWNER is performing the additional work with OWNER's employees) proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work and shall properly connect and coordinate the Work with theirs. Unless otherwise provided in the Contract Documents, CONTRACTOR shall do all cutting, fitting, and patching of the Work that may be required to make its several parts come together properly and integrate with such other work. CONTRACTOR shall not endanger any work of others by cutting, excavating or otherwise altering their work and will only cut or alter their work with the written consent of ENGINEER and the others whose work will be affected. The duties and responsibilities of CONTRACTOR under this

paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of CONTRACTOR in said direct contracts between OWNER and such utility owners and other contractors.

7.3 If the proper execution or results of any part of CONTRACTOR's work depends upon work performed by others under this Article 7, CONTRACTOR shall inspect such other work and promptly report to ENGINEER in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of CONTRACTOR's Work. CONTRACTOR's failure so to report will constitute an acceptance of such other work as fit and proper for integration with CONTRACTOR's Work except for latent or non-apparent defects and deficiencies in such other work.

Coordination

7.4 Unless otherwise provided in the Supplementary Conditions, OWNER shall have sole authority and responsibility in respect of such coordination.

Should CONTRACTOR cause damage to the Work or property of any separate CONTRACTOR at the site, or should any claim arising out of CONTRACTOR's performance of the Work at the site be made by any separate contractor against CONTRACTOR, OWNER, ENGINEER, or any other person, CONTRACTOR shall promptly attempt to settle with such other contractor by agreement, or to otherwise resolve the dispute by arbitration or at law. CONTRACTOR shall, to the fullest extent permitted by Laws, and Regulations, indemnify and hold OWNER and ENGINEER harmless from and against all claims, damages, losses, and expenses (including, but not limited to, fees of engineers, architects, attorneys, and other professionals and court and arbitration costs) arising directly, indirectly, or consequentially out of any action, legal or equitable, brought by any separate contractor against OWNER or ENGINEER to the extent based on a claim arising out of CONTRACTOR's performance of the Work. Should a separate contractor cause damage to the Work or property of CONTRACTOR or should the performance of Work by any separate CONTRACTOR at the site give rise to any other claim, CONTRACTOR shall not institute any action, legal or equitable, against OWNER or ENGINEER or permit any action against any of them to be maintained and continued in its name or for its benefit in any court or before any arbiter which seeks to impose liability on or to recover damages from OWNER or ENGINEER on account of any such damage or claim. If CONTRACTOR is delayed at any time in performing or furnishing Work by any act or neglect of a separate contractor and OWNER and CONTRACTOR are unable to agree as to the extent of any adjustment in Contract Time attributable thereto, CONTRACTOR may make a claim for an extension of time in accordance with Article 12. An extension of the Contract Time shall be CONTRACTOR's exclusive remedy with respect to OWNER and ENGINEER for any delay, disruption, interference, or hindrance caused by any separate contractor. This paragraph does not prevent recovery from OWNER or ENGINEER for activities that are their respective responsibilities.

Article 8. Owner's Responsibilities

8.1 Except as otherwise provided in these General Conditions, OWNER shall issue all communications to CONTRACTOR through ENGINEER.

8.2 In case of termination of the employment of ENGINEER, OWNER shall appoint an engineer whose status under the Contract Documents shall be that of the former ENGINEER.

8.3 OWNER shall furnish the data required of OWNER under the Contract documents promptly and shall make payments to CONTRACTOR promptly when they are due as provided in paragraphs 14.4 and 14.13.

8.4 OWNER's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in paragraphs 4.1 and 4.4.

8.5 OWNER is obligated to execute Change Orders as indicated in paragraph 10.4.

8.6 OWNER's responsibility in respect of certain inspections, tests, and approvals is set forth in paragraph 13.4.

8.7 In connection with OWNER's right to stop Work or suspend Work, see paragraphs 13.10 and 15.1. Paragraph 15.2 deals with OWNER's right to terminate services of CONTRACTOR under certain circumstances.

8.8 The OWNER shall not supervise, direct, or have control or authority over, nor be responsible for, CONTRACTOR's means, methods, techniques, sequences, or procedures of construction or the safety precautions and programs incident thereto, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the furnishing or performance of the Work. OWNER will not be responsible for CONTRACTOR's failure to perform or furnish the Work in accordance with the Contract Documents.

8.9 OWNER's responsibility in respect of undisclosed Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Materials uncovered or revealed at the site is set forth in paragraph 4.5.

8.10 If and to the extent OWNER has agreed to furnish CONTRACTOR reasonable evidence that financial arrangements have been made to satisfy OWNER's obligations under the Contract Documents, OWNER's responsibility in respect thereof will be as set forth in the Supplementary Conditions.

Article 9. Engineer's Status During Construction

OWNER's Representative

9.1 ENGINEER will be OWNER's representative during the construction period. The duties and responsibilities and the limitations of authority of ENGINEER as OWNER's representative during construction are set forth in the Contract Documents and shall not be extended without written consent of OWNER and ENGINEER.

Visits to Site

9.2 ENGINEER will make visits to the site at intervals appropriate to the various stages of construction as ENGINEER deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of CONTRACTOR's executed Work. Based on information obtained during such visits and observations, ENGINEER will endeavor for the benefit of OWNER to determine, in general, if the Work is proceeding in accordance with the Contract Documents. ENGINEER will not be required to make exhaustive or continuous onsite inspections to check the quality or quantity of the Work.

ENGINEER's efforts will be directed toward providing for OWNER a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and onsite observations, ENGINEER will keep OWNER informed of the progress of the Work and will endeavor to guard OWNER against **defective** Work. ENGINEER's visits and onsite observations are subject to all the limitations on ENGINEER's authority and responsibility set forth in paragraph 9.13 and particularly, but without limitation, during or as a result of ENGINEER's onsite visits or observations of CONTRACTOR's Work ENGINEER will not supervise, direct, control, or have authority over or be responsible for CONTRACTOR's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the furnishing or performance of the Work.

Project Representative

9.3 ENGINEER will furnish a Resident Project Representative, assistants, and other field staff to assist ENGINEER in observing the performance of the Work of the CONTRACTOR. The responsibilities and authority and limitations thereon of any such Resident Project Representative and assistants will be as provided in paragraph 9.13 and in the Supplementary Conditions. If OWNER designates another representative or agent to represent OWNER at the site who is not ENGINEER's Consultant, agent or employee, the responsibilities and authority and limitations thereon of such other person will be as provided in the Supplementary Conditions.

9.3.1 Resident Project Representative is ENGINEER's Agent and will act as directed by and under the supervision of ENGINEER, and will confer with ENGINEER regarding his actions. His dealings in matters pertaining to the onsite Work will in general be with ENGINEER and CONTRACTOR keeping the ENGINEER advised as necessary. His dealings with Subcontractors will only be through or with the full knowledge and approval of CONTRACTOR.

Duties and Responsibilities

Resident Project Representative will:

Schedules

Review the progress schedule, schedule of Shop Drawing submittal, schedule of values and other schedules prepared by CONTRACTOR and consult with ENGINEER concerning acceptability.

Conferences and Meetings

Attend meetings with CONTRACTOR, such as preconstruction conferences, progress meetings and other job conferences, and other project-related meetings.

Liaison

Serve as ENGINEER's liaison with CONTRACTOR, working principally through CONTRACTOR's superintendent and assist him in understanding the intent of the Contract Documents. Assist ENGINEER in serving as OWNER's liaison with

CONTRACTOR when CONTRACTOR's operations affect OWNER's onsite operations.

Assist in obtaining from ENGINEER additional details or information, when required for proper execution of the Work.

Shop Drawings and Samples

Record date of receipt of Shop Drawings and samples.
Receive samples, which are furnished at the site by CONTRACTOR for ENGINEER's review, and notify ENGINEER of their availability for examination.

Advise ENGINEER and CONTRACTOR of the commencement of any Work requiring a Shop Drawing or sample submission if the submission has not been approved by ENGINEER.

Review of Work, Rejection of Defective Work, Inspections, and Tests

Conduct onsite observations of the Work in progress to assist ENGINEER in determining that the Work is proceeding in accordance with the Contract Documents.

Report to ENGINEER whenever he believes that any Work is unsatisfactory, faulty or defective, or does not conform to the Contract Documents, or has been damaged, or does not meet the requirements of any inspections, tests, or approvals required to be made; and advise ENGINEER when he believes Work should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection, or approval.

Verify that tests, equipment, and systems startups and operating and maintenance training are conducted in presence of the appropriate personnel, and that CONTRACTOR maintains adequate records thereof; observe, record, and report to ENGINEER appropriate details relative to the test procedures and start-ups.

Accompany visiting inspectors representing public or other agencies having jurisdiction over the Project, record the results of these inspections and report to ENGINEER.

Interpretation of Contract Documents

Report to ENGINEER when clarifications and interpretations of the Contract Documents are needed and Transmit to CONTRACTOR clarification and interpretation of the Contract Documents as issued by ENGINEER.

Modifications

Consider and evaluate CONTRACTOR's suggestions for modification in Drawings or Specifications and report with his recommendations to ENGINEER. Transmit to CONTRACTOR decisions issued by ENGINEER.

Records

Maintain at the job site orderly files for correspondence, reports of job conferences, Shop Drawings and samples, reproductions or original Contract Documents including all Work Directive Changes, Addenda, Change Orders, Field Orders, additional Drawings issued subsequent to the execution of the Agreement, ENGINEER's clarifications and interpretations of the Contract Documents, progress reports, and other Project related documents.

Keep a diary, daily report form, or log book, recording hours on the job site, weather conditions, data relative to questions of Work Directive Changes, Change Orders, or changed conditions, list of job site visitors, daily activities, decisions, observations in general, and specific observations in more detail as in the case of observing test procedures.

Record names, addresses, and telephone numbers of all CONTRACTORs, subcontractors, and major suppliers of equipment and materials.

Reports

Furnish ENGINEER periodic reports as required of progress of the Work and of CONTRACTOR's compliance with the progress schedule and schedule of Shop Drawings and sample submittal.

Consult with ENGINEER in advance of scheduled major tests, inspections or start of important phases of the Work.

Draft proposed Change Orders and Work Directive Changes, obtaining backup material from CONTRACTOR and recommend to ENGINEER Change Orders, Work Directive Changes, and Field Orders.

Report immediately to ENGINEER upon the occurrence of any accident.

Payment Requests

Review applications for payment with CONTRACTOR for compliance with the established procedure for their submission and forward with his recommendations to ENGINEER, noting particularly the relationship of the payment requested to the schedule of values, Work completed and materials and equipment delivered at the site but not incorporated in the Work.

Certificates, Maintenance, and Operations Manuals

During the Course of Work verify that certifications, maintenance, and operation manuals and other data required to be assembled and furnished by CONTRACTOR are applicable to the items actually installed and in accordance with the Contract Documents, and have this material delivered to ENGINEER for review and forwarding to OWNER prior to final payment of the Work.

Completion

Before ENGINEER issues a Certificate of Substantial Completion, submit to CONTRACTOR a list of observed items requiring correction or completion.

Conduct final inspection in the company of ENGINEER and CONTRACTOR and prepare a final list of items to be corrected or completed.

Observe that all items on final list have been corrected or completed and make recommendations to ENGINEER concerning acceptance.

Limitation of Authority

Resident Project Representative shall not:

Authorize any deviations from the Contract Documents or accept any substitute materials or equipment, unless authorized by ENGINEER.

Exceed limitations of ENGINEER's authority as set forth in the Contract Documents.

Undertake any of the responsibilities of CONTRACTOR, Subcontractors, or CONTRACTOR's superintendent.

Advise on, or issue directions relative to or assume control over any aspect of the means, methods, techniques, sequences, or procedures for construction unless such is specifically called for in the Contract Documents.

Advise on or issue directions regarding or assume control over safety precautions and programs in connection with the Work.

Shall not accept Shop Drawings or sample submittals from anyone other than CONTRACTOR.

Authorize OWNER to occupy the Work in whole or in part.

Participate in specialized field or laboratory tests or inspections conducted by others except as specifically authorized by ENGINEER.

Clarifications and Interpretations

9.4 ENGINEER will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents (in the form of Drawings or otherwise) as ENGINEER may determine necessary, which shall be consistent with the intent of and reasonably inferable from Contract Documents. Such written clarifications and interpretations will be binding on OWNER and CONTRACTOR. If OWNER or CONTRACTOR believes that a written clarification or interpretation justifies an adjustment in the Contract Price or the Contract Times and the parties are unable to agree to the amount or extent thereof, if any, OWNER or CONTRACTOR may make a written claim therefor as provided in Article 11 or Article 12.

Authorized Variations in Work

9.5 ENGINEER may authorize minor variations in the work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on OWNER and also on CONTRACTOR who shall perform the Work involved promptly.

Rejecting Defective Work

9.6 ENGINEER will have authority to disapprove or reject Work which ENGINEER believes to be **defective**, or that ENGINEER believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. ENGINEER will also have authority to require special inspection or testing of the work as provided in paragraph 13.9, whether or not the work is fabricated, installed or completed.

Shop Drawings, Change Orders and Payments

9.7 In connection with ENGINEER's authority as to Shop Drawings and Samples, see paragraphs 6.24 through 6.28 inclusive.

9.8 In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.

9.9 In connection with ENGINEER's authority as to Applications for Payment, see Article 14.

Determinations for Unit Prices

9.10 ENGINEER will have authority to determine the actual quantities and classifications of items of Unit Price Work performed by CONTRACTOR, and the written decisions of ENGINEER on such matters will be final, binding on OWNER and CONTRACTOR and not subject to appeal (except as modified by ENGINEER to reflect changed factual conditions).

Decisions on Disputes

9.11 ENGINEER will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. Claims, disputes, and other matters relating to the acceptability of the Work or the interpretation of the requirements of the Contract Documents pertaining to the performance and furnishing of the Work and Claims under Articles 11 and 12 in respect of changes in the Contract Price or Contract Times will be referred initially to ENGINEER in writing with a request for a formal decision in accordance with this paragraph. Written notice of each such claim, dispute or other matter will be delivered by the claimant to ENGINEER and the other party to the Agreement promptly (but in no event later than fifteen days) after the start of the occurrence or event giving rise thereto, and written supporting data will be submitted to ENGINEER and the other party within thirty days after the start of such occurrence or event unless ENGINEER allows an additional period of time for the submission of additional or more accurate data in support of such claim, dispute of other matter. The opposing party shall submit any response to ENGINEER and the claimant within thirty days after receipt of the claimant's last submittal (unless ENGINEER allows additional time). ENGINEER will render a formal decision in writing within thirty days after receipt of the opposing party's submittal, if any, in accordance with

this paragraph. ENGINEER's written decision on such claim, dispute or other matter will be final and binding upon OWNER and CONTRACTOR.

9.12 When functioning under paragraphs 9.10 and 9.11, ENGINEER will not show partiality to OWNER or CONTRACTOR and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity. The rendering of a decision by ENGINEER pursuant to paragraphs 9.10 or 9.11 with respect to any such claim, dispute or other matter (except any which have been waived by the making or acceptance of final payment as provided in paragraph 14.15) will be a condition precedent to any exercise by OWNER or CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations.

Limitations on ENGINEER's Authority and Responsibilities

9.13

9.13.1 Neither ENGINEER's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by ENGINEER in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by ENGINEER shall create, impose or give rise to any duty owned by ENGINEER to CONTRACTOR, any Subcontractor, any Supplier, any other person or organization, or to any surety for or employee or agent of any of them.

9.13.2 ENGINEER will not supervise, direct, control, or have authority over or be responsible for CONTRACTOR's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the furnishing or performance of the Work. ENGINEER will not be responsible for CONTRACTOR's failure to perform or furnish the Work in accordance with the Contract Documents.

9.13.3 ENGINEER will not be responsible for the acts or omissions of CONTRACTOR or of any Subcontractor, any Supplier, or of any other person or organization performing or furnishing any of the Work.

9.13.4 ENGINEER's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds and certificates of inspection, tests and approvals, and other documentation required to be delivered by paragraph 14.12 will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests and approvals that the results certified indicate compliance with, the Contract Documents.

9.13.5 The limitations upon authority and responsibility set forth in this paragraph 9.13 shall also apply to ENGINEER's Consultants, Resident Project Representative, and Assistants.

Article 10. Changes in the Work

10.1 Without invalidating the Agreement and without notice to any surety, OWNER may, at any time or from time to time, order additions, deletions, or revisions in the Work. A Written Amendment, a Change Order, or a Work Change Directive will authorize such additions, deletions, or revisions. Upon receipt of any such document, CONTRACTOR shall promptly proceed with the Work involved, which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

10.2 If OWNER and CONTRACTOR are unable to agree as to the extent, if any, of an adjustment in the Contract Price or an adjustment of the Contract Times that should be allowed as a result of a Work Change Directive, a claim may be made therefor as provided in Article 11 or Article 12.

10.3 CONTRACTOR shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any Work performed that is not required by the Contract Documents as amended, modified, and supplemented as provided in paragraphs 3.5 and 3.6 except in the case of an emergency as provided in paragraph 6.23 or in the case of uncovering Work as provided in paragraph 13.9.

10.4 OWNER and CONTRACTOR shall execute appropriate Change Orders recommended by ENGINEER (or Written Amendments) covering:

10.4.1 changes in the Work which are (i) ordered by OWNER pursuant to paragraph 10.1., (ii) required because of acceptance of **defective** Work under paragraph 13.13 or correcting **defective** Work under paragraph 13.14, or (iii) agreed to by the parties;

10.4.2 changes in the Contract Price or Contract Times which are agreed to by the parties; and

10.4.3 changes in the Contract Price or Contract Times, which embody the substance of any written decision rendered by ENGINEER pursuant to paragraph 9.11.

10.5 If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times) is required by the provisions of any Bond to be given to a surety, the giving of any such notice will be CONTRACTOR's responsibility, and the amount of each applicable Bond will be adjusted accordingly.

Article 11. Change of Contract Price

11.1 The Contract Price constitutes the total compensation (subject to authorized adjustments) payable to CONTRACTOR for performing the Work. All duties, responsibilities, and obligations assigned to or undertaken by CONTRACTOR shall be at CONTRACTOR's expense without change in the Contract Price.

11.2 The Contract Price may only be changed by a Change Order or by a Written Amendment. Any claim for an adjustment in the Contract Price shall be based on written notice delivered by the party making the claim to the other party and to ENGINEER promptly (but in no event later than fifteen days) after the start of the occurrence or event giving rise to the claim and stating the

general nature of the claim. Notice of the amount of the claim with supporting data shall be delivered within thirty days after the start of such occurrence or event (unless ENGINEER allows additional time for claimant to submit additional or more accurate data in support of the claim) and shall be accompanied by claimant's written statement that the adjustment claimed covers all known amounts to which the claimant is entitled as a result of said occurrence or event. ENGINEER shall determine all claims for adjustment in the Contract Price in accordance with paragraph 9.11 if OWNER and CONTRACTOR cannot otherwise agree on the amount involved. No claim for ad adjustment in the Contract Price will be valid if not submitted in accordance with this paragraph 11.2.

11.3 The value of any Work covered by a Change Order or of any claim for an adjustment in the Contract Price will be determined as follows:

11.3.1 where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of paragraphs 11.9.1 through 11.9.3 inclusive);

11.3.2 where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with paragraph 11.6.2);

11.3.3 where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under paragraph 11.3.2, on the basis of the Cost of the Work (determined as provided in paragraphs 11.4 and 11.5) plus a CONTRACTOR's fee for overhead and profit (determined as provided in paragraph 11.6).

Cost of the Work

11.4 The term Cost of the Work means the sum of all costs necessarily incurred and paid by CONTRACTOR in the proper performance of the Work. Except as otherwise may be agreed to in writing by OWNER, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items and shall not include any of the costs itemized in paragraph 11.5:

11.4.1 Certified payroll record costs for employees in the direct employment of CONTRACTOR in the performance of the Work under schedules of job classifications shall be submitted to the ENGINEER with the claim. Such employees shall include without limitation superintendents, foremen, and other personnel employed full-time at the site. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits which shall include social security contributions, unemployment, excise and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work after regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by OWNER.

11.4.2 Invoices for cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith shall be submitted to the ENGINEER with the claim. All cash discounts shall accrue to CONTRACTOR unless OWNER deposits funds with CONTRACTOR with which to make payments, in which case the cash discounts shall accrue to OWNER. All trade discounts, rebates, refunds, and returns from sale of surplus materials and equipment shall be in accordance with the State Department of Highways, Division of Highways, and State of Colorado Standard Specifications for Road and Bridge Construction 2005 Edition. If the materials used in performing the extra Work are taken from the CONTRACTOR's stock, then in lieu of invoices the CONTRACTOR shall furnish an affidavit, certifying that such materials were taken from its stock, that the quantity claimed was actually used in the Work, and that the price and transportation claimed represent the actual cost to the CONTRACTOR shall be submitted to the ENGINEER with the claim.

11.4.3 Payments made by CONTRACTOR to the Subcontractors for Work performed or furnished by Subcontractors. If required by OWNER, CONTRACTOR shall obtain competitive bids from subcontractors acceptable to OWNER and CONTRACTOR and shall deliver such bids to OWNER who will then determine, with the advice of ENGINEER, which bids, if any, will be accepted. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work Plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as CONTRACTOR's Cost of the Work and fee as provided in paragraphs 11.4, 11.5, 11.6 and 11.7. All subcontracts shall be subject to the other provisions of the Contract Documents insofar as applicable.

11.4.4 Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

11.4.5 Supplemental costs including the following:

11.4.5.1 The proportion of necessary transportation, travel, and subsistence expenses of CONTRACTOR's employees incurred in discharge of duties connected with the Work.

11.4.5.2 Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office and temporary facilities at the site and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost less market value of such items used but not consumed which remain the property of CONTRACTOR.

11.4.5.3 Rentals rates of all construction equipment and machinery and the parts thereof which has been authorized by the ENGINEER, the CONTRACTOR will be paid for the use of equipment in the manner hereinafter specified. Rental rates will be from the current edition of the Rental Rate Blue Book for Construction Equipment and will be determined as follows:

Hourly rate: RR = (ADJ BB/176)(RF)(SAF)+EOC

Where:	RR	=	Hourly rental rate
	ADJ BB/176	=	Blue Book Monthly Rate adjusted for year of manufacture/176
	RF	=	Regional Factor of 1.06
	SAF	=	State Adjustment Factor of 1.05
	EOC	=	Estimated Hourly Operating Costs from Blue Book

With each claim, the CONTRACTOR shall submit the rental rate calculations including copies of the appropriate pages of the Blue Book for each piece of equipment listed in the claim.

Rental of equipment not owned by the CONTRACTOR will be paid for by invoice cost plus operating cost (EOC). Copies of the applicable pages of the Rental Rate Blue Book for Construction Equipment shall be submitted to the ENGINEER with the claim.

The costs of transportation, loading, unloading, installation, dismantling, and removal thereof all in accordance with the terms of said rental agreements. If equipment is used intermittently and when not in use could be returned to its rental source at less expense to the OWNER than holding it at the Work site, it shall be returned unless the CONTRACTOR elects to keep it at the Work site at no expense to the OWNER. The rental of any such equipment, machinery, or parts shall cease when the use of the equipment is no longer necessary for the Work. No payment will be made for the use of tools, which have a replacement value of $200.00 or less. Operators will be paid for separately as provided in paragraph 11.4.1. Certified invoices for rental cost of all construction equipment and machinery incorporated in the Work shall be submitted to the ENGINEER with the claim.

11.4.5.4 Sales, consumer, use, or similar taxes related to the Work, and for which CONTRACTOR is liable, imposed by Laws and Regulations.

11.4.5.5 Deposits lost for causes other than negligence of CONTRACTOR, any Subcontractor or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable.

11.4.5.6 Losses and damages (and related expenses) caused by damage to the work, not compensated by insurance or otherwise, sustained by CONTRACTOR in connection with the performance and furnishing of the Work, (except losses and damages within the

deductible amounts of property insurance established by OWNER in accordance with paragraph 5.9), provided they have resulted from causes other than the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of OWNER. No such losses, damages and expenses shall be included in the Cost of the Work for the purpose of determining CONTRACTOR's fee. If, however, any such loss or damage requires reconstruction and CONTRACTOR is placed in charge thereof, CONTRACTOR shall be paid for services a fee proportionate to that stated in paragraph 11.6.2.

11.4.5.7 The cost of utilities, fuel, and sanitary facilities at the site.

11.4.5.8 Minor expenses such as telegrams, long distance telephone calls, telephone service at the site, expressage, and similar petty cash items in connection with the Work.

11.5 The term Cost of the Work shall not include any of the following:

11.5.1 Payroll costs and other compensation of CONTRACTOR's officers, executives, principals (of partnership and sole proprietorships), general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by CONTRACTOR whether at the site or in CONTRACTOR's principal or a branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in paragraph 11.4.1 or specifically covered by paragraph 11.4.4: all of which are to be considered administrative costs covered by the CONTRACTOR's fee.

11.5.2 Expenses of CONTRACTOR's principal and branch offices other than CONTRACTOR's office at the site.

11.5.3 Any part of CONTRACTOR's capital expenses, including interest on CONTRACTOR's capital employed for the Work and charges against CONTRACTOR for delinquent payments.

11.5.4 Cost of premiums for all Bonds and for all insurance whether or not CONTRACTOR is required by the Contract Documents to purchase and maintain the same (except for the cost of premiums covered by subparagraph 11.4.5.9 above).

11.5.5 Costs due to the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of **defective** Work, disposal of materials or equipment wrongly supplied and making good any damage to property.

Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in paragraph 11.4.

11.6 The CONTRACTOR's fee allowed to CONTRACTOR for overhead and profit shall be determined as follows:

11.6.1 a mutually acceptable fixed fee; or

11.6.2 if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the work:

11.6.2.1 for costs incurred under paragraphs 11.4.1 and 11.4.2, the CONTRACTOR's fee shall be fifteen percent;

11.6.2.2 for costs incurred under paragraph 11.4.3, the CONTRACTOR's fee shall be five percent;

11.6.2.3 where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of paragraphs 11.4.1, 11.4.2, 11.4.3, and 11.6.2 is that the Subcontractor who actually performs or furnishes the Work, at whatever tier, will be paid a fee of fifteen percent of the costs incurred by such Subcontractor under paragraphs 11.4.1 and 11.4.2 and that any higher tier Subcontractor and CONTRACTOR will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

11.6.2.4 no fee shall be payable on the basis of costs itemized under paragraphs 11.4.4, 11.4.5, and 11.5;

11.6.2.5 the amount of credit to be allowed by CONTRACTOR to OWNER for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in CONTRACTOR's fee by an amount equal to five percent of such net decrease; and

11.6.2.6 when both additions and credits are involved in any one change, the adjustment in CONTRACTOR's fee shall be computed on the basis of the net change in accordance with paragraphs 11.6.2.1 through 11.6.2.5, inclusive.

11.7 Whenever the cost of any Work is to be determined pursuant to paragraphs 11.4 and 11.5, CONTRACTOR will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in form acceptable to ENGINEER an itemized cost breakdown together with supporting data.

Cash Allowances

11.8 It is understood that CONTRACTOR has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be furnished and performed for such sums as may be acceptable to OWNER and ENGINEER. CONTRACTOR agrees that:

11.8.1 the allowances include the cost to CONTRACTOR (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the site, and all applicable taxes; and

11.8.2 CONTRACTOR's costs for unloading and handling on the site, labor, installation costs, overhead, profit, and other expenses contemplated for the allowances have been included in the Contract Price and not in the allowances and no demand for additional payment on account of any of the foregoing will be valid.

Prior to final payment, an appropriate Change Order will be issued as recommended by ENGINEER to reflect actual amounts due CONTRACTOR on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

Unit Price Work

11.9

11.9.1 Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the established unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by CONTRACTOR will be made by ENGINEER in accordance with paragraph 9.10.

11.9.2 Each unit price will be deemed to include an amount considered by CONTRACTOR to be adequate to cover CONTRACTOR's overhead and profit for each separately identified item.

11.9.3 OWNER or CONTRACTOR may make a claim for an adjustment in the contract Price in accordance with Article 11 if:

11.9.3.1 the quantity of any item of Unit Price Work performed by CONTRACTOR differs materially and significantly from the estimated quantity of such item indicated in the Agreement;

11.9.3.2 there is no corresponding adjustment with respect to any other item of Work; and

11.9.3.3 if CONTRACTOR believes that CONTRACTOR is entitled to an increase in Contract Price as a result of having incurred additional expense of, OWNER believes that OWNER is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

11.9.4 In no event shall a claim be made or an adjustment of Unit Price allowed if a variation in actual quantities used does not equal or exceed 25 percent (25%) of the total Bid Price.

12.1 The Contract Times (or Milestones) may only be changed by a Change Order or a Written Amendment. Any claim for an adjustment of the Contract Times (or Milestones) shall be based on written notice delivered by the party making the claim to the other party and to ENGINEER promptly (but in no event later than fifteen days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the extent of the claim with supporting data shall be delivered within thirty days after such occurrence (unless ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by the claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant has reason to believe it is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract Times (or Milestones) shall be determined by ENGINEER in accordance with paragraph 9.11 if OWNER and CONTRACTOR cannot otherwise agree. No claim for an adjustment in the Contract Times (or Milestones) will be valid if not submitted in accordance with the requirements of this paragraph 12.1.

12.2 Liquidated damages. The OWNER and the CONTRACTOR agree and recognize that time is of the essence for every time period set forth in the Contract Documents and that the OWNER will suffer financial loss if the Work is not substantially complete within the time set forth in the Contract Documents, plus any extensions thereof allowed in accordance with this Article 12 of the General Conditions. If the CONTRACTOR fails to perform the Work within the specified time set forth in the Contract Documents as adjusted pursuant to Article 12, the OWNER and CONTRACTOR agree that as liquidated damages, and not as a penalty, for delay in performance the Contractor shall pay OWNER in the amount stipulated below for each and every contract day that expires after the time set forth in the Contract Documents for Substantial Completion of the Work until the same is finally complete and ready for Final Payment. The OWNER shall have the right to deduct liquidated damages from any amount due or that may become due to the CONTRACTOR, or to collect such liquidated damages from the CONTRACTOR or the Surety. The OWNER has the option to enforce liquidated damages or to waive such damages. The liquidated damages herein specified shall only apply to the CONTRACTOR's delay in performance. Liquidated damages are intended only to compensate the OWNER for additional OWNER personnel efforts in administering the Contract after normally scheduled completion dates, and for City governmental and citizen inconvenience, lost opportunities, and lost confidence in government and morale of government when work is not completed on time. Such damages are uncertain in amount and difficult to measure and prove accurately. By executing this contract, the CONTRACTOR agrees that the liquidated damages specified in the Contract Documents are reasonable in amount and are not disproportionate to actual anticipated damages. Liquidated damages do not include any sums of money to reimburse the OWNER for extra costs which the OWNER may become obligated to pay on other contracts which are delayed or extended because of CONTRACTOR's failure to complete the Work within the time periods set forth in the Contract Documents. Liquidated damages are not intended to include litigation or attorneys' fees incurred by the OWNER, or other incidental or consequential damages suffered by the OWNER due to CONTRACTOR’s performance. If the OWNER charges liquidated damages to the CONTRACTOR, this shall not preclude the Owner from commencing an action against the CONTRACTOR for other actual harm resulting from the CONTRACTOR's performance, which is not due to the CONTRACTOR's delay in performance. In order to recover liquidated damages, OWNER is under no obligation to prove the actual damages sustained by OWNER due to the CONTRACTOR's delay in performance. In no event shall the CONTRACTOR be assessed liquidated damages if the contract is suspended or terminated for events beyond the control of the CONTRACTOR for which a time extension beyond the original schedule of performance could be granted under 12.3.

The parties agree that liquidated damages shall be in the amount set forth in Article 2 of the Agreement.

12.3 Where CONTRACTOR is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of CONTRACTOR, the Contract Times (or Milestones) will be extended in an amount equal to the time lost due to such delay if a claim is made therefor as provided in paragraph 12.1. Delays beyond the control of CONTRACTOR shall include, but not be limited to, acts or neglect by OWNER, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions or acts of God. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of CONTRACTOR.

12.4 The CONTRACTOR specifically waives any and all claims against the OWNER for damages resulting from any hindrance or delay caused by circumstances beyond the control of CONTRACTOR that prevents completing any part of the Work within the Contract Times (or Milestones), whether or not caused by the OWNER. The CONTRACTOR may instead be granted an extension of the Contract Times for which the OWNER will not claim liquidated damages, provided that the hindrance or delay is beyond the control of the CONTRACTOR. An extension of the Contract Times (or Milestones) in an amount equal to the time lost due to such delay shall be CONTRACTOR's sole and exclusive remedy for such delay. In no event shall OWNER be liable to CONTRACTOR, any subcontractor, any supplier, any other person or organization, or to any surety for or employee or agent of any of them, for damages arising out of or resulting from delays caused by or within the control of Contractor, or delays beyond the control of CONTRACTOR whether or not caused by the OWNER.

Article 13. Tests and Inspections; Correction, Removal, or Acceptance of Defective Work

Notice of Defects

13.1 Prompt notice of all **defective** Work of which OWNER or ENGINEER has actual knowledge will be given to CONTRACTOR. All **defective** Work may be rejected, corrected, or accepted as provided in this Article 13.

Access to Work

13.2 OWNER, ENGINEER, ENGINEER's Consultants, other representatives and personnel of OWNER, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Work at reasonable times for their observation, inspecting and testing. CONTRACTOR shall provide them proper and safe conditions for such access and advise them of CONTRACTOR's site safety procedures and programs so that they may comply therewith as applicable.

Tests and Inspections

13.3 CONTRACTOR shall give ENGINEER timely notice of readiness of the Work for all required inspections, tests or approvals, and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

13.4 OWNER shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:

13.4.1 for inspections, tests, or approvals covered by paragraph 13.5 below:

13.4.2 that costs incurred in connection with tests or inspections conducted pursuant to paragraph 13.9 below shall be paid as provided in said paragraph 13.9; and

13.4.3 as otherwise specifically provided in the Contract Documents.

13.4.4 Any and all retesting of soil necessitated by the CONTRACTOR's operations or inability to obtain specified density test results on the first attempt shall be the sole responsibility and costs of the CONTRACTOR to achieve required passing test results. Retesting required because of non-conformance to specified requirements shall be performed by the independent firm employed by the OWNER. Payment for retesting will be charged to the CONTRACTOR by deducting inspection, testing and administrative charges from the Contract Price.

13.5 If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested or approved by an employee or other representative of such public body, CONTRACTOR shall assume full responsibility for arranging and obtaining such inspections, tests or approvals, pay all costs in connection therewith, and furnish ENGINEER the required certificates of inspection, or approval. CONTRACTOR shall also be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests or approvals required for OWNER's and ENGINEER's acceptance of materials or equipment to be incorporated in the Work, or of materials, mix designs, or equipment submitted for approval prior to CONTRACTOR's purchase thereof for incorporation in the Work.

13.6 If any Work (or the work of others) that is to be inspected, tested, or approved is covered by CONTRACTOR without written concurrence of ENGINEER, it must, if requested by ENGINEER, be uncovered for observation.

13.7 Uncovering Work as provided in paragraph 13.6 shall be at CONTRACTOR's expense unless CONTRACTOR has given ENGINEER timely notice of CONTRACTOR's intention to cover the same and ENGINEER has not acted with reasonable promptness in response to such notice.

Uncovering Work

13.8 If any Work is covered contrary to the written request of ENGINEER, it must, if requested by ENGINEER, be uncovered for ENGINEER's observation and replaced at CONTRACTOR's expense.

13.9 If ENGINEER considers it necessary or advisable that covered Work be observed by ENGINEER or inspected or tested by others, CONTRACTOR, at ENGINEER's request, shall uncover, expose or otherwise make available for observation, inspection or testing as ENGINEER may require, that portion of the Work in question, furnishing all necessary labor, material and equipment. If it is found that such Work is **defective,** CONTRACTOR shall pay all claims, costs, losses and damages caused by, arising out of or resulting from such uncovering, exposure, observation, inspection and testing and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and OWNER shall be entitled to an appropriate decrease

in the Contract Price, and, if the parties are unable to agree as to the amount thereof, may make a claim therefor as provided in Article 11.

OWNER May Stop the Work

13.10 If the Work is **defective**, or CONTRACTOR fails to supply sufficient skilled workers or suitable materials or equipment, or fails to furnish or perform the Work in such a way that the completed Work will conform to the Contract Documents, OWNER may order CONTRACTOR to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of OWNER to stop the Work shall not give rise to any duty on the part of OWNER to exercise this right for the benefit of CONTRACTOR or any surety or other party.

Correction or Removal of Defective Work

13.11 If required by ENGINEER, CONTRACTOR shall promptly, as directed, either correct all **defective** Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by ENGINEER, remove it from the site and replace it with Work that is not **defective.** CONTRACTOR shall pay all claims, costs, losses, and damages caused by or resulting from such correction or removal (including but not limited to all costs of repair or replacement of work of others).

Correction Period
13.12

13.12.1 If within one year after the date of Final Completion or such longer period of time as may be prescribed by Laws or Regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any Work is found to be defective, CONTRACTOR shall within seven calendar days after receiving notice from OWNER, without cost to OWNER and in accordance with OWNER's written instructions: (i) correct such defective Work, or if it has been rejected by OWNER, remove it from the site and replace it with WORK that is not defective, and (ii) satisfactorily correct or remove and replace any damage to other Work or the work of others resulting therefrom. If CONTRACTOR does not within seven calendar days after receiving notice from OWNER comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, OWNER may have the defective Work corrected or the rejected Work removed and replaced, and all claims, costs, losses, and damages caused by or resulting from such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by CONTRACTOR.

13.12.2 In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications or by Written Amendment.

13.12.3 Where **defective** Work (and damage to other Work resulting therefrom) has been corrected, removed, or replaced under this paragraph 13.12, the correction period hereunder with respect to such Work will be extended for an additional

period of one year after such correction or removal and replacement has been satisfactorily completed.

Acceptance of Defective Work

13.13 If, instead of requiring correction or removal and replacement of **defective** Work, OWNER (and, prior to ENGINEER's recommendation of final payment, also ENGINEER) prefers to accept it, OWNER may do so. CONTRACTOR shall play all claims, costs, losses, and damages attributable to OWNER's evaluation of and determination to accept such **defective** Work (such costs to be approved by ENGINEER as to reasonableness). If any such acceptance occurs prior to ENGINEER's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and OWNER shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, OWNER may make a claim therefor as provided in Article 11. If the acceptance occurs after such recommendation, CONTRACTOR will pay an appropriate amount to OWNER.

OWNER May Correct Defective Work

13.14 If CONTRACTOR fails within a reasonable time after written notice from ENGINEER to correct **defective** Work or to remove and replace rejected Work as required by ENGINEER in accordance with paragraph 13.11, or if CONTRACTOR fails to perform the Work in accordance with the Contract Documents, or if CONTRACTOR fails to comply with any other provision of the Contract Documents, OWNER may, after seven days' written notice to CONTRACTOR, correct and remedy any such deficiency. In exercising the rights and remedies under this paragraph OWNER shall proceed expeditiously. In connection with such corrective and remedial action, OWNER may exclude CONTRACTOR from all or part of the site, take possession of all or part of the Work, and suspend CONTRACTOR's services related thereto, take possession of CONTRACTOR's tools, appliances, construction equipment and machinery at the site and incorporate in the Work all materials and equipment stored at the site or for which OWNER has paid CONTRACTOR but which are stored elsewhere. CONTRACTOR shall allow OWNER, OWNER's representatives, agents and employees, OWNER's other contractors and ENGINEER and ENGINEER's Consultants access to the site to enable OWNER to exercise the rights and remedies under this paragraph. All claims, costs, losses, and damages incurred or sustained by OWNER in exercising such rights and remedies will be charged against CONTRACTOR and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and OWNER shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, OWNER may make a claim therefor as provided in Article 11. Such claims, costs, losses, and damages will include but not be limited to all costs of repair or replacement of work of others destroyed or damaged by correction, removal or replacement of CONTRACTOR's **defective** Work. CONTRACTOR shall not be allowed an extension of the Contract Times (or Milestones) because of any delay in the performance of the Work attributable to the exercise by OWNER of OWNER's rights and remedies hereunder.

Article 14. Payments to Contractor and Completion

Schedule of Values

14.1 Progress payments on account of Unit Price Work will be based on the number of units completed.

Application for Progress Payment

14.2 At least twenty days before the date established for each progress payment (but not more often than once a month), CONTRACTOR shall submit to ENGINEER for review an Application for Payment filled out and signed by CONTRACTOR covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice or other documentation warranting that OWNER has received the materials and equipment free and clear of all Liens, claims, security interests, or encumbrances and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect OWNER's interest therein, all of which will be satisfactory to OWNER. The amount of retainage with respect to progress payments will be as stipulated in the Agreement. With each application for payment the CONTRACTOR shall submit a notarized waiver(s) of claim signed by the CONTRACTOR acceptable in form to the ENGINEER. The waiver of claim for payment for the work of the CONTRACTOR shall equal the amount of the previous payment distributed to the CONTRACTOR for work of the CONTRACTOR and the amount of the total previous payment distributed to the CONTRACTOR.

CONTRACTOR's Warranty of Title

14.3 CONTRACTOR warrants and guarantees that title to all Work, materials and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to OWNER no later than the time of payment free and clear of all Liens.

Review of Applications for Progress Payment

14.4 ENGINEER will, within ten days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to OWNER, or return the Application to CONTRACTOR indicating in writing ENGINEER's reasons for refusing to recommend payment. In the latter case, CONTRACTOR may make the necessary corrections and resubmit the Application. Ten days after presentation of the Application for Payment to OWNER with ENGINEER's recommendation, the amount recommended will (subject to the provisions of the last sentence of paragraph 14.7) become due and when due will be paid by OWNER to CONTRACTOR.

14.5 ENGINEER's recommendation of any payment requested in an Application for Payment will constitute a representation by ENGINEER to OWNER, based on ENGINEER's onsite observations of the executed Work as an experienced and qualified design professional and on ENGINEER's review of the Application for Payment and the accompanying data and schedules, that to the best of ENGINEER's knowledge, information and belief:

14.5.1 the Work has progressed to the point indicated,

14.5.2 the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for

Unit Price Work under paragraph 9.10 and to any other qualifications stated in the recommendation), and

14.5.3 the conditions precedent to CONTRACTOR's being entitled to such payment appear to have been fulfilled insofar as it is ENGINEER's responsibility to observe the Work.

However, by recommending any such payment ENGINEER will not thereby be deemed to have represented that: (i) exhaustive or continuous onsite inspections have been made to check the quality or the quantity of the Work beyond the responsibilities specifically assigned to ENGINEER in the Contract Documents or (ii) that there may not be other matters or issues between the parties that might entitle CONTRACTOR to be paid additionally by OWNER or entitle OWNER to withhold payment to CONTRACTOR.

14.6 ENGINEER's recommendation of any payment, including final payment, shall not mean that ENGINEER is responsible for CONTRACTOR's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the furnishing or performance of Work, or for any failure of CONTRACTOR to perform or furnish Work in accordance with the Contract Documents.

14.7 ENGINEER may refuse to recommend the whole or any part of any payment if, in ENGINEER's opinion, it would be incorrect to make the representations to OWNER referred to in paragraph 14.5. ENGINEER may also refuse to recommend any such payment, or, because of subsequently discovered evidence or the results of subsequent inspections or tests, nullify any such payment previously recommended, to such extent as may be necessary in ENGINEER's opinion to protect OWNER from loss because:

14.7.1 the Work is **defective**, or completed Work has been damaged requiring correction or replacement,

14.7.2 the Contract Price has been reduced by Written Amendment or Change Order,

14.7.3 OWNER has been required to correct **defective** Work or complete Work in accordance with paragraph 13.14, or

14.7.4 ENGINEER has actual knowledge of the occurrence of any of the events enumerated in paragraphs 15.2.1 through 15.2.3 inclusive.

In addition to the retainages set forth in the Contract Documents, the Owner may retain one hundred percent (100%) of all progress payments for any unsatisfactory performance of the Work and any payment recommended by the ENGINEER, including without limitation:

Defective work or failure to repair or replace defective work;

Claims filed against the CONTRACTOR, or reasonable evidence indicating probable filing of such claims;

Failure of the CONTRACTOR to make adequate or proper payments to subcontractors or suppliers for materials, equipment or labor;

Failure to obtain necessary permits or licenses, or to comply with applicable laws, ordinances, codes, or regulations, unless such noncompliance is due to reasons beyond the control of the CONTRACTOR, or due to act of the OWNER or and ENGINEER hired by the OWNER, or agents or employees thereof;

Reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Price then unpaid;

Reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;

Persistent failure to carry out the Work in accordance with the Contract Documents;

As a set off for amounts due the Owner on other items;

Collusion with other bidders in preparing the bid;

Actual knowledge of the occurrence of any of the events enumerated in paragraphs 14.7.1 through 14.7.3 or paragraphs 15.2.1 through 15.2.3, inclusive.

When the above reasons for withholding payment are removed and corrected to the OWNER's satisfaction, OWNER shall make payment to the CONTRACTOR of the sums withheld pursuant to this paragraph, subject to the amounts required to be retained by the Contract Documents.

Progress Payments to Suppliers and Subcontractors. The CONTRACTOR shall make partial payments of the amount due to each of the CONTRACTOR's suppliers and subcontractors in the same manner as the OWNER is required to pay the CONTRACTOR under Article 4 of the Agreement and Article 14 of the General Conditions, provided that the suppliers and subcontractors are performing to the CONTRACTOR's satisfaction. If the OWNER is notified that the CONTRACTOR is in arrears in payments to the CONTRACTOR's suppliers or subcontractors, the OWNER shall notify the CONTRACTOR and determine why such funds are being withheld. If the OWNER determines that no legitimate basis exists for the CONTRACTOR's withholding of such payments, the OWNER may, five (5) days after the mailing of written notice to the CONTRACTOR, make such payments directly to the CONTRACTOR's suppliers or subcontractors from funds which otherwise would be due the CONTRACTOR.

Substantial Completion

14.8 When CONTRACTOR considers the entire Work ready for its intended use CONTRACTOR shall notify OWNER and ENGINEER in writing that the entire Work is substantially complete (except for items specifically listed by CONTRACTOR as incomplete) and request that ENGINEER issue a certificate of Substantial Completion. Within a reasonable time thereafter, OWNER, CONTRACTOR, and ENGINEER shall make an inspection of the Work to determine the status of completion. If ENGINEER does not consider the Work substantially complete, ENGINEER will notify CONTRACTOR in writing giving the reasons therefor. If ENGINEER considers the Work substantially complete, ENGINEER will prepare and deliver to OWNER a tentative certificate of Substantial Completion, which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. OWNER shall have seven days after receipt of the tentative certificate during which to make written

objection to ENGINEER as to any provisions of the certificate or attached list. If, after considering such objections, ENGINEER concludes that the Work is not substantially complete, ENGINEER will within fourteen days after submission of the tentative certificate to OWNER notify CONTRACTOR in writing, stating the reasons therefor. If, after consideration of OWNER's objections, ENGINEER considers the Work substantially complete, ENGINEER will within said fourteen days execute and deliver to OWNER and CONTRACTOR a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as ENGINEER believes justified after consideration of any objections from OWNER. At the time of delivery of the tentative certificate of Substantial Completion, ENGINEER will deliver to OWNER and CONTRACTOR a written recommendation as to division of responsibilities pending final payment between OWNER and CONTRACTOR with respect to security, operation, safety, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless OWNER and CONTRACTOR agree otherwise in writing and so inform ENGINEER in writing prior to ENGINEER's issuing the definitive certificate of Substantial Completion, ENGINEER's aforesaid recommendation will be binding on OWNER and CONTRACTOR until final payment.

14.9 OWNER shall have the right to exclude CONTRACTOR from the Work after the date of Substantial Completion, but OWNER shall allow CONTRACTOR reasonable access to complete or correct items on the tentative list.

Partial Utilization

14.10 Use by OWNER at OWNER's option of any substantially completed part of the Work which: (i) has specifically been identified in the Contract Documents or (ii) OWNER, ENGINEER, and CONTRACTOR agree constitutes a separately functioning and usable part of the Work that can be used by OWNER for its intended purpose without significant interference with CONTRACTOR's performance of the remainder of the Work, may be accomplished prior to Substantial Completion of all the Work subject to the following:

14.10.1 OWNER at any time may request CONTRACTOR in writing to permit OWNER to use any such part of the Work which OWNER believes to be ready for its intended use and substantially complete. If CONTRACTOR agrees that such part of the Work is substantially complete, CONTRACTOR will certify to OWNER and ENGINEER that such part of the Work is substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. CONTRACTOR at any time may notify OWNER and ENGINEER in writing that CONTRACTOR considers any such part of the Work ready for its intended use and substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. Within a reasonable time after either such request, OWNER, CONTRACTOR, and ENGINEER shall make an inspection of that part of the Work to determine its status of completion. If ENGINEER does not consider that part of the Work to be substantially complete, ENGINEER will notify OWNER and CONTRACTOR in writing giving the reasons therefor. If ENGINEER considers that part of the Work to be substantially complete, the provisions of paragraphs 14.8 and 14.9 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof land access thereto.

Final Inspection

14.11 Upon written notice from CONTRACTOR that the entire Work or an agreed portion thereof is complete, ENGINEER will make a final inspection with OWNER and CONTRACTOR and will notify CONTRACTOR in writing of all particulars in which this inspection reveals that the Work is incomplete or **defective.** CONTRACTOR shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

Final Application for Payment

14.12 After CONTRACTOR has completed all such corrections to the satisfaction of ENGINEER and delivered in accordance with the Contract Documents all maintenance and operating instructions, schedules, guarantees, Bonds, certificates or other evidence of insurance required by paragraph 5.4, certificates of inspection, marked-up record documents (as provided in paragraph 6.19) and other documents. CONTRACTOR may make application for final payment following the procedure for progress payments. The final application for payment shall be accompanied (except as previously delivered) by: (i) all documentation called for in the Contract Documents, including but not limited to the evidence satisfactory to the OWNER of the continuation of completed operations insurance and any insurance coverage written on a claims-made basis at final payment and one year thereafter; (ii) the consent of surety to final payment and that the performance bond shall remain in effect throughout the guarantee period; (iii) complete and legally effective claim releases signed by all suppliers and subcontractors in the form provided in the Contract Documents certifying that all outstanding claims for payment have been paid. The CONTRACTOR shall not receive final payment due under the Agreement until the CONTRACTOR obtains and files the foregoing items (i), (ii), and (iii).

14.12.1 LIENS. Colorado Statutes do not provide for any right of lien against public buildings. In lieu thereof, §38-26-107, Colorado Revised Statutes, as amended, provides adequate relief for any claimant having furnished labor, materials, rental machinery, tools, equipment, or services toward construction of the particular public work in that final payment may not be made to a CONTRACTOR until all such creditors have been put on notice by publication of such pending payment and given opportunity to stop payment to the CONTRACTOR in the amount of such claims. Pursuant to §38-26-107, C.R.S., any supplier may bring a suit and file a notice of lis pendens against the OWNER within ninety (90) days after the date set for final settlement. If any such supplier or person files any such claim and notice of lis pendens, the OWNER shall withhold retained amounts from final payments to the CONTRACTOR as are necessary to satisfy fully such claims. References to liens appearing in Article 14 shall be deemed as references to claims made pursuant to C.R.S §38-26-101 et seq. unless the context requires otherwise.

Final Payment and Acceptance

14.13 If, on the basis of ENGINEER's observation of the Work during construction and final inspection, and ENGINEER's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, ENGINEER is satisfied that the Work has been completed and CONTRACTOR's other obligations under the Contract Documents have been fulfilled, ENGINEER will, within ten days after receipt of the final Application for Payment, indicate in writing ENGINEER's recommendation of payment and present the Application to OWNER for

payment. At the same time ENGINEER will also give written notice to OWNER and CONTRACTOR that the Work is acceptable subject to the provisions of paragraph 14.15. Otherwise, ENGINEER will return the Application to CONTRACTOR, indicating in writing the reasons for refusing to recommend final payment, in which case CONTRACTOR shall make the necessary corrections and resubmit the Application. Upon receipt of the ENGINEER's recommendation for payment and the final Application for Payment, OWNER shall order the publication of Notice of Final Payment as required by C.R.S. §38-26-107(1) and shall make final payment in accordance with C.R.S. 38-26-107(3).

14.14 If, through no fault of CONTRACTOR, final completion of the Work is significantly delayed and if ENGINEER so confirms, OWNER shall, upon receipt of CONTRACTOR's final Application for Payment and recommendation of ENGINEER, and without terminating the Agreement, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by OWNER for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if Bonds have been furnished as required in paragraph 5.1, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by CONTRACTOR to ENGINEER with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

Waiver of Claims

14.15 The making and acceptance of final payment will constitute:

14.15.1 a waiver of all claims by OWNER against CONTRACTOR, except claims arising from unsettled Liens, from **defective** Work appearing after final inspection pursuant to paragraph 14.11, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from CONTRACTOR's continuing obligations under the Contract Documents; and

14.15.2 a waiver of all claims by CONTRACTOR against OWNER other than those previously made in writing and still unsettled.

Article 15. Suspension of Work and Termination

OWNER May Suspend Work

15.1 At any time and without cause, OWNER may suspend the Work or any portion thereof for a period of not more than ninety days by notice in writing to CONTRACTOR and ENGINEER, which will fix the date on which Work will be resumed. CONTRACTOR shall resume the Work on the date so fixed. CONTRACTOR shall be allowed an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if CONTRACTOR makes an approved claim therefor as provided in Articles 11 and 12.

OWNER May Terminate

15.2 Upon the occurrence of any one or more of the following events:

15.2.1 if CONTRACTOR persistently fails to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the progress schedule established under paragraph 2.8 as adjusted from time to time pursuant to paragraph 6.6);

15.2.2 if CONTRACTOR disregards Laws or Regulations of any public body having jurisdiction;

15.2.3 if CONTRACTOR otherwise violates in any substantial way any provisions of the Contract Documents;

OWNER may, after giving CONTRACTOR (and the surety, if any,) seven days' written notice and to the extent permitted by Laws and Regulations, terminate the services of CONTRACTOR, exclude CONTRACTOR from the site and take possession of the Work and of all CONTRACTOR's tools, appliances, construction equipment, and machinery at the site and use the same to the full extent they could be used by CONTRACTOR (without liability to CONTRACTOR for trespass or conversion), incorporate in the Work all materials and equipment stored at the site or for which OWNER has paid CONTRACTOR but which are stored elsewhere, and finish the Work as OWNER may deem expedient. In such case CONTRACTOR shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages sustained by OWNER arising out of or resulting from completing the Work such excess will be paid to CONTRACTOR. If such claims, costs, losses, and damages exceed such unpaid balance, CONTRACTOR shall pay the difference to OWNER. Such claims, costs, losses, and damages incurred by OWNER will be reviewed by ENGINEER as to their reasonableness and when so approved by ENGINEER incorporated in a Change Order, provided that when exercising any rights or remedies under this paragraph OWNER shall not be required to obtain the lowest price for the Work performed.

15.3 Where CONTRACTOR's services have been so terminated by OWNER, the termination will not affect any rights or remedies of OWNER against CONTRACTOR then existing or which may thereafter accrue. Any retention or payment of moneys due CONTRACTOR by OWNER will not release CONTRACTOR from liability.

15.4 Upon seven days' written notice to CONTRACTOR and ENGINEER, OWNER may, without cause and without prejudice to any other right or remedy of OWNER, elect to terminate the Agreement. In such case, CONTRACTOR shall be paid (without duplication of any items):

15.4.1 for completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

15.4.2 for expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;

15.4.3 for all claims, costs, losses and damages incurred in settlement of terminated contracts with Subcontractors, Suppliers and others; and

15.4.4 for reasonable expenses directly attributable to termination.

CONTRACTOR shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

CONTRACTOR May Stop Work or Terminate

15.5 If, through no act or fault of CONTRACTOR, the Work is suspended for a period of more than ninety days by OWNER or under an order of court or other public authority, or ENGINEER fails to act on any Application for Payment within thirty days after it is submitted or OWNER fails for thirty days to pay CONTRACTOR any sum finally determined to be due, then CONTRACTOR may, upon seven days' written notice to OWNER and ENGINEER, and provided OWNER or ENGINEER do not remedy such suspension or failure within that time, terminate the Agreement and recover from OWNER payment on the same terms as provided in paragraph 15.4. In lieu of terminating the Agreement and without prejudice to any other right or remedy, if ENGINEER has failed to act on an Application for Payment within thirty days after it is submitted, or OWNER has failed for thirty days to pay CONTRACTOR any sum finally determined to be due, CONTRACTOR may upon seven days' written notice to OWNER and ENGINEER stop the Work until payment of all such amounts due CONTRACTOR, including interest thereon. The provisions of this paragraph 15.5 are not intended to preclude CONTRACTOR from making claim under Articles 11 and 12 for an increase in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to CONTRACTOR's stopping Work as permitted by this paragraph.

Article 16. Miscellaneous

Giving Notice

16.1 Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

Computation of Times

16.2.1 When any period of time is referred to in the Contract Documents by days, it will be computed to include the first and the last day of such period.

Notice of Claim

16.3 Should OWNER or CONTRACTOR suffer injury or damage to person or property because of any error, omission or act of the other party or of any of the other party's employees or agents or others for whose acts the other party is legally liable, claim will be made in writing to the other party within a reasonable time of the first observance of such injury or damage. The provisions of this paragraph 16.3 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitations or repose.

Cumulative Remedies

16.4 The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto, and, in particular but without limitation, the warranties,

guarantees, and obligations imposed upon CONTRACTOR by paragraphs 6.12, 6.16, 6.30, 6.31, 6.32, 13.1, 13.12, 13.14, 14.3, and 15.2 and all of the rights and remedies available to OWNER and ENGINEER thereunder, are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee or by other provisions of the Contract Documents, and the provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right and remedy to which they apply.

Professional Fees and Court Costs Included

16.5 Whenever reference is made to "claims, costs, losses, and damages," it shall include in each case, but not be limited to, all fees and charges of engineers, architects, attorneys and other professionals and all court or arbitration or other dispute resolution costs.

Interest

16.6 In the event that any payment of interest is to be made pursuant to any provision of the Contract Documents, excluding any bid bond, labor and materials bond or performance bond entered into by the CONTRACTOR, interest shall be paid at the average rate earned by the City of Louisville on its invested funds during the quarterly fiscal period prior to the period during which the interest was accrued.

Third Parties

16.7 The contract is not intended to create any right in or for the public or any member thereof, any subcontractor or supplier, or any other third party, or to authorize anyone not a party to the contract to maintain a suit to enforce its terms. The duties, obligations, and responsibilities of the parties to the contract, with respect to third parties, shall remain as imposed by law. This paragraph shall not apply to any surety to the extent it is acting under any labor and materials bond or performance bond entered into by the CONTRACTOR.

Severability

16.8 To the extent that the performance of the parties' obligations may be accomplished within the intent of the contract, the terms of the contract are severable, and should any term or provision of the contract be declared invalid or become inoperative for any reason, such invalidity or failure shall not affect the validity of any other contract term or provision.

Equal Opportunity Employer

16.9 The CONTRACTOR will not discriminate against any employee or applicant for employment because of race, color, religion, age, sex, disability, or national origin. The CONTRACTOR will take affirmative action to ensure that applicants are employed and that employees are treated during employment without regard for their race, color, religion, age, sex, disability, or national origin. Such action shall include but not be limited to the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship. The CONTRACTOR agrees to post in conspicuous places, available to employees and applicants for employment,

notice to be provided by an agency of the federal government, setting forth the provisions of the Equal Opportunity Laws.

The CONTRACTOR shall be in compliance with the appropriate areas of the Americans with Disabilities Act of 1990 as enacted and from time to time amended and any other applicable federal regulation. A signed, written certificate stating compliance with the Americans with Disabilities Act may be requested at any time during the life of any contract and with any contract entered by the OWNER.

Supplementary Conditions

CONDITIONS OF THE CONTRACT

These Supplementary Conditions amend or supplement the General Conditions of the Project Manual as indicated below. All provisions, which are not so amended or supplemented, remain in full force and effect.

1. GC-1 DEFINITIONS

A. Section 1.9.1, **CONTRACT DAY** of Article 1 of the General Conditions, delete the definition in its entirety and add the following language:

CONTRACT DAY – A calendar day of 24 hours each, excluding Saturdays, Sundays, OWNER-observed holidays and Abnormal Weather days.

B. Section 1.41, **SUBSTANTIAL COMPLETION** of Article 1 of the General Conditions, add the following language:

The Work will not be considered suitable for Substantial Completion review until all project Bid Items and incidentals in the Work are completed and operational as designed, all designated or required governmental inspections and certifications have been made and posted, designated instruction of Owner's personnel in the operation of systems has been completed, and all final finishes within the Contract are in place. In general, the only remaining work shall be minor in nature, so that the Owner could occupy the building or utilize the improvements on that date and the completion of the Work by the Contractor would not materially interfere or hamper the Owner's normal operations. As a further condition of Substantial Completion acceptance, the Contractor shall certify that all remaining "punch list" work will be completed within twenty (20) Contract Days after receipt of notification or as agreed upon following the date of issuance of Certificate of Substantial Completion.

2. GC-2 PRELIMINARY MATTERS

A. Add the following language to Section 2.3 of Article 2 of the General Conditions:

- Contractor shall not park equipment and employee vehicles on abutting side streets that can be used by residents that are directly impacted by the reconstruction.

- Construction Phasing for the project shall be as follows:

All Locations

a. Provide ingress, egress to private drives and single access developments. No additional payment will be made to provide access. All closures must be communicated to the property owners 5-days in advance of driveway closures.

No work shall be performed on City observed Holidays:

- Memorial Day: No work shall be performed from 12 pm May 24 through May 27.
- Juneteenth: No work shall be performed on June 19.
- July 4th: No work shall be performed on July 4.

3. GC-4 AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS

A. Section 4.4, **REFERENCE POINTS,** of Article 4 of the General Conditions, delete the second paragraph in its entirety and add the following language:

The OWNER shall not provide survey reference points, construction stakes, lines and grade for the work unless otherwise noted.

4. GC-6 CONTRACTOR'S RESPONSIBILITIES

A. **Permits**

a. Paragraph 6.13.2, add the following language:

A deposit is required for the 2" water meter in an amount of $2500 and the deposit is reimbursed when the 2" meter is returned, in good condition. Charges for water consumption are waived when water is used for this project. Bulk Water Permit and meter are available from the City of Louisville Operations Division, located at 739 S. 104th St.

b. Paragraph 6.13.3, add the following language:

Right of Way Permit fee is waived for this project.

5. GC-7 OTHER WORK

A. Section 7.1 of Article 7 of the General Conditions, add the following language:

The OWNER has employed an asphalt contractor to resurface various streets. The concrete replacement work in this contract shall be completed prior to the asphalt resurfacing. Asphalt patching may take place at the same time as the concrete replacement work in the same location(s). It is critical for CONTRACTOR to maintain the phasing schedule identified in the Supplementary Conditions. CONTRACTOR shall coordinate their activities with the asphalt contractor to allow completion of concrete flatwork prior to asphalt resurfacing.

6. ARTICLE 9 ENGINEER'S STATUS DURING CONSTRUCTION

A. Section 9.3.1 **CONFERENCES AND MEETINGS** of the General Conditions, add the following language:

NEIGHBORHOOD MEETING

At least 10 days prior to the start of construction, CONTRACTOR will be required to coordinate and have a representative at a meeting with the residents of the neighborhood. CONTRACTOR is required to hand out notices to all affected residents at least 5 days prior to the meeting. A template for the notice is below. ENGINEER must review and approve the notice prior to delivery. ENGINEER shall be notified by CONTRACTOR after notices are distributed. At this meeting CONTRACTOR will be required to define the schedule for construction and to address any special needs and concerns of the residents. ENGINEER shall be present at this meeting.

Construction Notification / Neighborhood Meeting Invite

[CONTRACTOR NAME] has been contracted by the City of Louisville to perform the SWQMP Pilot Project in 2024. The intent of this work is to improve the quality of storm water in multiple locations though out the City. This work will begin in [MONTH] and will be completed by [MONTH]

A neighborhood meeting is scheduled for [DATE] at [TIME]. The meeting will be located in the Council Chambers at City Hall at 749 Main Street. Representatives from the City and [CONTRACTOR] will be present to discuss the project.

Topics that will be covered at the meeting will include coordination of work, and time frames.

Construction will begin at 7 AM and should be completed by 5 PM. Note that delays during the day could require the contractor to work beyond 5 PM on some days. All vehicles will need to be removed from the street by 7:00 AM if “NO PARKING” signs are on your street to allow the contractors access to the area. The “NO PARKING” signs will be placed on your street at least 24 hours prior to work beginning. When work is being performed in front of your address, the process will require that your street/driveway be closed for parking most of the day, so please make arrangements to park any vehicles you need outside the work area. Every effort will be made to have the street open by 5:00 PM.

We hope the coordination will reduce your inconvenience and allow for you to plan accordingly. We appreciate your patience as we repair the street near your address. If you have any questions or concerns or need immediate assistance, please contact [CONTRACTOR] Project Manager [NAME] at [CONTRACTOR PM PHONE NUMBER].

In the event that weather or other delays occur, we may need to reschedule the work and will attempt notify affected residents of any changes.

Attendees can request interpretation services at least 7 days in advance of the meeting (Los asistentes podrán solicitar los servicios de un intérprete con 7 días de anticipación a la fecha una reunion) by contacting Derek Cosson at dcosson@louisvilleco.gov or 303-335-4814.

7. GC-12 CHANGES OF CONTRACT TIMES

A. Section 12.2 **LIQUIDATED DAMAGES** of Article 12 of the General Conditions, add the following language:

PHASE TIMES – The work is broken into Phases as specified in the Supplementary Conditions with a specific road closure or lane closure limit, described work item with respective day limit, and Substantial Completion date for each Phase. Failure to perform the phase work described in Section 2.3 of the General Conditions will result in liquidated damages. The CONTRACTOR shall pay OWNER **ONE THOUSAND DOLLARS ($1,000.00)** for each and every **Contract Day** and portion thereof that expires after the specified road or lane closure limit days, described work item with respective day limit and Substantial Completion date until the same is finally complete.

B. Add the following language to Article 12 of the General Conditions:

12.4 EXTENSIONS OF TIME

a. The OWNER and CONTRACTOR are both aware that construction will be conducted during spring and summer and that variable weather conditions are typical for the site of the work.

b. The CONTRACTOR expressly agrees that the Contract Price is based on completion of the work within the times specified in the Agreement and under weather conditions typically encountered during the contemplated construction period at the site of the work.

c. For purposes of evaluating requests for extensions of time due to abnormal weather conditions, the following conditions, and no others, will be considered unusually severe:

1) Precipitation volume exceeding the historical mean for the *months* of the construction period by more than one standard deviation.

2) Isolated abnormal weather occurrences of a severely destructive nature, which in fact, cause such destruction at the site of the work.

d. For the purpose of determining mean conditions, all available data contained in the records of the National Weather Service for reporting from Denver, as well as data available from the State Climatologist for the same areas.

e. The CONTRACTOR further agrees that should a request for time extension due to abnormal weather conditions, the CONTRACTOR shall submit all necessary historical and detailed daily data during the construction period to support the claim.

8. GC-13 TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

A. Section 13.11, **CORRECTION OR REMOVAL OF DEFECTIVE WORK** of Article 13 of the General Conditions, add the following language:

Failure or neglect on the part of the ENGINEER to condemn unsatisfactory material or reject inferior workmanship will in no way release the CONTRACTOR, nor shall it be construed to mean the acceptance of such work, nor shall Final Acceptance bar the OWNER from recovering damages in case fraud was practiced, or for defective work resulting from the CONTRACTOR's dishonesty.

Work done contrary to or regardless of the instructions of the ENGINEER, work done without lines, grade, and/or cross section stakes and grades shown on the Plans or as given by the ENGINEER, or any deviation made from the Plans and Specifications without written authority will be considered unauthorized and at the expense of the CONTRACTOR and will not be measured or paid for by the OWNER. Any and all work so done may be ordered removed and replaced immediately at the CONTRACTOR's expense.

SECTION 01010 - SUMMARY OF WORK

PART 1 - GENERAL

1.1 SUMMARY:

1.1.1 PROJECT NAME: 2024 SWQMP PILOT PROJECT

1.1.2 PROJECT NUMBER: 503499-660287
PROJECT LOCATION: Louisville, Colorado

1.1.3 OWNER: City of Louisville

1.1.4 WORK INCLUDED: The Work consists of demolition, concrete replacement, grading, storm infrastructure adjustments, landscape repairs and traffic control, construction complete, including all work appurtenant thereto, on various streets within the City of Louisville, Colorado.

1.1.5 EXHIBIT A - ESTIMATED QUANTITIES PER PLAN SHEET

EXHIBIT A

ESTIMATED QUANTITIES PER PLAN SHEET

Pond WW-1 Schedule of Unit Prices				
Bid Item #	**Bid Item Code**	**Description**	**Unit**	**QTY**
1	GN-02-001	MOBILIZATION	LS	1
2	GN-03-001	POTHOLING	EA	2
3	GN-04-001	CONSTRUCTION SURVEYING	LS	1
4	GN-05-001	TRAFFIC CONTROL	LS	1
5	ESC-01-001	BMP INSTALLATION AND MAINTENANCE (ESC)	LS	1
6	RR-06-001	REMOVAL OF FLARED END SECTION	EA	1
7	RR-06-002	REMOVAL OF RIPRAP	SY	45
8	RR-06-003	REMOVAL OF CONCRETE CURB (S. PLAY AREA)	LF	162
9	RR-06-004	REMOVAL OF CONCRETE CURB (N. PLAY AREA-PARKS ITEM)	LF	159
10	RR-06-005	REMOVE SEDIMENT FROM DRAINPIPE	EA	1
11	RR-06-006	REMOVAL OF CONCRETE (S. SIDEWALK, TRICKLE CHANNEL)	SY	150
12	RR-06-007	REMOVAL OF TREE, 6- to 24-Inch in Diameter	EA	6
13	GG-02-001	GEOTEXTILE FILTER MATERIAL (NON-WOVEN)	SY	287
14	ESP-02-001	UNCLASSIFIED EXCAVATION (COMPLETE IN PLACE)	CY	194
15	RW-01-001	AGGREGATE BASE COURSE (CLASS 6)	TON	14
16	RW-02-001	COBBLE MIX	TON	110
17	RW-06-001	FEATURE BOULDERS, 24-INCH (PARKS ITEM)	TON	45
18	RW-07-001	FOREBAY WALL	LF	90
19	RW-09-001	FILTER MATERIAL, GRANULAR (3/4")	TON	56
20	SS-08-001	6 INCH PRE-WRAPPED SLOTTED HDPE PIPE UNDERDRAIN	LF	38
21	SC-04-001	CONCRETE CURB AND GUTTER (MATCH EXISTING)	LF	15

22	SC-08-001	CONCRETE SIDEWALK (MATCH EXISTING)	SY	8
23	SC-12-001	CONCRETE FOREBAY	SY	67
24	SC-20-001	SAFETY GRATE, INCLUDE HEADWALL	EA	1
25	LS-06-001	IRRIGATION REPLACEMENT/ADJUSTMENTS	SF	8,800
26	LS-09-001	PLUG, VARIOUS	EA	740
27	LS-10-001	SEEDING-CHANNEL	SF	4,700
28	LS-10-002	SEEDING-TURF	SF	4,100
29	LS-11-001	PLANTINGS (SHRUBS)	EA	67
30	LS-13-001	TREE, ALDER, 1.5" CAL	EA	6
31	LS-17-001	SOIL PREP/COMPOST	CY	82
AA	LS-006-002	RELOCATE IRRIGATION LINE UNDER CHANNEL (ONLY IF NECESSSARY)	EA	1
AA	RT-06-001	SIGNAGE (NO MOW)	EA	2
AA	RT-06-002	SIGNAGE (NATIVE GRASSES)	EA	2

Pond Q-1 Schedule of Unit Prices				
Bid Item #	**Bid Item Code**	**Description**	**Unit**	**QTY**
1	GN-02-001	MOBILIZATION	LS	1
2	GN-03-001	POTHOLING	EA	3
3	GN-04-001	CONSTRUCTION SURVEYING	LS	1
4	GN-05-001	TRAFFIC CONTROL	LS	1
5	ESC-01-001	BMP INSTALLATION AND MAINTENANCE (ESC)	LS	1
6	RR-06-001	REMOVAL OF RIPRAP	CY	399
7	RR-06-002	REMOVAL OF SEDIMENT FROM DRAINPIPE	EA	1
8	RR-06-003	REMOVAL OF CONCRETE (SIDEWALK AND MAIN CHANNEL)	SY	445
9	GG-02-001	GEOTEXTILE FILTER MATERIAL (NON-WOVEN)	SY	1130
10	ESP-02-001	UNCLASSIFIED EXCAVATION (COMPLETE IN PLACE)	CY	372
11	ESP-03-001	EMBANKMENT MATERIAL (COMPLETE IN PLACE)	CY	55
12	RW-01-001	AGGREGATE BASE COURSE (CLASS 6)	TON	8
13	RW-02-001	COBBLE MIX	TON	353
14	RW-06-001	FEATURE BOULDERS, 24-INCH (PARKS ITEM)	TON	75
15	RW-07-001	FOREBAY WALL	LF	66
16	RW-09-001	FILTER MATERIAL, GRANULAR (3/4")	TON	261
17	RW-010-001	BURIED RIPRAP WITH TOPSOIL	CY	68
18	SS-08-001	6 INCH PRE-WRAPPED SLOTTED HDPE PIPE UNDERDRAIN	LF	104
19	SC-04-001	CONCRETE CURB AND GUTTER (MATCH EXISTING)	LF	15
20	SC-08-001	CONCRETE SIDEWALK (MATCH EXISTING)	SY	8
21	SC-12-001	CONCRETE FOREBAY	SY	39
22	SC-12-002	ADD WEIR WALLS TO THREE EXISTNG CHANNELS	LS	1

23	SC-20-001	SAFETY GRATE, INCLUDE HEADWALL	EA	1
24	LS-06-001	TEMPORARY IRRIGATION	LS	1
25	LS-10-001	SEEDING-CHANNEL	SF	22,300
26	LS-11-001	PLANTINGS (SHRUBS)	EA	159
27	LS-17-001	SOIL PREP/COMPOST	CY	140
AA	RT-06-001	SIGNAGE (NO MOW)	EA	2

SECTION 01025 - MEASUREMENT AND PAYMENT

1.1 GENERAL

A. Measurement and payment criteria applicable to (portions of) the Work performed under a unit price payment method.

B. Defect assessment and non-payment for rejected work.

1.2 AUTHORITY

A. Measurement methods delineated in the individual specification sections complement the criteria of this section. (In the event of conflict, the requirements of the individual specification section govern.)

B. Take all measurements and compute quantities. ENGINEER will verify measurements and quantities.

1.3 UNIT QUANTITIES SPECIFIED

A. Quantities indicated in the Bid Form are for bidding and contract purposes only. Quantities and measurements supplied or placed in the Work and verified by ENGINEER determine payment.

B. If the actual Work requires more or fewer quantities than those quantities indicated, provide the required quantities at the unit/lump sum prices contracted.

C. If the actual Work requires a change that is equal to an increase or decrease that is 25 percent (25%) or more of the Bid Price, then OWNER or CONTRACTOR may claim for a Contract Price adjustment.

D. The City reserves the right to remove work from the Contract. If an item is removed from the contract, no payment will be made for said item.

1.3.1 LUMP SUM SCHEDULES

A. There will be no measurement for lump sum items included in the lump sum schedule.

1.3.2 FORCE ACCOUNT – MINOR CONTRACT REVISIONS

A. Force account items include the Project Manager's estimate for items included in the Contract. The estimated amounts marked with "AL" will be added to the total bid to determine the amount of performance and payment bonds. Force Account work shall be performed as directed and approved by the City's Project Manager. This is not a lump sum bid item, but rather an allowance for work not reasonably anticipated in the above items.

B. Payment will be made in accordance with the General Conditions. If additional work as described above is not encountered, this item will not be used.

C. Force Account Descriptions

i. F/A Minor Contract Revisions – This work consists of minor work and approved by the Project Manager, which is not included in the Contract drawings or specifications, and is necessary to accomplish the scope of work of this contract.

1.4 MEASUREMENT OF QUANTITIES

A. Measurement by volume: Measured by cubic dimension using mean length, width, and height or thickness.

B. Measurement by area: Measured by square dimension, using mean length and width or radius.

C. Linear measurement: Measured by linear dimension, at the item centerline or mean chord.

D. Measurement by weight: The term "ton" will mean the short ton consisting of 2000 pounds avoirdupois.

Materials measured or proportioned by weight shall be weighed on accurate scales. Scales shall be accurate within the allowable tolerances as prescribed by State law. The scales shall be sealed by the measurement Standards Section of the Colorado Department of Agriculture at least once each year, each time the scales are relocated, and as often as ENGINEER may deem necessary. Scales shall be furnished by CONTRACTOR or CONTRACTOR may utilize commercial scales.

Scales shall be operated according to the Colorado Department of Agriculture's regulations. Weighers, scales, scale tickets, scale house, and verification of the scale's accuracy will not be measured and paid for separately but shall be included in the work.

CONTRACTOR may use either certified hopper scales or certified platform scales.

When platform scales are used to weigh vehicles carrying material paid for by weight, each vehicle shall be weighed by a certified weigher. Hopper scales used to directly measure material paid for by weight shall be operated by certified weighers and provide an accurate net weight.

The operator of each vehicle carrying material measured and paid for by weight shall obtain a scale ticket (certificate of correct weight) from the certified weigher and deliver the ticket to ENGINEER at the point of delivery of the material.

The scale ticket shall include the following information:

1. Project Number
2. Date
3. Ticket Number
4. Haul Unit Number
5. Gross weight
6. Tare Weight

7. Net Weight
8. Material Type
9. Certified Weigher's Name

1.5 PAYMENT

A. Payment includes: Full compensation for all required labor, products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit.

B. Final payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities accepted by ENGINEER multiplied by the unit price for Work which is incorporated in or made necessary by the Work.

1.6 DEFECT ASSESSMENT

A. Replace the Work, or portions of the Work, not conforming to specified requirements.

1.7 NON-PAYMENT FOR REJECTED PRODUCTS

A. Payment will not be made for any of the following:

1. Products wasted or disposed of in a manner that is not acceptable.
2. Products determined as unacceptable before or after placement.
3. Products not completely unloaded from the transporting vehicle.
4. Products placed beyond the lines and levels of the required Work.
5. Products remaining on hand after completion of the Work.
6. Loading, hauling, and disposing of rejected Products.

2.0 PRODUCTS - Not Used

3.0 EXECUTION - Not Used

SECTION 01091 - REFERENCE STANDARDS

PART 1 - SUMMARY

1.1 SUMMARY:

1.1.1 WORK INCLUDED:

A. This Section contains a summary of industry-accepted and recognized standards published by trade associations, government, and institutional organizations, which are referred to in the various sections of these specifications or elsewhere in the Contract Documents.

B. Standards listed herein are included in the Contract Documents by this reference, and become a part of the Contract Documents to the same extent as though included in their entirety unless specific limitations are noted in the individual Specifications Sections.

C. Listings of reference standards include name and address of the organization publishing the standard, plus the full name and designator of each of the standards referenced herein.

D. If a publication date or edition number is listed with the reference standard, that publication date or edition number shall apply; otherwise, the publication date of edition number in effect at the Contract Date shall apply.

E. Inclusion of reference standards herein does not make the Engineer an agent of the publishing agency, nor does it obligate the Engineer to perform inspections required by or enforce rules or regulations contained in the reference standards.

1.2 REFERENCES:

1.2.1 RELATED DOCUMENTS: General Conditions, Supplementary Conditions, and applicable provisions of other Division 1 sections apply to this section.

1.2.2 PRECEDENCE OF REQUIREMENTS: In the event of a conflict between the requirements of a published reference standard and the specific requirements of the general conditions, supplementary conditions, or other Contract Documents, or between one reference standard and another reference standard, the more stringent requirements shall take precedence.

PART 2 - PRODUCTS - (Not Used)

PART 3 - EXECUTION

3.1.1 AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)
444 North Capital Street NW, Suite 225, Washington, DC 2002

M103 -- Mild to medium strength carbon-steel castings for general application
M105 -- Gray iron castings

M111 -- Zinc (Hot-Galvanized) coatings on products fabricated from rolled, pressed, and forged steel shapes, plates, bar, and strip
M183 -- Structural steel
T166 -- Bulk specific gravity of compacted bituminous mixtures

3.1.2 AMERICAN CONCRETE INSTITUTE (ACI)

P.O. Box 19150, Redford Station, Detroit, MI 48219
(313) 372-9800

ACI 211.1 -- Standard practice for selecting proportions for normal, heavyweight, and mass concrete
ACI 211.2 -- Standard practice for selecting proportions for structural lightweight concrete
ACI 301 -- Specifications for structural concrete for buildings
ACI 304 -- Recommended practice for measuring, mixing, transporting, and placing concrete
ACI 304.2R -- Placing concrete by pumping methods
ACI 305R -- Hot weather concreting
ACI 306R -- Cold weather concreting
ACI 315 -- Details and detailing of concrete reinforcement
ACI 318 -- Building codes requirements for reinforced concrete
Note: Reference to ACI 318 may be limited by more stringent requirements of local building code
ACI 347 -- Recommended practice for concrete formwork
ACI SP-66 -- ACI detailing manual (synopsis)

3.1.3 AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

1916 Race Street, Philadelphia, PA 19103
(215) 299-5585

ASTM A27 -- Specification for steel castings, carbon, for general application
ASTM A36 -- Standard specification for structural steel
ASTM A48 -- Specification for gray iron castings
ASTM A53 -- Specification for pipe, steel, black and hot-dipped, zinc-coated, welded and seamless
ASTM A82 -- Specifications for steel wire, plain, for concrete reinforcement.
ASTM A120 -- Specification for pipe, steel, black and hot-dipped zinc-coated (galvanized) welded and seamless, for ordinary uses
ASTM A123 -- Specification for zinc (hot dipped-galvanized) coatings on iron and steel products
ASTM A185 -- Specifications for steel welded wire, fabric, plain, for concrete reinforcement
ASTM A283 -- Specification for low and intermediate tensile strength carbon steel plates, shapes, and bars
ASTM A307 -- Specification for carbon steel externally threaded standard fasteners
ASTM A325 -- Specification for high-strength bolts for structural steel joints
ASTM A366 -- Specification for steel, carbon, cold-rolled sheet, commercial quality
ASTM A416 -- Specification for uncoated seven-wire stress-relieved steel strand for pre-stressed concrete
ASTM A421 -- Specification for uncoated stress-relieved wire for pre-stressed concrete
ASTM A446 -- Specification for steel sheet, zinc-coated (galvanized) by the hot-dip process, structural (physical) quality

ASTM A490 -- Specification for heat-treated, steel structural bolts, 150 ksi (1035 map) tensile strength
ASTM A500 -- Specification for cold-formed welded and seamless carbon steel structural tubing in rounds and shapes
ASTM A501 -- Specification for hot-formed welded and seamless carbon steel structural tubing
ASTM A525 -- Specification for general requirements for steel sheet, zinc-coated (galvanized) by the hot-dip process
ASTM A526 -- Specification for sheet steel, zinc-coated (galvanized) by the hot-dip process, commercial quality
ASTM A536 -- Specification for ductile iron castings
ASTM A568 -- Specification for general requirements for steel, carbon, and high-strength, low-alloy hot-rolled sheet and cold-rolled sheet
ASTM A570 -- Specification for hot-rolled carbon steel sheet and strip, structural quality
ASTM A572 -- Specification for high-strength low-alloy columbium-vanadium steels of structural quality
ASTM A588 -- Specification for high-strength low-alloy structural steel with 50 ksi (345MPa) minimum yield point to 4 inches thick
ASTM A611 -- Specification for steel, cold-rolled sheet, carbon, structural
ASTM A615 -- Specification for deformed and plain billet-steel bars for concrete reinforcement
ASTM A663 -- Specification for steel bars, carbon, merchant quality, mechanical properties
ASTM A775 -- Specification for epoxy-coated reinforcing steel bars
ASTM B32 -- Specification for solder metal
ASTM B88 -- Specification for seamless copper water tube
ASTM B209 -- Specification for aluminum and aluminum-alloy sheet and plate
ASTM B221 -- Specification for aluminum-alloy extruded bars, rods, wire, shapes, and tubes
ASTM C31 -- Methods of making and curing concrete test specimens in the field
ASTM C33 -- Specification for concrete aggregates
ASTM C36 -- Specification for gypsum wall board
ASTM C39 -- Test method for compressive strength of cylindrical concrete specimens
ASTM C42 -- Method of obtaining and testing drilled cores and sawed beams of concrete
ASTM C67 -- Method of testing brick and structural clay tile
ASTM C76 -- Specification for reinforced concrete culvert, storm drain, and sewer pipe
ASTM C79 -- Test method for gypsum sheathing board
ASTM C94 -- Specification for ready mixed concrete
ASTM C109 -- Test method for compressive strength of hydraulic cement mortars (using 2-inch or 50 mm cube specimens)
ASTM C110 -- Methods for physical testing of quicklime, hydrated lime, and limestone
ASTM C136 -- Method for sieve analysis of fine and coarse aggregates
ASTM C138 -- Test method for unit weight, yield, and air content (gravimetric) of concrete
ASTM C140 -- Method of sampling and testing concrete masonry units
ASTM C143 -- Test method for slump or Portland cement concrete
ASTM C144 -- Specification for aggregate for masonry mortar
ASTM C150 -- Specification for Portland cement
ASTM C171 -- Specification for sheet materials for curing concrete
ASTM C172 -- Method of sampling fresh concrete
ASTM C173 -- Test method for air content of freshly mixed concrete by the volumetric method
ASTM C207 -- Specification for hydrated lime for masonry purposes

ASTM C231 -- Test method for a content of freshly mixed concrete by the pressure method
ASTM C260 -- Specification for air entraining admixtures for concrete
ASTM C270 -- Specification for mortar for unit masonry
ASTM C309 -- Specification for liquid membrane-forming compounds for curing concrete
ASTM C330 -- Specification for lightweight aggregated for structural concrete
ASTM C425 -- Specification for compression joints for vitrified clay pipe and fittings
ASTM C476 -- Specification for grout for masonry
ASTM C478 -- Specification for precast reinforced concrete manhole sections
ASTM C494 -- Specification for chemical admixtures for concrete
ASTM C506 -- Specification for reinforced concrete arch culvert, storm drain, and sewer pipe
ASTM C507 -- Specification for reinforced concrete elliptical culvert, storm drain, or sewer pipe
ASTM C578 -- Specification for performed, cellular polystyrene thermal insulation
ASTM C612 -- Specification for mineral fiber block and board thermal insulation
ASTM C630 -- Specification of water-resistant gypsum backing board
ASTM C641 -- Test method for staining materials in lightweight concrete aggregates
ASTM C645 -- Specification for non-load (axial) bearing steel studs, runners (track), and furring channels for screw application of gypsum board
ASTM C665 -- Specification for mineral fiber blanket thermal insulation for light frame construction and manufactured housing
ASTM C672 -- Test method for scaling resistance of concrete surfaces exposed to deicing chemicals
ASTM C700 -- Specification for vitrified clay pipe, extra strength, standard strength, and perforated
ASTM C726 -- Specification for mineral fiber and mineral fiber, rigid cellular, polyurethane composite roof insulation board
ASTM C803 -- Test method for penetration resistance of hardened concrete
ASTM C805 -- Test method for rebound number of hardened concrete
ASTM C828 -- Recommended practice for low-pressure air test of vitrified clay pipe lines
ASTM C834 -- Specification for latex sealing compounds
ASTM C920 -- Specification for elastomeric joint sealants
ASTM C936 -- Specification for solid concrete interlocking paving units
ASTM D41 -- Specification for asphalt primer used in roofing and waterproofing
ASTM D312 -- Specification for asphalt used in roofing
ASTM D422 -- Test method for particle size analysis of soils
ASTM D448 -- Specification for standard sizes of coarse aggregate for highway construction
ASTM D698 -- Test method for moisture density relations of soils and soil-aggregate mixtures using 5.5-lb rammer and 12-inch drop
ASTM D1188 -- Test method for bulk specific gravity and density of compacted bituminous mixtures using paraffin-coated specimens
ASTM D1227 -- Specification for emulsified asphalt used as a protective coating for built-up roofing
ASTM D1556 -- Test method for density of soil in place by the sand-cone method
ASTM D1557 -- Method for moisture density relations of soils and soil-aggregate mixtures using 10-lb rammer and 18-inch drop
ASTM D1559 -- Test method for resistance to plastic flow of bituminous mixtures using marshal apparatus
ASTM D1667 -- Specification for flexible cellular materials - vinyl chloride polymers and copolymers (closed-cell vinyl)

ASTM D1751 -- Specification for preformed expansion joint fillers for concrete paving and structural construction (non-extruding and resilient bituminous types)
ASTM D1752 -- Specification for preformed sponge rubber and cork expansion joint fillers for concrete paving and structural construction
ASTM D1784 -- Specification for rigid poly (vinyl chloride) (PVC) compounds and chlorinated poly (vinyl chloride) (CPVC) compounds
ASTM D1785 -- Specification for poly (vinyl chloride) (PVC) pipe, schedules 40, 80, and 120
ASTM D2000 -- Classification for rubber products in automotive applications
ASTM D2167 -- Test method for density of soil in place by the rubber-balloon method
ASTM D2172 -- Test method for quantitative extraction of bitumen from bituminous paving mixtures
ASTM D2178 -- Specification for asphalt glass (felt) used in roofing and waterproofing
ASTM D2216 -- Method for laboratory determination of water (moisture) content of soil, rock, and soil-aggregate mixtures
ASTM D2241 -- Specification for poly (vinyl chloride) (PVC) plastic pipe (SDR-PR)
ASTM D2287 -- Specification for nonrigid vinyl chloride polymer and copolymer molding and extrusion compounds
ASTM D2487 -- Test method for classification of soils for engineering purposes
ASTM D2564 -- Specification for solvent cements for poly (vinyl chloride) (PVC) plastic pipe and fittings
ASTM D2729 -- Specification for poly (vinyl chloride) (PVC) sewer pipe and fittings
ASTM D2855 -- Recommended practice for making solvent cemented joints with poly (vinyl chloride) (PVC) pipe and fittings
ASTM D2898 -- Accelerated weathering of fire-retardant-treated wood for fire testing
ASTM D2922 -- Test method for density of soil and soil-aggregate in place by nuclear method
ASTM D2950 -- Test method for density of bituminous concrete in place by nuclear method
ASTM D3017 -- Test method for moisture content of soil and soil-aggregate in place by nuclear methods (shallow depth)
ASTM D3034 -- Specification for type PSM poly (vinyl chloride) (PVC) sewer pipe and fittings
ASTM D3909 -- Specification for asphalt roll roofing (glass mat) surfaced with mineral granules
ASTM D4253 -- Test method for maximum index density of soils using a vibratory table
ASTM D4254 -- Test methods for minimum index density of soils and calculation of relative density
ASTM D4318 -- Test method for liquid limit, plastic limit, plasticity index of soils
ASTM D4397 -- Specification for polyethylene sheeting for construction, industrial, and agricultural applications
ASTM E84 -- Test method for surface burning characteristics of building materials
ASTM E96 -- Test methods for water vapor transmission of materials
ASTM E136 -- Test method for behavior of materials in a vertical tube furnace at 750^{o}C
ASTM E283 -- Test method for rate of air leakage through exterior windows, curtain walls, and doors
ASTM E329 -- Recommended practice for inspection and testing agencies for concrete, steel, and bituminous materials as used in construction
ASTM E331 -- Test method for water penetration of exterior windows, curtain walls, and doors by uniform static air pressure difference
ASTM E605 -- Test method for thickness and density of sprayed fire-resistive material applied to structural members
ASTM E759 -- Test method for effect of deflection of sprayed fire-resistive material applied to structural members

ASTM E760 -- Test method for effect of impact on bonding of sprayed fire-resistive material applied to structural members

ASTM E761 -- Test method for compressive strength of sprayed fire-resistive material applied to structural members

ASTM E859 -- Test method for air erosion of sprayed fire-resistive material applied to structural members

ASTM F567 -- Practice for installation of chain link fence

ASTM F679 -- Specification for poly (vinyl chloride) (PVC) large diameter plastic gravity sewer pipe and fittings

3.1.4 AMERICAN WATER WORKS ASSOCIATION (AWWA)

6666 W. Quincy Ave., Denver, CO 80235
(303) 794-7711

Specifications and Test Methods Specifically Referenced Herein.

3.1.5 PORTLAND CEMENT ASSOCIATION (PCA)

5420 Old Orchard Road, Skokie, IL 60077
(312) 966-6200

Design and Control of Concrete Admixtures.

3.1.6 CITY OF LOUISVILLE

Department of Public Works - Engineering Division
749 Main Street, Louisville, Colorado 80027
(303) 335-4608

Design and Construction Standards, 1994 Edition

3.1.7 COLORADO DEPARTMENT OF TRANSPORTATION (CDOT)

4201 E. Arkansas Avenue, Denver, CO 80222
(303) 757-9011

Standard Specification for Road and Bridge Construction, current Edition.

- END OF SECTION -

SECTION 01300 - SUBMITTALS

PART 1 - GENERAL

1.1 SUMMARY:

1.1.1 WORK INCLUDED:

A. This section contains a summary of submittals required by the Contract Documents, and establishes the general procedures and requirements for submittals.

B. Submittals covered under this section include, but are not necessarily limited to, schedules, reports, product data, shop drawings, samples, and miscellaneous data specifically prepared for the work by CONTRACTOR or any subcontractor, manufacturer, or supplier, to illustrate some portion of the work.

1.1.2 RELATED WORK: Specific requirements for submittals are included in the individual specification sections.

1.2 REFERENCES:

1 .2.1 RELATED DOCUMENTS: General conditions, supplementary conditions, and applicable provisions of Division 1 sections apply to this section.

1.3 DEFINITIONS:

1 .3.1 PRODUCT DATA: As used herein, the term "product data" includes standard printed information published by the manufacturer describing materials, products, systems, and installation instruction not specifically prepared for this project, other than designation of selections from among available choices printed.

1.3.2 SHOP DRAWINGS: As used herein, the term "shop drawings" includes specially prepared technical data forms including drawings, diagrams, performance curves, data sheets, schedules templates, patterns, reports, calculations, instructions, measurements and similar information not in standard printed form for application to more than one project. Supplier's standard component drawings may be submitted if they clearly show the exact items required for the work, in context with adjacent materials and with such relationships clearly shown. Shop drawings are not part of Contract Documents.

1 .3.3 SAMPLES: As used herein, the term "samples" includes fabricated and unfabricated physical examples of materials, products, and units of work; as complete units or smaller portions of units of work; either for limited visual inspection or, where in indicated, for more detailed testing and analysis.

1.3.4 MOCK-UPS: As used herein, the term "mock-ups" means special on-site of off-site forms of samples, which are too large or otherwise inconvenient for handling in transmittal or submittal form.

1.3.5 MISCELLANEOUS DATA: As used herein, the term "miscellaneous data" means various documents related directly to the work, including project photographs, survey data and reports, physical work records, statements of applicability, copies of certificates, bonds, quality testing and certifying reports, copies of industry standards, record drawings, field measurement data, operation and maintenance materials, overrun stock, security/protection/safety keys, and similar information, devices, materials, which are applicable to the work but not processed as shop drawings, product data, or samples.

1.4 QUALITY ASSURANCE:

1.4.1 GENERAL

A. No extension of time will be granted, nor will consideration be given to claims arising out of CONTRACTOR's failure to submit shop drawings, product data, samples, or related submittals which do not allow adequate lead time for Engineer's review, and also do not allow ample time for revision, resubmission, and subsequent review by Engineer as required.

1.4.2 PERFORMANCE: Promptly check each submittal for accuracy, completeness, and applicability, and review, approve, and submit - in sequence according to the submittal schedule so as to cause no delay in the work or in the work of the OWNER or any separate Contractor - all submittals required by the Contract Documents. Identify each submittal to include name of project, specification section, supplier, source, finish, and location of use in the project.

1.4.3 VERIFICATION:

A. By making a submittal to ENGINEER, CONTRACTOR represents that he has approved such submittals and has determined and verified:

1. The applicability of the submittal to the project,
2. all quantities and sizes of materials, detailed fabricating dimensions, temporary erection connections or closures, tolerances and the proper fit and mating with adjacent materials,
3. related field measurements and field construction criteria, and
4. information pertaining to fabrication process and techniques of construction and erection.

B. CONTRACTOR further represents that he has checked and coordinated information contained within such submittal with requirements of the work and of the Contract Documents.

1.4.4 RESPONSIBILITY: CONTRACTOR shall not be relieved of responsibility for any deviation from requirements of the Contract Documents by ENGINEER review of submittals, unless CONTRACTOR has specifically informed ENGINEER in writing of such deviation at the time of submission, and ENGINEER has taken no written exception to the specific deviation. CONTRACTOR shall not be relieved from responsibility for errors or omissions in submittals by ENGINEER's review of or action upon such submittals.

1.4.5 SUBMITTAL VALIDITY: Submittals submitted which are not required to be submitted or are submitted without CONTRACTOR's approval will not be processed by ENGINEER, but will be

returned to CONTRACTOR for his compliance with Contract Document requirements, in which event it shall be deemed that CONTRACTOR has not complied with requirements of the Contract Documents, and CONTRACTOR shall bear responsibility for all delays as if no submittals had been submitted.

1.4.6 COMMENCEMENT OF WORK: No portion of the work requiring submittals shall be commenced until submittals have been acted on by ENGINEER. All such portions of the work shall be in accordance with appropriate, required submittals. **All submittals shall be submitted to ENGINEER prior to commencement of project construction**.

1.5 GENERAL SUBMITTAL REQUIREMENTS:

1.5.1 SCHEDULING: Where appropriate in various required administrative submittals (listing of products, manufacturers, suppliers, subcontractors, and in the progress schedule), show principal work-related submittal requirements and time schedules for coordination and integration of submittal activity with related work.

1.5.2 COORDINATION AND SEQUENCING: Coordinate preparation and processing of submittals with performance of work so that the work will not be delayed by submittals. Coordinate and sequence different categories of submittals for the same work, and for interfacing units of work, so that one will not be delayed by coordination with another. No extension of time will be allowed because of failure to properly coordinate and sequence submittals.

1.5.3 PREPARATION OF SUBMITTALS: Provide permanent marking on each submittal to identify project, date, Contractor, subcontractor, submittal name, applicable specification section, and similar information to distinguish it from other submittals. Show evidence of CONTRACTOR's review by clearly exhibiting check marks and stamped approval marking acceptance and provide space for ENGINEER's and ENGINEER's consultant's review or action marking. Package each submittal appropriately for transmittal and handling.

1.5.4 SPECIFIC CATEGORY SUBMITTAL REQUIREMENTS: Except as otherwise indicated in individual specifications sections, comply with general requirements specified herein for each indicated submittal category. Furnish and process intermediate submittals, where required between initial and final, similar to initial submittals(s).

1.5.5 PROGRESS SCHEDULE: Refer to supplementary conditions for progress schedule requirements.

1.5.6 DAILY REPORTS: Furnish copies of each daily report prepared by CONTRACTOR's Project Superintendent to ENGINEER and the OWNER. Transmit reports on a daily basis.

1.5.7 SHOP DRAWINGS:

A. Furnish newly-prepared information, on reproducible sheets, with graphic information at accurate scale (except as otherwise indicated), with name of preparer (firm name) indicated thereon. Affix seal of Contractor's or fabricator's design engineer where applicable. Show all dimensions, and note which are based on field measurement. Identify materials and products in the work shown. Indicate compliance with standards, and special coordination requirements.

B. Where shop drawings are normally required, and where specifically called for in the specifications, submit to ENGINEER four (4) blueline or blackline prints of each shop drawing and/or schedule required. Two prints will be returned.

C. Subsequent submittal(s), if required for correction or confirmation of corrective items, shall be same as initial submittal except as otherwise requested by ENGINEER or specified in conditions of the contract.

D. Shop drawings and schedules will be reviewed for general conformance with the design concept contained within the Contract Documents.

E. Do not allow shop drawing copies into field without appropriate final markings by ENGINEER.

1.5.8 PRODUCT DATA:

A. Collect required data into one submittal for each unit of work or system. Mark each copy in a legible and reproducible manner to show which choices and options are applicable to the project; "highlighting" with colored markers not acceptable. Include manufacturer's standard printed recommendations for application and use, compliance with standards, application of labels and seals, notation of field measurements which have been checked, and special coordination requirements.

B. Do not submit product data, or allow its use on the project, until compliance with requirements of Contract Documents has been confirmed by CONTRACTOR. Submittals of product data are for information and record, unless otherwise indicated.

C. The initial submittal will be the only submittal required unless returned promptly by ENGINEER, marked with an action which indicated an observed noncompliance. Submit 4 copies, each marked or labeled with project name, date, Contractor, subcontractor, submittal name, applicable specification section, and similar information to distinguish it from other submittals. Provide sufficient space for ENGINEER’s action stamp. ENGINEER will retain two copies for himself and return the rest.

D. Do not proceed with installation of materials, products, or systems, until a copy of applicable product data is in the possession of the installer.

E. Maintain one set of product data for each submittal at the project site.

1.5.9 PUBLISHED STANDARDS: Where submittal of published standards is required, except where specified integrally with "Product Data" submittals, submit a single copy for ENGINEER’s use. Where workmanship at the project site and elsewhere is governed by published standards, furnish additional copies to fabricators, installers, and others involved in performance of the work.

1.5.10 CONSTRUCTION PHOTOGRAPHS: Unless otherwise provided in the Contract Documents, OWNER will arrange and pay for construction photographs, and/or videotapes.

PART 2- PRODUCTS - (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULES:

3.1.1 SUBMITTAL SCHEDULE: The following scheduled is included as a checklist for convenience only, and may not include all submittals required. Failure to include submittals in this schedule does not relieve CONTRACTOR from providing submittals if required by individual specification sections.

General Requirements		
Section	Title	Submittals Required
1410	Testing and Inspections	N/A - City to provide Testing Services
1700	Contract Closeout	Record documents, Certificates of Compliance, Certificates of Inspection, Warranties, Guaranties, Bonds, Insurance Certificates, Consent of Surety, Releases of Liens, List of subcontractors and suppliers Acknowledgment of date of commencement of warranties and guaranties
Technical Specifications: See Technical Specifications for Submittals		

- END OF SECTION -

SECTION 01410 - TESTING AND INSPECTIONS

PART 1 - SUMMARY:

1.1.1 WORK INCLUDED:

A. This section defines the responsibilities of the various agencies or parties performing testing and inspection services as specified herein or required by the Contract Documents.

B. Quality assurance testing and inspections will be provided by an independent testing and inspections agency selected and paid for by OWNER.

C. Cooperate with the selected testing and inspections agency and all others who may be responsible for testing and inspection of the work.

1.1.2 RELATED WORK: Specific testing and inspection requirements are described in the various sections of these specifications. Failure to list specific testing or inspection requirements does not relieve CONTRACTOR from providing all tests, which are indicated to be his responsibility, or from cooperating with the testing and inspections agency.

1.1.3 LIMITATION OF AUTHORITY: The testing and inspections agency is not authorized to release, revoke, or alter the requirements of the Contract Documents, or to approve or accept any portion of the work without ENGINEER's written consent.

1.2 REFERENCES:

1.2.1 RELATED DOCUMENTS: General conditions, supplementary conditions, and applicable provisions of other Division 1 Sections apply to this Section.

1.2.2 REFERENCE STANDARDS: Comply with the requirements of all reference standards, codes, ordinances, rules, and regulations contained in the various sections of these specifications, except where more stringent requirements are listed herein or otherwise required by the Contract Documents. A complete listing of applicable reference standards, including full name of publishing agency and date or number is contained in section 01091.

1.3 DEFINITIONS:

1.3.1 QUALITY ASSURANCE TESTS AND INSPECTIONS: All tests and inspections specified herein or elsewhere in the Contract Documents which are performed by an independent testing and inspections agency to determine compliance of materials, products, equipment, or completed work with the requirements of the Contract Documents.

1.3.2 CODE COMPLIANCE TESTS AND INSPECTIONS: Mandatory tests or inspections required by codes or ordinances, or other authorities having jurisdiction over the work.

1.3.3 CONTRACTOR'S CONVENIENCE TESTS AND INSPECTIONS: Tests or inspections informed exclusively for the CONTRACTOR's convenience or information.

1.3.4 RE-TESTING: Subsequent testing or inspections of the work or any portion of the work for which initial testing has indicated non-compliance with the Contract Documents or with applicable codes, ordinances, rules, and regulations.

1.4 SUBMITTALS:

1.4.1 TEST AND INSPECTION REPORTS: Copies of all test and inspection reports will be promptly delivered by the testing and inspections agency directly to OWNER and ENGINEER.

1.5 PAYMENT FOR TESTS AND INSPECTIONS:

1.5.1 INITIAL QUALITY ASSURANCE TESTS AND INSPECTIONS: Paid for by OWNER.

1.5.2 CODE COMPLIANCE TESTS AND INSPECTION: Paid for by CONTRACTOR**.**

1.5.3 CONTRACTOR'S CONVENIENCE TESTS AND INSPECTIONS: Paid for by CONTRACTOR.

1.5.4 ADDITIONAL OR ALTERNATIVE TESTS AND INSPECTIONS: Paid for by OWNER if the materials or work tested is found to be in compliance with the Contract Documents; otherwise paid for by CONTRACTOR.

1.5.5 RE-TESTING: Paid for by CONTRACTOR.

PART 2 - PRODUCTS - (Not Used)

PART 3 - EXECUTION

3.1 COOPERATION WITH TESTING AND INSPECTIONS AGENCY:

3.1.1 ACCESS TO THE WORK: Representatives of the testing and inspections agency or other legally constituted testing or inspections personnel shall have unrestricted access to the site and all other locations where the work is in progress, including borrow pits, batch plants, material yards, or other locations where materials are being obtained, fabricated, or stored.

3.1.2 FACILITIES FOR TESTING: Provide all necessary facilities required for testing and inspecting the work, including but not limited to, lifts, and suitable safe storage areas for freshly poured concrete test cylinders.

3.1.3 NOTIFICATION: Notify ENGINEER not less than forty-eight (48) hours prior to tentative date or time when testing and inspection services will be required. Re-confirm date and time not less than twenty-four (24) hours prior to time when such services will be required. ENGINEER will schedule testing and inspection agency.

3.2 TEST AND INSPECTION PROCEDURES:

3.2.1 GENERAL: Gathering of specimens or samples, measuring, and testing of all materials, products, or other work shall be performed according to the procedures of the referenced standard test method.

3.2.2 TAKING SPECIMENS: Unless otherwise indicated, all specimens and samples for testing will be taken by the testing and inspections agency personnel, either at the source of the material or at the site for work in progress.

3.2.3 DELIVERY OF SPECIMENS: Unless otherwise indicated, pick-up and delivery of specimens or samples to the testing and inspections agency's laboratory will be done by the agency's personnel. This includes concrete test cylinders, which have been stored on site for the initial curing period.

3.2.4 RE-TESTING: When initial tests or inspections indicate non-compliance of the work or any portion thereof, the non-complying portion shall be removed, replaced, or reworked (re-compacted in the case of subgrade, fill, or backfill material), and re-tested by the same agency performing the initial test or inspection. Do not proceed with additional work until the non-complying work has re-tested and found to be in compliance.

3.2.5 ADDITIONAL OR ALTERNATIVE TESTS:

A. OWNER and ENGINEER reserve the right to require additional or alternative tests or inspections of materials or work for which either has reason to believe may not be in compliance with the requirements of the Contract Documents.

B Examples of such additional tests may include, but are not limited to, additional sieve analysis of aggregates or granular fill material; additional field density tests of subgrade, fill, or backfill materials; additional slump tests of concrete as it is being placed; core tests of in-place structural concrete; load testing of concrete structures; x-ray or other non-destructive testing of structural steel; and field-cut test strips of membrane roofing.

C. Payment for additional or alternative tests will be determined as provided herein above.

3.3 SCHEDULES:

3.3.1 SCHEDULE OF QUALITY CONTROL TESTS AND INSPECTIONS:

A. The following schedule is included for information only, as a convenience to CONTRACTOR, and is not intended to limit the number and type of tests to be performed by the testing and inspections agency.

B. Carefully examine the individual sections of these specifications for additional or complete quality control testing and inspections requirements. Failure to include any test or inspection in this schedule does not relieve CONTRACTOR from the testing and inspection requirements contained in the individual sections of the specifications.

C. This schedule includes quality control tests and inspections only, which will be performed by the selected testing and inspections agency and paid for as previously mentioned in Article 13 of the General Conditions. Code compliance tests and inspections, Contractor's convenience tests and inspections, and additional or alternative tests and inspections requested by the City are not included.

Section	Description of Test or Inspection	Test Qty/Interval
Earthwork	Fill and Backfill Material (Lab): Moisture Content – ASTM D2216 Max. Index Density – ASTM D4253 Moisture/Density Rel. – ASTM D698 or ASTM D1557 Plasticity Index – ASTM D4318 Particle Size Analysis – ASTM D422 Field Density Tests – ASTM D1556, D2167, or D2922 Field Moisture Tests – ASTM D3017 Subgrade: Fill, Bldg., and Paved Areas: Backfill: Site and Misc. Fills:	1 each test/soil type One/500 sf One/500 sf per lift One/250 sf/2 ft vert. One/500 sf/1 ft vert.
Utilities	Bedding Material (Lab): Particle Size Analysis – ASTM D422 Backfill Material (Lab): Moisture/Density Relation – ASTM D698 or D1557 Field Density Tests – ASTM D1556, D2167, or D2922 Field Moisture Tests – ASTM D3017:	1/soil type 1/soil type One/150 lf @ trench bottom at 2 ft vert. intervals, and at top
Paving	Asphalt Content – ASTM D2172 Asphalt Gradation – ASTM C136 Bulk Specific Gravity – ASTM D1188 AASHTO T166 Marshall Test – ASTM D1559	One each/500 tons, min. 2/day
Concrete	Concrete Quality: Fresh Concrete – ASTM C172 Compressive Strength – ASTM C39 Unit Weight – ASTM C138 Slump – ASTM C142 Air Content – ASTM C173 or C231 Hardened Concrete (failings only): ASTM C42, C803, C805, or load tests	One each/50 CY or major fraction thereof; min. 1/pour One each/truck As determined by ENGINEER

- END OF SECTION -

SECTION 01500 - TEMPORARY FACILITIES, CONTROLS, AND SERVICES

PART 1 - GENERAL

1.1 SUMMARY:

1.1.1 WORK INCLUDED: Provide temporary utilities and miscellaneous temporary facilities required during construction, including installation, maintenance, and removal upon completion of the work.

1.2 REFERENCES:

1.2.1 RELATED DOCUMENTS:

A. General conditions, supplementary conditions, and applicable provisions of other Division 1 sections apply to this section.

B. Section 02600 Construction Zone Traffic Control.

PART 2 - PRODUCTS

2.1 TEMPORARY CONSTRUCTION FACILITIES:

2.1.1 STORAGE STRUCTURES: Provide enclosed, weather tight storage facilities for materials and equipment, which require protection from the elements.

2.1.2 SANITARY FACILITIES:

A. Provide temporary toilet facilities for duration of work, for use by any and all employees engaged in the work. Comply with requirements of applicable codes, regulations, laws, and ordinances.

B. **ENGINEER shall approve locations of all temporary toilet facilities for the work. CONTRACTOR shall instruct any and all employees engaged in the work to use the designated temporary toilet facility or other approved toilet facility**.

2.1.3 FENCES AND BARRICADES:

A. Provide temporary orange fences along the property owner side of the construction limits as shown on the plans. In the remaining work areas and streets provide traffic control devices as may be specified elsewhere within certain sections of the specifications, and as may be required by local code or authority and as required to maintain safety of work place.

B. Maintain temporary fences, bulkheads, and other protective facilities in good condition throughout the term of the work. Remove at completion of the work and replace or repair all work damaged thereby. Repair or replace on a daily basis safety facilities or devices damaged or removed during the course of the work.

2.1.4 CONSTRUCTION STAGING

A. Coordinate construction activities with the property and business owners to minimize impacts.

B. CONTRACTOR will not be permitted to operate trucks and equipment or store equipment and supplies on private property unless he has written permission to do so.

2.1.5 STORAGE OF MATERIALS/EQUIPMENT, ETC.

A. CONTRACTOR shall not be allowed to park any vehicles (including worker's personal vehicles) or equipment in any on-street parking spaces that are open to traffic.

B. No construction trailers or storage yards will be allowed in the work area and neighborhood. CONTRACTOR shall locate trailer/storage yard subject to approval of ENGINEER.

2.3 TEMPORARY CONTROLS

A. Noise Control. Equip construction machinery and vehicles with practical sound and muffling devices and operate in a manner to minimize noise consistent with efficient performance of the work.

B. Dust Control.

1. Take reasonable measures to prevent unnecessary dust.

2. Moisten dirt roads used for transportation and haul with water or apply a chemical dust suppressant to control dust.

3. Cover dusty material in transit when necessary to prevent blowing.

C. Pollution Control.

1. Prevent the pollution of drains and watercourses by sanitary wastes, sediment, debris, and other substances resulting from construction activities.

2. Retain all spent oils, hydraulic fluids, and other petroleum fluids in containers for disposal off the site.

3. Do not perform equipment maintenance or fueling within 50 feet of any water course.

D. Erosion Control.

1. Take such measures as are necessary to prevent erosion of soil on the site and adjacent properties that might result from construction activities.

2. Provide temporary materials such as hay bales, sand bags, or plastic sheets, to prevent the erosion of banks or excavation where runoff may be increased or concentrated due to construction activities.

3. Take such measures as are necessary to prevent soil, mud, debris, etc. from entering the storm sewer system. CONTRACTOR shall be responsible for cleaning existing storm sewer downstream of the site if any soil, mud, debris, etc. enter it from the site. ENGINEER shall inspect system prior to final inspection and required cleaning will be noted on the punch list. CONTRACTOR shall clean to the satisfaction of ENGINEER.

2.4 OTHER TEMPORARY SERVICES:

2.4.1 CLEANING:

A. Provide daily sweeping and cleanup of dust, debris, litter, trash containers, and other items required to maintain a clean, orderly, and accessible site. Hauling of debris to legal dump or landfill is required daily as a minimum.

B. Provide daily sweeping or cleaning of adjacent streets and walkways as required to prevent accumulation of mud, dust, or soil thereon from construction traffic and personnel.

C. CONTRACTOR shall at his/her own expense clean up and remove all refuse and unused materials of any kind resulting from the work. Upon failure to do so within seventy-two (72) hours after request by ENGINEER, the work may be done by OWNER and the cost thereof be charged to CONTRACTOR and deducted from his/her final estimate.

2.4.2 ACCESS RAMPS:

A. During resurfacing activities (milling and leveling) provide hard surface ramps as directed by ENGINEER to access private property, public property, pedestrian crossings, streets, and alleys.

2.4.3 OWNER-MAINTAINED FACILITIES:

A. During construction activities including but not limited to demolition, unclassified excavation, subgrade cement treatment, and asphalt paving, CONTRACTOR shall protect from damage all OWNER-maintained facilities. Street signage, storm sewer inlets and manholes, sanitary sewer manholes, water main valve boxes, and water service curb stop boxes damaged or backfilled during construction shall be repaired, replaced, and made accessible. Backfilled manholes and inlets shall be cleaned immediately. Upon failure to repair, replace, or clean OWNER-maintained facilities promptly, the work may be completed by OWNER and the cost thereof be charged to CONTRACTOR and deducted from his/her final estimate.

PART 3 - EXECUTION

3.1 MAINTENANCE OF TEMPORARY FACILITIES:

3.1.1 TEMPORARY STRUCTURES: Maintain temporary offices, storage facilities, sanitary facilities, fire protection facilities, trailers, fences, barricades, and other structures in a neat, orderly appearance for the duration of the work.

3.1.2 REMOVAL OF TEMPORARY FACILITIES: Remove temporary facilities and structures from the site as soon as practicable or when no longer required by CONTRACTOR or subcontractors. Restore areas occupied by temporary facilities to like new condition, or to match surrounding areas.

PART 4 - MEASUREMENT AND PAYMENT

4.1 SUMMARY

4.1.1 Temporary Facilities and Controls and Services will not be paid for separately but shall be included in the work.

- END OF SECTION -

SECTION 01700 - CONTRACT CLOSEOUT

PART 1 - GENERAL

1.1 SUMMARY:

1.1.1 WORK INCLUDED: This section includes administrative procedures and closeout submittals required at substantial completion and final completion of the work.

1.1.2 RELATED WORK: Additional specific requirements are specified in the various sections of these specifications.

1.2 REFERENCES:

1.2.1 RELATED DOCUMENTS: General conditions, supplementary conditions, and applicable provisions of these specifications apply to this section.

1.3 DEFINITIONS:

1.3.1 CONTRACT CLOSEOUT: Contract closeout is defined to include general administrative requirements near the end of the contract time, in preparation for final acceptance, final payment, normal completion of the contract, occupancy by OWNER, and similar actions evidencing completion of the work. Time of closeout is directly related to substantial completion, and therefore may be either a single time period for the entire work or a series of time periods for individual parts of the work which have been certified as substantially complete at different dates. That time variation, if any, shall be applicable to other provisions of this section.

1.4 SUBMITTALS

1.4.1 RECORD DOCUMENTS - GENERAL:

A. Additional or specific requirements for record documents are indicated in individual sections of these specifications.

B. Do not use record documents for construction purposes; protect from deterioration and loss in a secure, fire resistive location.

C. Provide access to record documents for ENGINEER's or OWNER's reference during normal working hours.

D. Review record documents for progress and accuracy at regularly scheduled job progress meetings.

E. Upon completion of mark-up, submit record documents to the ENGINEER for the OWNER's records.

1.4.2 RECORD DRAWINGS (FIELD SET):

A. Maintain at the project site during the course of the work a white print set (blueline or blackline) of contract drawings and shop drawings in clean, undamaged condition, with mark-ups of actual installations which vary substantially form the work as originally shown.

B. Mark whichever drawing is most capable of showing "field" condition fully and accurately; however, where shop drawings are used for mark up, record a cross reference at corresponding locations on the contract drawings.

C. Mark changes or deviations with red erasable pencil. Where feasible, use other colors to distinguish between variations in separate categories of work.

D. Record new information, which is recognized to be of importance to the OWNER but was not shown on either the contract drawings or shop drawings. Give particular attention to concealed work which would be difficult to measure and record at a later date. Note related change order or field order numbers where applicable.

E. Record all deviations in sizes, locations, or other features of work from the Contract Documents. It shall be possible, using these drawings, to correctly and easily locate, identity, and establish sizes of all piping, directions of flow, and other features of the work which will be concealed in finished work or underground.

F. Establish locations of concealed and underground work by accurate dimensions to column lines or permanent walls, locating all bends or turns, and properly referencing invert elevations and rates of fall.

G. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates, and other identification on cover of each set.

1.4.3 FINAL RECORD DRAWINGS (AS-BUILTS):

A. Submit the final marked-up field copy of record drawings to the ENGINEER for review and approval.

1.4.4 RECORD SPECIFICATIONS:

A. Maintain one copy of specifications, including addenda, change orders, and similar modifications issued in printed form during construction. Mark up variations of substance in actual work in comparison with text of specifications and modifications as issued.

B. Give particular attention to substitutions, selection of options, and similar information on work where it is concealed or cannot otherwise be readily discerned at a later date by direct observation.

C. Note related record drawing information and product data where applicable.

D. Label record specifications with the words "RECORD COPY" and the date submitted, stamped or neatly printed in block letters on the cover.

1.4.5 OTHER DOCUMENTS: Submit the required number of the following additional documents, which may be required by the various specification sections:

1) Certificates of compliance with applicable reference standards.
2) Certificates of inspection or other evidence of compliance with governmental agencies or authorities having jurisdiction over the work.
3) Warranties, guarantees, and bonds.
4) Certificates of insurance for products and completed operations.
5) Written consent of surety.
6) Evidence of payment and release of liens for subcontractors, suppliers, and other goods and services (Claims Release Forms).
7) Certificate of substantial completion form signed by CONTRACTOR accepting the date of substantial completion.
8) Final Inspection report signed by CONTRACTOR.
9) Certificate of final completion signed by the CONTRACTOR acknowledging the date of final completion.
10) Operations and maintenance manuals as required.

PART 2 - PRODUCTS - (Not Used)

PART 3 - EXECUTION

3.1 PREREQUISITES:

3.1.1 FINAL COMPLETION: Prior to requesting the City's final observation for certification of final acceptance and payment, as required by the general and supplemental conditions, complete the following:

1) Submit final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required. List known exceptions to final completion of the work, if any, in the request.

2) Submit updated final statement, accounting for additional changes to contract sum.

3) Submit certified copy of final punch list of itemized work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance.

4) Submit written consent of surety.

5) Revise and submit evidence of final, continuing insurance coverage complying with insurance requirements.

PART 4 - MEASUREMENT AND PAYMENT

4.1 SUMMARY

4.1.1 Contract Closeout will not be paid for separately but shall be included in the work.

- END OF SECTION -

TECHNICAL SPECIFICATIONS

TABLE OF CONTENTS

ITEM	SECTION	SUB-SECTION OR ARTICLE
DIVISION 00: PROCUREMENT & CONTRACTING REQUIREMENTS		
AVAILABLE PROJECT INFORMATION	**00 30 00**	
GEOTECHNICAL DATA		00 31 32
PROCUREMENT FORMS	**00 40 00**	
UNIT PRICE BID SCHEDULE		00 41 43
DIVISION 01: GENERAL REQUIREMENTS		
PAYMENT PROCEDURES		01 29 00
DIVISION 03: CONCRETE		
REINFORCING STEEL		03 21 00
STRUCTURAL CONCRETE		03 31 00
DIVISION 31: EARTHWORK		
EXCAVATION AND FILL		31 23 00
EROSION AND SEDIMENT CONTROLS		31 25 00
RIPRAP, BOULDERS, SOIL RIPRAP, AND BEDDING		31 37 00
DIVISION 32: EXTERIOR IMPROVEMENTS		
IRRIGATION		32 84 00
SOIL PREPARATION		32 91 13
SEEDING		32 92 20
LANDSCAPE PLANTING		32 93 00
DIVISION 33: UTILITIES		
SUBDRAINAGE		33 46 00

July 25, 2023
Project No. 23043

2750 S. Wadsworth Blvd., Suite D-200
Denver, Colorado 80227
303.625.9502
www.LithosEng.com

ICON Engineering, Inc.
7000 South Yosemite Street, Suite 170
Centennial, CO 80112

Attention: Ms. Heather Seitz, PE

Regarding: Desktop Geotechnical Review Memo
Louisville Pond Improvements
Louisville, Colorado

Ms. Seitz,

Lithos Engineering (Lithos) understands that ICON Engineering (ICON) is providing design services for the City of Louisville for various landscaping treatments at three potential detention pond locations in Louisville, Colorado. This memorandum summarizes the surficial soils encountered at the sites based on previous geotechnical investigations and geologic mapping. The location of the three potential detention ponds is shown on Figure 1.

Memorandum Summary

1. At project site WW-1, anticipated surficial soils consist of clays, sands, and gravels with shallow claystone bedrock.
2. At project site Q-1, anticipated surficial soils consist of silty sand and clayey sand.
3. At project site W-1, anticipated surficial soils consist of clay and silt with some sand and gravel.

Previous Geotechnical Investigations

ICON provided Lithos with two geotechnical investigation reports for a review of the surficial soils at the project sites. Fox & Associates of Colorado (Fox) conducted a geotechnical investigation in 1986 that consisted of drilling eleven geotechnical borings in the subdivision that encircles project site WW-1. Soils and Materials Consultants (SMC) conducted a geotechnical investigation in 1991 that consisted of drilling 22 geotechnical borings for a subdivision near project site Q-1. The findings of these reports are described below.

Subsurface Conditions

Subsurface conditions for the three project sites as interpreted from geologic mapping and previous geotechnical reports are generally described below.

Project Site WW-1

Based on Fox's geotechnical investigation, surficial soils consist of topsoil, clays, sandy clays, silty sands, and mixed sands and gravels. Near-surface blow counts indicated a consistency of medium stiff to very stiff for clay soils and a relative density of medium dense for sand soils. Weathered claystone was encountered within the first five feet of three geotechnical borings, with blow counts ranging from 16 to 24 blows per foot (bpf). Competent bedrock was encountered in all eleven borings at depths ranging from

5 to 13 feet below the ground surface (bgs). The clay soils and claystone bedrock samples exhibited low to moderate swell potential and were identified as moderately to highly plastic. Groundwater in the closest boring, Test Hole 7, encountered groundwater 10 feet bgs.

Geologic mapping by Brandt et al. (2004) and Kellogg et al. (2008) indicates the project site is underlain by Louviers alluvium, Slocum alluvium, and bedrock of the Laramie Formation and Fox Hills Sandstone. The Louviers alluvium is described as gravel, sand, silt, and clay forming terraces above streams and the Slocum alluvium is described as bouldery cobble gravel. The Laramie Formation is described as shale, claystone, siltstone, and sandstone with interbedded coal beds. The Fox Hills Sandstone is described as sandstone and interbedded shale.

Project Site Q-1

SMC's geotechnical investigation was conducted approximately 0.25 miles northwest of the project site. The surficial soils encountered were predominantly clay and clayey sand, with blow counts indicating a consistency of medium stiff to very stiff. Sands and gravels were generally encountered beneath the clay and immediately above claystone and sandstone bedrock located 10 to 21 feet bgs.

Geologic Mapping by Brandt et al. (2004) and Kellogg et al. (2008) indicates the project site is underlain by eolian sand. The eolian sand is described as silty sand to clayey sand from wind erosion of sediments from flood plain sediments of major streams.

Project Site W-1

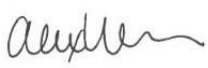
No previous geotechnical investigations were provided for this project site. Based on geologic mapping by Brandt et al. (2004) and Kellogg et al. (2008), the project site is underlain by Louviers Alluvium. Louviers alluvium is described as pebbly coarse sand, cobbly gravel, with lenses of silt and clay. The uppermost unit is commonly clayey to pebbly silt.

Closing

This memorandum constitutes our deliverable for the Project and is based on information provided to Lithos by ICON and our understanding of the Project to date. The subsurface conditions described in this memo were based on data obtained from exploratory borings performed by others and information provided by the client. Subsurface conditions are typically variable, both laterally and vertically, and the nature and extent of the subsurface variations across the site may not become evident until construction. We appreciate the opportunity to work with you and look forward to helping the Project team on this Project.

If you have any questions regarding the content of this letter, please contact the undersigned.

Sincerely,
Lithos Engineering



Alex Warren, EI, GIT
Staff Engineer

Sarah Myers, EI
Project Manager

LITHOS ENGINEERING

Robin Dornfest, PG
President

References

Brandt, T.R., Moore, D.W., and K.E. Murray, 2004, A Spatial Database of Bedding Attitudes to accompany Geologic Map of the Greater Denver Area, Front Range Urban Corridor, Colorado by Trimble and Machette, US Geological Survey, Open File Report 03-025, scale 1:100,000.

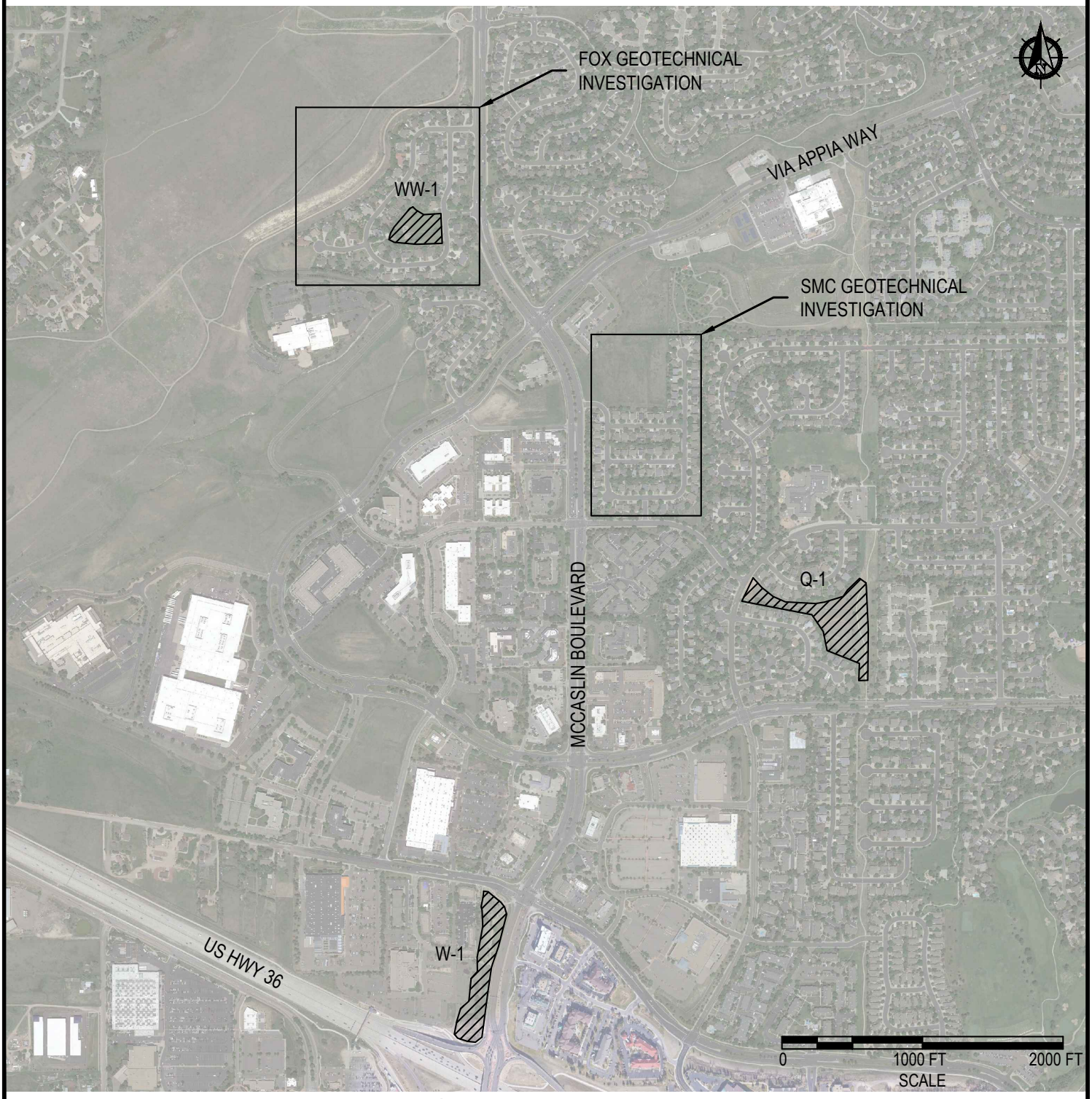
Fox & Associates of Colorado, June 1986, Geotechnical Engineering Investigation, The Enclave Subdivision, McCaslin Boulevard & West Enclave Circle, Louisville, Colorado, Job No. 1-1102-7087, prepared for R.B. Development.

Kellogg, K.S., Shroba, R.R., Bryant, B., and W.R., Premo, 2008, Geologic Map of the Denver West 30' x 60' Quadrangle, North-central Colorado, US Geological Survey, Scientific Investigations Map 3000, scale 1:100,000.

Soils and Materials Consultants, January 1992, Subsoil Investigation Lots 1-85, Cherrywood II, Louisville, Colorado, Project No. 1795-01, prepared for Storck Development Corporation.

LEGEND:

PROJECT SITE



PROJECT OVERVIEW MAP

LITHOS ENGINEERING
2750 S. WADSWORTH BLVD. SUITE D-200
DENVER, COLORADO 80227
303.625.9502

PROJECT TITLE	LOUISVILLE POND IMPROVEMENTS
DRAWING TITLE	PROJECT OVERVIEW MAP

OWNER: City of Louisville, COLORADO • SINCE 1878

CLIENT: ICON ENGINEERING, INC

PROJECT NO.:	23043	DRAWN BY:	AW
LOCATION:	LOUISVILLE, CO	DESIGNED BY:	SM
DATE:	JULY 2023	CHECKED BY:	RD

FIGURE NUMBER: 1

SECTION 01 29 00

PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. For each BID item, the WORK will be measured and paid for on either a unit price basis or on a lump sum basis. The quantities provided on the BID are estimates of the actual quantities of WORK only and are included solely for determining the probable cost of WORK. The actual quantities of WORK may differ from the BID quantities. The basis of measurement and payment for each unit price BID item will be the actual amount of WORK authorized, completed, and accepted. All labor, equipment, materials, and any incidentals required to complete the WORK will be considered subsidiary to that BID item and will not be measured or paid for separately. The CONTRACTOR agrees to make no claim for damages, loss of anticipated profits, or otherwise, due to differences between the actual WORK quantities and the estimated BID quantities.

B. Payment will be made only for each item included in the BID. No WORK will be paid for that is not completed in accordance with the DRAWINGS and SPECIFICATIONS and accepted by the ENGINEER. Except as may be otherwise stipulated, no labor, equipment, materials, or any incidentals required to complete the WORK will be furnished by OWNER.

C. The basis of measurement and payment for each BID item is described below. A general listing of BID items, accompanied by a summary of the WORK, is provided below. It is not intended to completely describe all WORK. Refer to the DRAWINGS and SPECIFICATIONS for detailed information on each BID item.

D. These Payment Procedures shall not be modified. Changes, additions, or deletions of BID items, as necessary, to meet PROJECT requirements shall be included in the City of Louisville Supplementary Conditions.

1.02 MEASUREMENT AND PAYMENT PROCEDURES

A. GN – GENERAL

1. Bid Item GN-02-001: Mobilization

a. No separate measurement for payment will be made for any labor, equipment, and materials required for this item. The lump sum price will include all the CONTRACTOR's costs. This BID item includes, but is not limited to:

1) Furnishing, installing, and removing temporary fencing and construction markers around PROJECT work areas and any other fencing/security items as deemed necessary by the CONTRACTOR.
2) Establishing and removing the CONTRACTOR's offices, buildings, and other necessary facilities
3) Obtaining, complying with, and transferring permits

4) Providing environmental controls for the life of the PROJECT
5) Providing required bonds and insurance
6) Preparing and maintaining the PROJECT schedule
7) Delivering and removing the CONTRACTOR's equipment, supplies, and excess materials, and cleaning up the site
8) Restoring the PROJECT site to pre-project or final grades and conditions
9) Preparing and securing approvals of submittals
10) Preparing record drawings
11) Preparing and providing copies of stormwater and other required reports
12) Providing all other related and necessary labor, equipment, and materials to complete the WORK.

b. Fifty (50) percent of the lump sum price will be paid at the time of the first monthly progress payment; an additional thirty (30) percent will be paid when one-half the original CONTRACT amount is earned. The remaining twenty (20) percent will be paid upon final acceptance of the PROJECT. The total amount for mobilization will not exceed ten (10) percent of the total BID.

Bid Item	**Pay Unit**
Mobilization	LS

2. Bid Item GN-03-001: Potholing

a. The measurement and payment for potholing will be on a per each basis for each pothole prior to construction. Utilities shown on the DRAWINGS to be exposed and protected as part of the construction operations are not included in this item. The CONTRACTOR will only pothole under this item as directed by the ENGINEER. The unit price will include all the CONTRACTOR's costs. This BID item includes, but is not limited to:

1) Coordinating with utility companies
2) Locating and protecting all existing utilities in and along the PROJECT reach
3) Identifying the utility type, depth, and dimensions prior to construction
4) Preparing and submitting pothole logs to the ENGINEER
5) Backfilling potholes and patching roadway, as required.

b. Payment will be based on units completed and accepted.

Bid Item	**Pay Unit**
Potholing	EA

3. Bid Item GN-04-001: Construction Surveying

a. No separate measurement for payment will be made for any labor, equipment, and materials required for this item. The lump sum price will include all the CONTRACTOR's costs. This BID item includes, but is not limited to:

1) Staking horizontal and vertical alignments
2) Providing cut sheets to the OWNER or OWNER's representative
3) Providing replacement stakes
4) Locating existing utilities
5) Staking overlot grading
6) Setting subgrade elevations and offsets
7) Setting temporary control points
8) Re-establishing land monuments
9) Finishing grades and structure elevations by a Professional Licensed Surveyor, as required, for record or as built DRAWINGS.
10) Finishing grades and elevations by a Professional Licensed Surveyor, as required, for Pond Volume Certification
11) Providing all other related and necessary labor, equipment, and materials to complete the WORK.

b. Payment will be based on the percentage of completed and accepted WORK.

Bid Item	**Pay Unit**
Construction Surveying	LS

4. Bid Item GN-05-001: Traffic Control

a. No separate measurement for payment will be made for any labor, equipment, and materials required for this item. The lump sum price will include all the CONTRACTOR's costs. This BID item includes, but is not limited to:

1) Preparing, implementing, adjusting as necessary, and maintaining the CONTRACTOR's approved Traffic Control Plan
2) Updating and submitting traffic control plans, as necessary, according to city, county, and other applicable regulations
3) Preparing, implementing, maintaining, and adjusting, as necessary, pedestrian controls
4) Providing all other related and necessary labor, equipment, pavement markings, and materials to complete the WORK.

b. One third of the lump sum price for this item will be paid after twenty-five (25) percent of the original CONTRACT amount has been earned, the second third will be paid after fifty (50) percent of the original CONTRACT amount has been earned, and the final third upon final acceptance of the PROJECT.

Bid Item	**Pay Unit**
Traffic Control	LS

B. ESC - EROSION AND SEDIMENT CONTROL

1. Bid Item ESC-01-001: BMP Installation and Maintenance

a. The measurement for payment for this item will be a lump sum for all equipment and labor required to maintain all BMPs in accordance with the DRAWINGS and SPECIFICATIONS or as otherwise directed by ENGINEER. Prior to performing maintenance on any BMP, the

CONTRACTOR shall meet with the ENGINEER to determine what maintenance is required and to estimate the number of hours required to perform the maintenance. The price will include all the CONTRACTOR'S costs. This BID will include but is not limited to:

1) Furnishing and installing all required BMP materials
2) Furnishing all labor and equipment required to install all BMP materials.
3) Implementing and adjusting as necessary the approved Erosion and Sediment Control Plan in accordance with the DRAWINGS and SPECIFICATIONS
4) Performing sediment removal
5) Sweeping public right-of-way along the project limits and haul routes as necessary
6) Replacing BMPs if necessary
7) Inspecting and maintaining all erosion and sediment control measures and replacing as necessary
8) Providing all other related and necessary labor, equipment, and materials to complete the WORK.

b. Payment will be based on units completed and accepted.

Bid Item	**Pay Unit**
BMP Installation and Maintenance	LS

C. RR – REMOVE, RELOCATE, AND ABANDON

1. Bid Item RR-06-001: Remove Riprap
Bid Item RR-06-002: Remove Sediment from Drainpipe
Bid Item RR-06-003: Remove Concrete Sidewalk and Main Channel

a. The measurement for payment for this item will be per each, cubic yard, or square yard based on BID item and in accordance with the DRAWINGS and SPECIFICATIONS. No separate measurement for payment will be made for any labor, equipment, and materials required for this item. The unit price will include all the CONTRACTOR's costs, which are not specifically measured and paid for under other BID items. This BID item includes, but is not limited to:

1) Removing, hauling, and disposing of structures and obstructions including, but not limited to, existing riprap, concrete curbs, sidewalks or channels, sediment and any structures and obstructions that interfere with the WORK.
2) Concrete removal shall be done using a saw, cutting a clean line in locations where removal abuts concrete that will remain in place.
3) Backfilling and compacting after removal of structures and obstructions, as necessary.
4) Moisture conditioning of suitable backfill material.
5) Restoring area, as required
6) Providing all other related and necessary labor, equipment, and materials to complete the WORK.

b. Payment will be based on units completed and accepted.

Bid Item	Pay Unit
Remove Riprap	CY
Remove Sediment from Drainpipe	EA
Remove Concrete Sidewalk and Main Channel	SY

D. GG - GEOTEXTILES AND GEOGRID

1. Bid Item GG-02-001: Geotextile, Non-Woven

a. The measurement for payment for this item will be the actual number of square yards of geotextile placed as measured in plan view from the DRAWINGS but will not include the material buried in the anchor trenches or required lapping of the geotextile or slope variability, in accordance with the DRAWINGS and SPECIFICATIONS or as otherwise directed by the ENGINEER. The unit price will include all the CONTRACTOR's costs. This BID item includes, but is not limited to:

1) Excavating and preparing subgrade
2) Furnishing and installing all materials, including the geotextile, threading, anchors, and backfill as shown in the DRAWINGS.
3) Placing the geotextile per manufacturer's specifications
4) Replacing as directed by the ENGINEER.
5) Providing all other related and necessary labor, equipment, and materials to complete the WORK.

b. Payment will be based on units completed and accepted.

Bid Item	Pay Unit
Geotextile, Non-Woven	SY

E. ESP - EARTHWORK AND SUBGRADE PREPARATION

1. Bid Item ESP-02-002: Unclassified Excavation, complete in place.

a. The measurement for payment for this item will be the actual number of cubic yards excavated and used for fill or hauled from the site, measured, and computed by the average end area method or grid method (difference between existing and finished grade) in accordance with the DRAWINGS and SPECIFICATIONS or as otherwise directed by the ENGINEER. No measurement of this item will be made unless changes to the CONTRACT DOCUMENTS are made, in which case the ENGINEER will perform measurement of the modified volume. The quantity is based on the neat lines shown on the DRAWINGS and does not account for shrinkage or swell and does not include structural excavation or pre-excavation required to install other BID items. The unit price will include all the CONTRACTOR's costs. This BID item includes, but is not limited to:

1) Excavating, transporting, stockpiling with BMPs, and hauling

excavated material to fill areas within PROJECT, or properly disposing off site.
2) Placing, reworking, and compacting fill material
3) Cross hauling material
4) Moistening, drying, and reconditioning material, as necessary, to meet moisture-density requirements.
5) Surface roughening and terracing BMPs as shown on the DRAWINGS.
6) Removing and hauling deleterious materials
7) Providing all other related and necessary labor, equipment, and materials to complete the WORK.

b. Payment will be based on units completed and accepted.

Bid Item	**Pay Unit**
Unclassified Excavation, complete in place	CY

2. Bid Item ESP-03-001: Embankment Material, Complete in Place

a. The measurement for payment for this item will be the actual number of cubic yards of fill to be imported from an offsite source to be properly stockpiled and placed along the finished lines and grades in accordance with the DRAWINGS and SPECIFICATIONS or as otherwise directed by the ENGINEER. Measurement of this item will be completed by the ENGINEER and will be measured and computed by the average end area method or grid method (difference between existing and finished grade) in accordance with the DRAWINGS and SPECIFICATIONS or as otherwise directed by the ENGINEER. The unit price will include all the CONTRACTOR's costs. This BID item includes, but is not limited to:

1) Locating, supplying, and transporting of approved material for the embankment
2) Stockpiling with BMPs
3) Hauling, placing, and compacting fill material
4) Reconditioning material, as necessary, to meet moisture-density requirements
5) Surface roughening and terracing BMPs as shown on the DRAWINGS
6) Providing all other related and necessary labor, equipment, and materials required to complete the WORK

b. Payment will be based on units completed and accepted.

Bid Item	**Pay Unit**
Embankment Material, complete in place	CY

F. RW – ROCKWORK

1. Bid Item RW-01-001: Aggregate Base Course

a. The measurement for payment for this item will be the actual number of

tons of aggregate base course placed in accordance with the DRAWINGS and SPECIFICATIONS or as otherwise directed by the ENGINEER. The unit price will include all the CONTRACTOR's costs. This BID item includes, but is not limited to:

1) Furnishing, transporting, mixing, and placing all aggregate base course
2) Excavating, preparing subgrade, backfilling, and compacting to the lines and grades shown on the DRAWINGS
3) Removing any debris, disposing unsuitable material, and transporting, stockpiling, and placing suitable excess material in fill areas within the PROJECT
4) Providing all other related and necessary labor, equipment, and materials to complete the WORK.

b. Payment will be based on units completed and accepted.

Bid Item	**Pay Unit**
Aggregate Base Course	TON

2. Bid Item RW-02-001: Cobble, 40/40/20 mix of 2-4", 4-6” and 8-12" Gray/rose

a. The measurement for payment for this item will be the actual number of tons of cobble placed in accordance with the DRAWINGS and SPECIFICATIONS or as otherwise directed by the ENGINEER. The unit price will include all the CONTRACTOR's costs. This BID item includes, but is not limited to:

1) Furnishing, transporting, mixing, and placing all cobble material
2) Excavating, placing, and compacting volume replaced by cobble material
3) Excavating, backfilling, and compacting.
4) Providing all other related and necessary labor, equipment, and materials to complete the WORK

b. Payment will be based on units completed and accepted.

Bid Item	**Pay Unit**
Cobble, 40/40/20 mix of 2-4", 4-6” and 8-12" Gray/rose	TON

3. Bid Item RW-03-001: Boulder, Feature, 24-Inch

a. The measurement for payment for this item will be per ton of feature boulders placed in accordance with the DRAWINGS and SPECIFICATIONS or as otherwise directed by the ENGINEER. Boulders shall be buff color and sourced from Arkins Parks Stone Quarry or may be relocated from the existing riprap area as directed by the ENGINEER. The unit price will include all the CONTRACTOR's costs. This BID item includes, but is not limited to:

1) Excavating, backfilling, and compacting preparing and stabilizing subgrade
2) Furnishing, handling, stockpiling, and placing boulders
3) Disposing rejected boulders providing all other related and

necessary labor, equipment, and materials to complete the WORK.

b. Payment will be based on units completed and accepted.

Bid Item	**Pay Unit**
Feature Boulders, 24-Inch	TON

4. Bid Item RW-04-001: Boulder Forebay Wall, Concrete

a. The measurement for payment for this item will be the actual number of linear feet of concrete forebay wall, including buried depth, placed in accordance with the DRAWINGS and SPECIFICATIONS or as otherwise directed by the ENGINEER. The unit price will include all the CONTRACTOR's costs. This BID item includes, but is not limited to:

1) Excavating, backfilling, and compacting, preparing, and stabilizing subgrade
2) Furnishing, handling, stockpiling, and placing concrete
3) Placing bedding, as required
4) Placing, vibrating, finishing, and curing grout, including providing fiber-mesh and color in the grout, as required
5) Furnishing and installing weep drains
6) Furnishing and placing steel reinforcement
7) Providing all other related and necessary labor, equipment, and materials to complete the WORK

b. Payment will be based on units completed and accepted.

Bid Item	**Pay Unit**
Boulder Forebay Wall, Concrete	LF

5. Bid Item RW-05-001: Filter Material, Granular (3/4”)

a. The measurement for payment for this item will be the actual number of tons of filter material placed in accordance with the DRAWINGS and SPECIFICATIONS or as otherwise directed by the ENGINEER. The unit price will include all the CONTRACTOR's costs. This BID item includes, but is not limited to:

1) Furnishing, transporting, and placing all filter material
2) Excavating, preparing subgrade, backfilling, and compacting to the lines and final grades
3) Removing any debris, disposing unsuitable materials, and transporting, stockpiling, or hauling suitable excess material off site providing all other related and necessary labor, equipment, and materials to complete the WORK.

b. Payment will be based on units completed and accepted.

Bid Item	**Pay Unit**
Filter Material, Granular (3/4”)	TON

6. Bid Item RW-010-001: Riprap, Buried

a. The measurement for payment for this item will be the actual number of cubic yards of riprap placed in accordance with the DRAWINGS and SPECIFICATIONS or as otherwise directed by the ENGINEER. No measurement of this item will be made unless changes to the CONTRACT DOCUMENTS are made, in which case the ENGINEER will perform measurement of the modified volume. Measurement does not include the thickness of the bedding. The unit price will include all the CONTRACTOR's costs. This BID item includes, but is not limited to:

1) Transporting and placing all riprap, which will come from the existing riprap area, per the plans
2) Excavating, backfilling, and compacting/plating
3) Removing and disposing excavated material and debris
4) Providing compacted fill required to bury riprap to 6" depth
5) Providing all other related and necessary labor, equipment, and materials to complete the WORK.

b. Payment will be based on units completed and accepted.

Bid Item	**Pay Unit**
Riprap, Buried	CY

G. SS – STORM SEWER SYSTEM

1. Bid Item SS-01-001: Underdrain Pipe, 6" Pre-Wrapped Slotted HDPE

a. The measurement for payment for this item will be the actual number of linear feet of underdrain pipe placed in accordance with the DRAWINGS and SPECIFICATIONS or as otherwise directed by the ENGINEER. The unit price will include all the CONTRACTOR's costs. This BID item includes, but is not limited to:

1) Trenching, backfilling, and compacting as shown on the DRAWINGS.
2) Furnishing, transporting, and placing all rock, pipe, clean-outs, and fittings
3) Providing all other related and necessary labor, equipment, and materials to complete the WORK.

b. Payment will be based on units completed and accepted.

Bid Item	**Pay Unit**
Underdrain Pipe, 6" Pre-Wrapped Slotted HDPE	LF

H. SC – STRUCTURES AND MISCELLANEOUS CONCRETE

1. Bid Item SC-04-001: Concrete Curb and Gutter (Match Existing)

a. The measurement for payment for this item will be the actual number of

linear feet of concrete curb and gutter with pan placed as measured along the flow line in accordance with the DRAWINGS and SPECIFICATIONS or as otherwise directed by the ENGINEER. No measurement for payment will be made for curb and gutter replaced outside of that specified on the DRAWINGS and SPECIFICATIONS or for driveway radius returns, vehicle access ramps, and pedestrian ramps. No measurement for payment will be made for replacement of materials damaged by the CONTRACTOR's operations. The unit price will include all the CONTRACTOR's costs. This BID item includes, but is not limited to:

1) Sawcutting, removing, and disposing all damaged and broken concrete, gravel, or other surface debris
2) Disposing of material, excavating, backfilling, and compacting, including imported backfill material if no suitable onsite material is available
3) Furnishing, forming, and placing concrete
4) Furnishing and applying curing compounds
5) Furnishing colored concrete as shown on DRAWINGS
6) Furnishing fiber-mesh reinforcement as shown on DRAWINGS
7) Finishing and edging concrete surfaces
8) Sawing or tooling joints
9) Furnishing and installing steel reinforcement as shown on DRAWINGS
10) Furnishing and installing cold joint material and dowels
11) Providing hot and cold protection
12) Furnishing and compacting all material required for a stable subbase, including bedding as shown on DRAWINGS
13) Providing all other related and necessary labor, equipment, and materials to complete the WORK.

b. Payment will be based on units completed and accepted.

Bid Item	**Pay Unit**
Concrete Curb and Gutter (Match Existing)	LF

2. Bid Item SC-08-001: Concrete Sidewalk (Match Existing)

a. The measurement for payment for this item will be the actual number of square yards of concrete sidewalk placed in accordance with the DRAWINGS and SPECIFICATIONS or as otherwise directed by the ENGINEER. The unit price will include all the CONTRACTOR's costs. This BID item includes, but is not limited to:

1) Sawcutting, removing, and disposing all damaged and broken concrete, gravel, or other surface debris
2) Furnishing, forming, and placing concrete sidewalk, including coloring and fiber-mesh and materials not otherwise provided for elsewhere in the DRAWINGS and SPECIFICATIONS
3) Furnishing and installing expansion joints
4) Furnishing and applying the curing compounds
5) Furnishing and placing reinforcing steel
6) Furnishing, forming, and placing concrete thickened edge

7) Providing hot and cold protection
8) Sawcutting control joints, as required
9) Finishing and edging the concrete surface
10) Furnishing and compacting all material required for a stable subbase, including bedding, if required
11) Excavating, backfilling, and compacting adjacent to trail or structure
12) Providing all other related and necessary labor, equipment, and materials to complete the WORK.

b. Payment will be based on units completed and accepted.

Bid Item	**Pay Unit**
Concrete Sidewalk (Match Existing)	LF

3. Bid Item SC-12-001: Concrete Forebay (inclu. Grouted Boulders and Dissipation Blocks)
Bid Item SC-12-002: Add Weir Walls to Three Existing Channels

a. The measurement for payment for this item will be the actual number of square yards of concrete to include grouted boulders and dissipation blocks and weir walls placed in accordance with the DRAWINGS and SPECIFICATIONS or as otherwise directed by the ENGINEER. No measurement for payment will be made for removed structural concrete outside of that specified on the DRAWINGS and SPECIFICATIONS. No measurement for payment will be made for replacement of materials damaged by the CONTRACTOR's operations. The unit price will include all the CONTRACTOR's costs. This BID item includes, but is not limited to:

1) Furnishing, forming, and placing concrete, including fiber-mesh as shown on the DRAWINGS
2) Furnishing and applying curing compounds
3) Finishing and edging concrete surfaces
4) Sawing or tooling joints
5) Furnishing and installing cold joint material
6) Furnishing and placing reinforcing steel
7) Placing base course
8) Providing hot and cold protection
9) Furnishing, placing, and compacting backfill material.
10) Furnishing and placing grouted boulders and dissipation blocks within the forebay, as shown on the DRAWINGS.
11) Providing all other related and necessary labor, equipment, and materials to complete the WORK.

b. Payment will be based on units completed and accepted.

Bid Item	**Pay Unit**
Concrete Forebay (inclu. Grouted Boulders and Dissipation Blocks)	SY
Add Weir Walls to Three Existing Channels	LS

4. Bid Item SC-02-001: Safety Grate, inclu. Concrete Headwall

   a. The measurement for payment for this item will be per each trash rack placed in accordance with the DRAWINGS and SPECIFICATIONS or as otherwise directed by the ENGINEER. The unit price will include all the CONTRACTOR's costs. This BID item includes, but is not limited to:

      1) Excavating, backfilling, including furnishing, transporting, and placing material and compacting as required.
      2) Furnishing, forming, and placing concrete for the concrete headwall.
      3) Finishing and edging concrete.
      4) Furnishing, transporting, and installing all reinforcing steel and materials not otherwise provided for elsewhere in the DRAWINGS and SPECIFICATIONS
      5) Constructing the specific bedding, including the furnishing placing, and compacting of sand, gravel, and rock
      6) Furnishing and installing temporary plugs and sandbags
      7) Furnishing, fabricating, welding, transporting, and placing rash rack
      8) Blasting, priming, painting, and coating trash rack, as required.
      9) Providing and attaching necessary hardware to anchor trash rack as specified.
      10) Providing all other related and necessary labor, equipment, and materials to complete the WORK.

   b. Payment will be based on units completed and accepted.

Bid Item	**Pay Unit**
Safety Grate, inclu. Concrete Headwall	EA

I. RT – ROADS AND TRAILS

1. Bid Item RT-06-001: Signage (NO MOW) (Add Alt Item)

   a. The measurement for payment for this item will be the actual number of signs placed in accordance with the DRAWINGS and SPECIFICATIONS or as otherwise directed by the ENGINEER. The unit prices will include all the CONTRACTOR's costs. This BID item includes, but is not limited to:

      1) Excavating and removing material
      2) Backfilling and compacting
      3) Furnishing, handling, stockpiling, and placing approved product as shown on the DRAWINGS and in accordance with manufacturer's specifications.
      4) Providing all other related work and necessary labor equipment, and materials to complete the WORK.

   b. Payment will be based on units completed and accepted.

Bid Item	Pay Unit
Signage (NO MOW) (Add Alt Item)	EA

J. LS – LANDSCAPING

1. Bid Item LS-06-001: Irrigation System

a. The measurement for payment for this item will a lump sum for all work to install a temporary irrigation system to ensure the proper watering conditions for seed growth and establishment in accordance with the DRAWINGS and SPECIFICATIONS or as otherwise directed by the ENGINEER. The unit price will include all the CONTRACTOR's costs. This BID item includes, but is not limited to:

1) Furnishing, transporting, and installing all pipe, heads, valves, valve boxes, couplings, elbows, fittings, and water meters, if required
2) Connecting to water supply and all associated fees, including tap fees as applicable
3) Raising existing sprinkler heads to account for new grading
4) Excavating, backfilling, and compacting
5) Testing and maintenance
6) Providing all other related and necessary labor, equipment, and materials to complete the WORK.

b. Payment will be based on the percentage of completed and accepted WORK.

Bid Item	Pay Unit
Irrigation System	LS

2. Bid Item LS-10-001: Seeding, Channel

a. The measurement for payment for this item will be the actual number of square feet of seeding placed in accordance with the DRAWINGS and SPECIFICATIONS or as otherwise directed by the ENGINEER. The unit price will include all the CONTRACTOR's costs. This BID item includes, but is not limited to:

1) Preparing soil, ripping, tilling and fine grading
2) Furnishing seed
3) Drilling or broadcasting seed
4) Installing temporary fence and barriers as shown on the DRAWINGS
5) Maintaining all seeded areas
6) Providing all other related and necessary labor, equipment, and materials to complete the WORK.

b. Payment will be based on units completed and accepted.

Bid Item	Pay Unit

Seeding, Channel	SF

3. Bid Item LS-11-001 to LS-11-005: Shrub / Planting, (5 GAL)

   a. The measurement for payment for this item will be per each shrub placed in accordance with the DRAWINGS and SPECIFICATIONS or as otherwise directed by the ENGINEER. The unit price will include all the CONTRACTOR's costs. This BID item includes, but is not limited to:

      1) Providing and installing plants
      2) Excavating
      3) Preparing soil and adding soil amendments
      4) Mulching
      5) Providing all other related and necessary labor, equipment, and materials to complete the WORK.

   b. Payment will be based on units completed and accepted.

Bid Item	**Pay Unit**
Shrub / Planting, (5 GAL)	EA

4. Bid Item LS-17-001: Soil Preparation, Compost

   a. The measurement for payment for this item will be the actual number of cubic yards of soil amendment placed in accordance with the DRAWINGS and SPECIFICATIONS or as otherwise directed by the ENGINEER. The unit price will include all the CONTRACTOR's costs. This BID item includes, but is not limited to:

      1) Furnishing, transporting, preparing, and placing soil amendments
      2) Providing all other related and necessary labor, equipment, and materials to complete the WORK.

   b. Payment will be based on units completed and accepted.

Bid Item	**Pay Unit**
Soil Preparation, Compost	CY

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

SECTION 03 21 00

REINFORCING STEEL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. This WORK shall consist of furnishing and placing reinforcing steel in accordance with these SPECIFICATIONS and in conformity with the DRAWINGS.

1.02 RELATED SECTIONS

A. The following is a list of SPECIFICATIONS which may be related to this section:

1. Section 03 31 00, Structural Concrete.

1.03 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Association of State and Highway Transportation Officials (AASHTO):

a. M31M/M31, Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.

b. AASHTO Standard Specifications for Welding of Structural Steel Highway Bridges.

2. American Concrete Institute (ACI):

a. ACI Detailing Manual.

b. 117, Specifications for Tolerance for Concrete Construction and Materials.

c. 318, Building Code Requirements for Structural Concrete.

3. American Welding Society (AWS):

a. D1.1/D1.1M, Structural Welding Code - Steel.

b. D1.4/D1.4M, Structural Welding Code - Reinforcing Steel.

c. D2.0, Welded Highway and Railway Bridges.

4. ASTM International (ASTM):

a. A82/A82M, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.

b. A497/A497M, Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete.

c. A615, Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.

d. A996/A996M, Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement.

e. A706/A706M, Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.

f. A767/A767M, Standard Specification for Zinc-coated (Galvanized) Steel Bars for Concrete Reinforcement.

g. A775/A775M, Standard Specification for Epoxy-coated Steel Reinforcing.

5. Concrete Reinforcing Steel Institute (CRSI):

a. Manual of Standard Practice.

b. Placing Reinforcing Bars.

1.04 SUBMITTALS

A. Two copies of a list of all reinforcing steel and bending diagrams shall be furnished to the ENGINEER at the site of the work at least one week before the placing of reinforcing steel is begun. Such lists will not be reviewed for accuracy. The CONTRACTOR shall be responsible for the accuracy of the lists and for furnishing and placing all reinforcing steel in accordance with the details shown on the plans.

1.05 DELIVERY, STORAGE, AND PROTECTION

A. Reinforcing steel shall be stored off of the ground and protected from oil or other materials detrimental to the steel or bonding capability of the reinforcing bar. Epoxy-coated reinforcing bars shall be stored on protective cribbing.

PART 2 PRODUCTS

2.01 REINFORCING STEEL

A. Deformed Bars: All bar steel reinforcement shall be of the deformed type, ASTM A615, AASHTO M31M/M31, and Grade (40 or 60) as specified on the DRAWINGS.

B. Spirals:

1. Spirals, hot-rolled plain or deformed bars per ASTM A615, Grade 60 or cold drawn wire per ASTM A82/A82M as specified on the DRAWINGS.

2. Spirals for columns shall have two (2) “spacers” with a section modulus >0.030in^3 in order to maintain the proper pitch and spacing.

C. Epoxy-Coated Reinforcing Bars: Epoxy-coated reinforcing bars shall conform to ASTM A775/A775M. When required, damaged epoxy coating shall be repaired with

patching material conforming to ASTM A775/A775M in accordance with the material manufacturer's recommendations.

D. Zinc-coated (Galvanized Reinforcing Bars): Zinc-coated reinforcing bars shall conform to ASTM A767/A767M. When required, damaged zinc coating shall be repaired with a zinc-rich formulation conforming to ASTM A767/A767M.

E. Welded Wire Fabric: All welded wire fabric reinforcement shall conform to ASTM A497/A497M.

F. Identification:

1. Bundles of reinforcing bars and wire spirals shall be tagged, with a metal tag, showing specification, grade, size, quantity, and suitable identification to permit checking, sorting, and placing. When bar marks are used to identify reinforcing bars on the DRAWINGS, the bar mark shall be shown on the tag. Tags shall be removed prior to concrete placement.

2. Bundles of flat sheets and rolls of welded wire fabric shall be tagged similar to reinforcing bars.

2.02 TIE WIRE

A. 16 gauge wire ties, manufactured by American Wire Tie, Inc., or equal. When epoxy-coated reinforcing steel is shown on the DRAWINGS, PVC coated wire ties shall be used. The minimum PVC coating shall be 0.7 mils.

2.03 BAR SUPPORTS

A. General: Bar supports and spacing shall be in accordance with the CRSI Manual of Standard Practice, Chapter 3, a maximum of four (4) feet, or as required by the DRAWINGS.

B. Floor Slabs: Uncoated steel or non-metallic composite chairs shall be used unless otherwise shown on the DRAWINGS. If required by ENGINEER, the chair shall be stapled on a bearing pad to prevent chair displacement. The bearing pad shall be made of exterior grade plywood and be approximately five (5) inches square.

C. Columns: Plastic "space wheels" manufactured by Aztec (Model DO 12/40), or equal, are required.

D. Epoxy-Coated and Zinc-Coated Bar Supports: Epoxy-coated reinforcing bars supported from formwork shall rest on coated wire bar supports made of dielectric or other acceptable materials. Wire supports shall be fully coated with dielectric material, compatible with concrete. Reinforcing bars used as support bars shall be epoxy-coated. In walls reinforced with epoxy-coated bars, spreader bars shall be epoxy-coated. Proprietary combination bar clips and spreaders used in walls with epoxy-coated reinforcing shall be made of corrosion-resistant material or coated with dielectric material.

2.04 FABRICATION

A. Fabrication tolerances for straight and bent bars shall be in accordance with the requirements of Subsection 4.3, Tolerance, of ACI 315 and the CRSI Manual of Standard Practice.

PART 3 EXECUTION

3.01 GENERAL

A. Rust, seams, surface irregularities, or mill scale shall not be cause for rejection provided that the weight and height of deformations of a hand-wire-brushed test specimen are not less than the applicable ASTM Specification.

3.02 BAR LIST

A. CONTRACTOR shall be responsible for the accuracy of the lists and for furnishing and placing all reinforcing steel in accordance with the details shown on the DRAWINGS.

B. Bar lists and bending diagrams for structures, which are included on the DRAWINGS, do not have to be furnished by CONTRACTOR. When bar lists and bending diagrams are included on the DRAWINGS, they are intended for estimating approximate quantities. CONTRACTOR shall verify the quantity, size, and shape of the bar reinforcement against those shown on the DRAWINGS and make any necessary corrections before ordering.

3.03 BENDING

A. All reinforcing bars shall be bent cold. Bars partially embedded in concrete shall not be field bent, except as shown on the DRAWINGS or permitted. Bars shall not be bent or straightened in a manner that may injure the material.

3.04 SPIRALS

A. One and one-half (1-1/2) finishing bends are required at the top and bottom of the spiral. Spacers shall be provided in accordance with Chapter 5, Section 9 of the CRSI Manual of Standard Practice. Welding as an aid to fabrication and/or installation is not permitted.

3.05 PLACING AND FASTENING

A. When placed in the WORK, the reinforcing bars shall be free from dirt, loose mill scale, paint, oil, loose rust, or other foreign substance.

B. The placing, fastening, splicing, and supporting of reinforcing steel and wire mesh or bar mat reinforcement shall be in accordance with the DRAWINGS and the latest edition of “CRSI Placing Reinforcing Bars.” In case of discrepancy between the DRAWINGS and the CRSI publication stated above, the DRAWINGS shall govern. Reinforcement shall be placed within the tolerances provided in ACI 117.

C. Steel reinforcement shall be accurately placed in the positions shown on the DRAWINGS and firmly held during the placing and setting of concrete by means of

spacer strips, stays, metal chairs or other approved devices or supports. Precast concrete bricks or other types of bricks are not permitted for support of reinforcement in footings, slabs, or any other part of the work. Chair and bolster supports for slabs and walls shall be spaced at a maximum of four- (4-) foot centers unless otherwise shown on the DRAWINGS. Staples used to attach bar supports to wall and roof forms shall have the staple "tails" clipped after form removal. For columns, three (3) wheels, spaced one hundred twenty degrees (120°) apart, shall be placed every four (4) feet of column height. CONTRACTOR may increase the column spiral pitch if a conflict occurs with the wheel. Pre-tied column reinforcing steel lowered into column forms shall be lowered vertically to prevent damage to the space wheels.

D. Bars shall be securely tied at fifty percent (50%) of all intersections except where spacing is less than one (1) foot in each direction, when alternate intersections shall be tied unless otherwise called out on the DRAWINGS or in applicable SPECIFICATIONS. Tying of steel by spot welding shall not be permitted unless specifically authorized by ENGINEER. The placing and securing of the reinforcement in any unit or section shall be accepted by ENGINEER before any concrete is placed in any such unit or section.

E. Bundle bars shall be tied together at not more than six- (6-) foot centers.

3.06 SPLICING

A. Bar steel reinforcement shall be furnished in the full lengths indicated on the DRAWINGS. Splicing of bars, except where shown on the DRAWINGS, shall not be permitted without the written acceptance of ENGINEER. Splices shall be staggered. In cases where permission is granted to splice bars, other than those shown on the DRAWINGS, the additional material required for the lap shall be furnished by CONTRACTOR at CONTRACTOR's own expense. The minimum distance between staggered splices for reinforcing bars shall be the length required for a lapped splice in the bar. All splices shall be full contact splices.

B. Splices shall not be permitted at points where the section is not sufficient to provide a minimum distance of two (2) inches between the splice and the nearest adjacent bar or the surface of the concrete.

C. Welding of reinforcement shall be done only if detailed on the DRAWINGS or if authorized by ENGINEER in writing. Welding shall be done by a certified welder. The welding shall conform to AWS D1.4/D1.4M with the modifications and additions specified hereinafter. Where AWS D2.0 Specifications for Welded Highway and Railway Bridges is referenced, the reference shall be construed to be for AWS D1.1. Where the term AWS D1.1/D1.1M is used it shall mean the American Welding Society Structural Welding Code, D1.5/D1.5M as modified and amended by the AASHTO Standard Specifications for Welding of Structural Steel Highway Bridges. After completion of welding, coating damage to coated reinforcing steel bars shall be repaired.

D. When required or permitted, a mechanical connection may be used to splice reinforcing steel bars or as substitution for dowel bars. The mechanical connection shall be capable of developing a minimum of one hundred twenty five percent (125%) of the yield strength of the reinforcing bar in both tension and compression. All parts of mechanical connections used on coated bars, including steel splice

sleeves, bolts, and nuts shall be coated with the same material used for repair of coating damage.

3.07 CUTTING

A. When coated reinforcing bars are cut in the field, the ends of the bars shall be coated with the same material used for repair of coating damage.

END OF SECTION

SECTION 03 31 00

STRUCTURAL CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. CONTRACTOR shall furnish all labor, tools, and equipment for the construction of reinforced cast-in-place concrete.

B. This section includes basic finishing and curing methods, accessory control, and expansion and contraction joint devices.

1.02 RELATED SECTIONS

A. The following is a list of SPECIFICATIONS which may be related to this section:

1. Section 03 11 00, Concrete Forming.

2. Section 03 15 00, Construction Joints.

3. Section 03 15 13, Waterstops.

4. Section 03 21 00, Reinforcing Steel.

5. Section 03 35 00, Concrete Finishing.

6. Section 03 39 00, Concrete Curing.

7. Section 07 92 00, Sealants.

8. Section 32 16 00, Sidewalks, Curbs, and Gutters.

1.03 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. ASTM International (ASTM):

a. C33, Standard Specification for Concrete Aggregates.

b. C94/C94M, Standard Specification for Ready-Mixed Concrete.

c. C150, Standard Specification for Portland cement.

d. C260, Standard Specification for Air-entraining Admixtures for Concrete.

e. C494/C494M, Standard Specification for Chemical Admixtures for Concrete.

f. C618, Standard Specification for Coal and Raw or Calcined Natural Pozzolan for Use in Concrete.

g. C979, Standard Specification for Pigments for Integrally Colored Concrete.

h. C1059, Standard Specification for Latex Agents for Bonding Fresh To Hardened Concrete.

i. D994, Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).

2. American Concrete Institute (ACI):

a. 211, Standard Practice for Selecting Proportions for Concrete.

b. 301, Specifications for Structural Concrete.

c. 304, Guide for Measuring, Mixing, Transporting and Placing Concrete.

d. 305.1, Specification for Hot Weather Concreting.

e. 306.1, Specification for Cold Weather Concreting.

f. 309, Standard Practice for Consolidating Concrete.

g. 318, Building Code Requirements for Structural Concrete.

h. 504, Guide to Joint Sealants.

1.04 SUBMITTALS

A. Provide product data on the following:

1. Ready-mixed concrete mix designs.

2. Fly ash.

3. Admixtures (such as air-entraining and water-reducing admixtures).

4. Form release agents.

5. Bonding agents.

6. Grout.

1.05 QUALITY ASSURANCE

A. Qualifications: The ready-mixed concrete supplier to CONTRACTOR shall have the capability to produce and deliver concrete, meeting the requirements of the DRAWINGS and SPECIFICATIONS. The supplier shall have a contingency plan for a back-up plant in the event of a mechanical malfunction of one of the primary plant(s).

1.06 DELIVERY, STORAGE, AND HANDLING

A. The ready-mixed concrete truck driver shall provide the batch ticket to ENGINEER at the time of concrete delivery. The ticket shall summarize the following information legibly in an easily discernible table:

1. Weight in pounds of all materials, excepting the water reducing and air-entraining agents which shall be in ounces.

2. Cubic yards batched.

3. The ratio of water to cementitious (W/C) materials ratio.

4. Temperature of the concrete at the time it was batched.

5. Time of batching.

6. Free moisture in the fine and coarse aggregates in percent of weight of aggregate.

7. Gallons of water that may be added at the site without exceeding the permissible W/C ratio.

8. Concrete Mix Design Number.

PART 2 PRODUCTS

2.01 MATERIALS

A. General: Acquire cement and aggregate from the same source for all work.

B. Cement: Cement shall be Portland cement Type II, unless otherwise indicated on the DRAWINGS.

C. Aggregate:

1. Fine Aggregate: Fine aggregate shall consist of hard, strong, durable particles complying with the provisions of ASTM C33.

2. Coarse Aggregate: Coarse aggregate shall conform to the provisions of ASTM C33. Aggregate shall be crushed aggregate or angular screened natural aggregate. Hydraulic - cement aggregate is unacceptable.

D. Water: Water shall be clean and free from injurious amounts of oils, acids, alkalis, salts, organic materials, or other substances that may be deleterious to concrete or steel. Mixing water for prestressed, pretensioned and prestressed post-tensioned concrete or for concrete which will contain aluminum embedments shall not contain deleterious amounts of chloride ion.

E. Admixtures: Admixtures to be used in concrete shall be subject to prior acceptance by ENGINEER. The admixture shall maintain the same composition and performance throughout the WORK as the product used in the concrete proportions established in accordance with ACI 211. Admixtures containing chloride ions shall not be used.

1. Air Entrainment:

a. An air-entraining agent shall be used in all concrete. The agent used shall conform to ASTM C260.

b. Unless otherwise shown on the DRAWINGS, the amount of air-entraining agent used in each concrete mix shall be such as will affect the entrainment of the percentage of air shown in the following tabulation in the concrete as discharged from the mixer or pumper discharge hose if applicable. Table 1 is applicable for concrete strengths less than five thousand (5,000) psi.

Table 1

Nominal Max. Aggregate Size (Inch)	Average Air Content (Percent)	
	Severe Exposure	Moderate Exposure
3/8	7-1/2 ± 1-1/2	6 ± 1-1/2
3/4	6 ± 1-1/2	5 ± 1-1/2
1-1/2	5-1/2 ± 1-1/2	4-1/2 ± 1-1/2

c. The level of exposure shall be determined by ENGINEER.

d. When a batch of concrete delivered to the PROJECT does not conform to the minimum specified air content, an air-entraining admixture may be added, one (1) time only for the batch, at CONTRACTOR's option prior to consideration for rejection. After the admixture is added, the concrete shall be remixed for a minimum of twenty (20) revolutions of the mixer drum at mixing speed. The concrete shall then be retested and if found acceptable, may be placed in accordance with the SPECIFICATIONS.

2. Water Reducing, Set-Controlling Admixture: CONTRACTOR shall use a "mid-range" water reducing, set controlling admixture, Polyheed 997, or equal. The water-reducing admixture shall be used in all concrete and shall conform to ASTM C494/C494M, specifically Types A, B, C, D, and E.

3. Finely Divided Mineral Admixtures (Fly Ash): Mineral admixtures shall be limited to fly ash conforming to ASTM C618, Class C or Class F. Class C fly ash is not permitted where sulfate resistant cement is required.

F. Evaporative Retardant: In accordance with Section 03 29 00, Concrete Curing.

G. Bituminous Coating: Bituminous Coating for aluminum pipes will be in accordance with AASHTO M-190 Type A.

H. Grout: In accordance with Section 03 60 00, Grouting.

I. Epoxy Bonding Agent:

1. Master Builders; Concresive Liquid (LPL).

2. Master Builders; Concresive Standard Liquid.

2.02 COMPRESSIVE STRENGTH

A. Concrete compressive strength requirements consist of a minimum strength that must be obtained before various loads of stresses are applied to the concrete and, for concrete designated by strength, a minimum strength at the age of twenty eight (28) days. Unless otherwise shown on the DRAWINGS, the twenty eight (28) day compressive strength of structural concrete shall be a minimum of four thousand five hundred (4,500) psi.

B. The mix shall be designed for required strengths in accordance with ACI 301. The ratio of water to the sum of concrete plus pozzolan shall not exceed 0.45 by weight for durable, watertight, concrete. The amount of fly ash in the mix shall be between fifteen and twenty percent (15 and 20%) by weight of the total cementitious materials.

C. Unless otherwise permitted or specified in the DRAWINGS, the concrete shall be proportioned and produced to have a slump not to exceed four (4) inches or less than two and one-half (2-1/2) inches. Concrete not consolidated by internal vibration shall be proportioned to have a slump not to exceed five and one-half (5-1/2) inches or less than four (4) inches.

2.03 SOURCE QUALITY CONTROL

A. Batching:

1. Measuring and batching of materials shall be done at a batching plant.

2. Portland Cement:

a. Either sacked or bulk cement may be used. No fraction of a sack of cement shall be used in a batch of concrete unless the cement is weighed. Bulk cement shall be weighed on scales separate and distinct from the aggregate hopper or hoppers. Batching shall be such that the accuracy of batching shall be plus or minus one percent of the required weight.

3. Water:

    a. Unless water is to be weighed, the water-measuring equipment shall include an auxiliary tank from which the measuring tank shall be filled. In lieu of the volume method, CONTRACTOR shall be permitted to use a water-metering device.

4. Aggregates:

    a. Aggregates shall be handled from stockpiles or other sources to the batching plant in such a manner as to secure a uniform grading of the material. Aggregates that have become segregated, or mixed with earth or foreign material, shall not be used. Batching shall be so conducted as to result in the weights of material required for each type aggregate within a tolerance of two percent (2%).

    b. Free water contents of the coarse and fine aggregates shall be continuously tested and concrete mixture adjusted for moisture conditions of the aggregate in order to meet the designated water/cement ratio.

5. Fine Aggregate:

    a. The proportion of fine aggregate shall be between thirty six and forty four percent (36 and 44%) by volume of the total aggregates in the concrete.

B. Mixing:

1. Ready-mixed concrete shall be either “central mixed” or “shrink mixed” concrete as defined in ASTM C94/C94M. “Truck mixed” concrete as defined in ASTM C94/C94M shall not be permitted. Mixing time shall be measured from the time water is added to the mix, or cement contacts the aggregate. All concrete shall be homogeneous and thoroughly mixed, and there shall be no lumps or evidence of undispersed cement. Mixers and agitators, which have an accumulation of hard concrete or mortar, shall not be used. Ready-mixed concrete shall be mixed and transported in accordance with ASTM C94/C94M.

2. The temperature of mixed concrete, immediately before placing shall not be less than fifty degrees Fahrenheit (50°F) or more than ninety degrees Fahrenheit (90°F). Aggregates and water shall be heated or cooled as necessary to produce concrete within these temperature limits. Neither aggregates nor mixing water shall be heated to exceed one hundred fifty degrees Fahrenheit (150°F).

3. The time elapsing from the time water is added to the mix (or the cement comes in contact with aggregate) until the concrete is deposited in place at the site of the WORK shall not exceed sixty (60) minutes when the concrete is hauled in non-agitating trucks, nor more than ninety (90) minutes when hauled in truck mixers or truck agitators.

4. The batch shall be so charged into the drum that a portion of the mixing water shall enter in advance of the cement and aggregates. The flow of water shall be uniform and all water shall be in the drum by the end of the first one-quarter (1/4) of the specified mixing time.

5. Cement shall be charged into the mixer by means that will not result in loss of cement because of the effect of wind, or in accumulation of cement on surfaces of hoppers or in other conditions which reduce or vary the required quantity of cement in the concrete mixture.

C. Transporting Mixed Concrete; Mixed Concrete or Truck Mixers:

1. Transporting of mixed concrete shall conform to ASTM C94/C94M.

2. Truck agitators shall be loaded not to exceed the manufacturer's guaranteed capacity. They shall maintain the mixed concrete in a thoroughly mixed and uniform mass during hauling.

3. No additional mixing water shall be incorporated into the concrete during hauling or after arrival at the delivery point, unless approved by ENGINEER. If additional water is to be incorporated into the concrete at the site, the drum shall be revolved not less than thirty (30) revolutions at mixing speed after the water is added and before discharge is commenced. One (1) addition of water at the site to adjust mix workability is permitted but the maximum water cement ratio shall not be exceeded.

4. CONTRACTOR shall furnish a water-measuring device in good working condition, mounted on each transit mix truck, for measuring the water added to the mix on the site. All water tanks on transit mix trucks shall be filled prior to being batched and arrive at the construction site one hundred percent (100%) full.

5. Each load of ready mixed concrete delivered at the job shall be accompanied by the ticket in accordance with Article Delivery, Storage, and Handling.

PART 3 EXECUTION

3.01 PREPARATION

A. Prior to placing concrete, CONTRACTOR shall remove all debris and thoroughly dampen the surfaces that may be in contact with the concrete to be placed.

B. CONTRACTOR shall use compressed air from an air compressor to blow out construction debris and dirt at the bottom of members to be placed such as walls, beams, and columns, prior to final placement of forms that may obscure any joint. CONTRACTOR shall demonstrate to ENGINEER that all debris, such as concrete particles, saw dust, loose tie wire, bar tags, tape, trash and dirt, have been thoroughly removed.

C. All surfaces of forms and embedded materials that have become encrusted with dried mortar or grout from concrete previously placed shall be cleaned of all such mortar or grout before the surrounding or adjacent concrete is placed.

D. No concrete shall be placed until all formwork, reinforcement, installation of parts to be embedded, bracing of forms, and preparation of surfaces involved in the placing have been reviewed by ENGINEER.

E. Immediately before placing concrete, all surfaces upon or against which the concrete is to be placed shall be free from standing water, mud, debris, or loose materials.

F. No concrete shall be placed when form surfaces that may be in contact with the concrete, reinforcement, embedded items or sub-base is less than thirty two degrees Fahrenheit (32°F). When the mean daily outdoor temperature is less than forty degrees Fahrenheit (40°F), the temperature of the concrete shall be maintained between fifty degrees Fahrenheit (50°F) and seventy degrees Fahrenheit (70°F) for the required curing period. When necessary, arrangements for heating, covering, insulating, or housing the concrete work shall be made in advance of placement and shall be adequate to maintain the required temperature without injury as a result of concentration of heat. Combustion heaters shall not be used during the first twenty four (24) hours unless precautions are taken to prevent exposure of the concrete to exhaust gases which contain carbon dioxide.

G. Concrete shall not be placed against forms exposed to heating unless the temperature of the forms is first cooled to less than or equal to ninety degrees Fahrenheit (≤90°F).

3.02 PLACEMENT

A. Placement shall conform to ACI 301, Chapter 8, ACI 304, ACI 306.1, ACI 305.1, and ACI 309. No concrete shall be placed in water except with the written permission of ENGINEER. The surfaces of absorptive materials against or upon which concrete is to be placed shall be moistened thoroughly so that moisture will not be drawn from the freshly placed concrete. The concrete shall be placed by equipment that will prevent segregation or loss of ingredients. The stream of concrete shall not be allowed to separate by permitting it to fall freely over rods, spacers or other embedded materials.

B. Unless otherwise called out in these SPECIFICATIONS or shown on the DRAWINGS, the placement lift depth of concrete in walls shall be limited to two (2) feet or less to minimize surface defects such as air voids that can form on concrete surfaces. Lift depths shall be limited to one (1) foot if, in the opinion of ENGINEER, the quality of the finish is unacceptable at the two- (2-) foot lift depth.

C. Concrete shall be placed so as to avoid segregation of the materials and the displacement of the reinforcement.

D. Concrete shall not be dropped more than five (5) feet unless confined by closed chutes or pipes. Care shall be taken to fill each part of the form by depositing the concrete as near final position as possible. The coarse aggregate shall be worked back from the forms and worked around the reinforcement without displacing the bars. After initial set of the concrete, the forms shall not be jarred and strain shall not be placed on the ends of projecting reinforcement.

E. Where steep slopes are required, the chutes shall be equipped with baffle boards or be in short lengths that reverse the direction of movement.

F. Concrete shall not be pumped through aluminum alloy pipe.

G. All chutes, troughs, and pipes shall be kept clean and free from coatings of hardened concrete.

3.03 CONSOLIDATION

A. Concrete vibrators for consolidating concrete shall be two and one-half inch (2-1/2") diameter “high cycle” vibrators with a frequency under load of eight thousand (8,000) to ten thousand four hundred (10,400) vibrations per minute (vpm). Concrete vibrators of lesser capacity are unacceptable for use in any part of the construction. CONTRACTOR shall have at least one standby concrete vibrator ready for use for every two (2) concrete vibrators in use during a concrete placement.

B. All concrete shall be thoroughly consolidated with internal vibrators as recommended in ACI 309 immediately after deposition. The concrete shall be thoroughly worked around the reinforcing steel, around embedded items and into corners of forms. Vibration shall be supplemented by spading, rodding, or forking to eliminate all honeycomb and voids around embedded items.

C. The vibrator shall be inserted vertically, allowing it to penetrate rapidly to the bottom of the lift and at least six (6) inches into the previous lift. The vibrator shall be held at the bottom of lift for five to fifteen (5 - 15) seconds. The vibrator shall be pulled up at a rate of about three (3) inches per second.

D. The vibrator shall be inserted so that the fields of action overlap. The field of action is approximately eight (8) times the vibrator’s head diameter. Thus for a two and one-half (2-1/2) inch diameter vibrator, the spacing of each insertion shall be approximately twenty (20) inches.

E. Vibration shall be stopped when the concrete surface takes a sheen and large air bubbles no longer escape.

F. Do not use a vibrator to move concrete horizontally.

3.04 OPENINGS AND INSERTS

A. Pipe sleeves, inserts for pipe connections, anchors, and forms for pipe holes shall be accurately placed and securely fastened to the forms in such a manner that the placing of concrete shall not alter their alignment or location. In the event that openings are inadvertently omitted or improperly placed, ENGINEER may require the concrete to be cored at the proper location. Filling of improperly placed openings shall be done with expansive grout or dry pack or mortar applied with an accepted epoxy adhesive. The surfaces of the opening shall be roughened prior to filling.

3.05 EMBEDDED ITEMS

A. At the time of concrete placement, embedded items shall be clean and free from mud, oil, and other coatings that may adversely affect bonding capacity. Aluminum embedments shall be coated with a bituminous material to prevent electrolytic action between the embedded item and reinforcing steel that results in concrete deterioration. Embedment items shall be accurately placed and securely fastened to the forms in such a manner that the placing of concrete shall not alter their alignment or location. Contact between embedded items and reinforcing steel or tendon ducts is unacceptable and is not permitted.

3.06 CONSTRUCTION JOINTS

A. The location of all construction joints shall be subject to the acceptance of ENGINEER. The surface of all construction joints shall be thoroughly cleaned and all laitance and standing water removed. Clean aggregate shall be exposed by abrasive blast cleaning. Wire brushing and air water jets may be used while concrete is fresh provided results are equal to abrasive blast cleaning. Construction joints shall be keyed at right angle to the direction of shear. Except where otherwise shown on the DRAWINGS, keyways shall be at least one and one-half (1-1/2) inch in depth over at least twenty five percent (25%) of the area of the section.

3.07 EVAPORATIVE RETARDANT

A. The use of an evaporative retardant is required to assist in proper placement of concrete in accordance with Section 03 29 00, Concrete Curing. Apply two (2) times; after screeding and after the first floating operation. The retardant should be applied at a rate of one (1) gallon of sprayable solution per two hundred to four hundred (200 - 400) square feet by spraying with an industrial type sprayer. If the nozzle of the sprayer becomes plugged, CONTRACTOR shall clean, or replace, the nozzle. Under no circumstances shall the retardant be used except by spraying a mist with a nozzle. The retardant shall be applied in strict conformance with the manufacturer's recommendations and precautions. In no case shall the retardant be used as a finishing agent. The use of an evaporative retardant requires review and approval by ENGINEER.

3.08 FIELD QUALITY CONTROL

A. CONTRACTOR shall assist OWNER or the concrete testing consultant as requested during the performance of quality control testing. When concrete is placed using a concrete pumper, concrete for testing will be taken from the pumper discharge hose.

END OF SECTION

SECTION 31 23 00

EXCAVATION AND FILL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. This WORK shall consist of excavation, embankment fill, disposal of excess material, shaping, and compaction of all material encountered within the limits of WORK, including excavation and fill for structures. The excavation shall include, but is not limited to, the native soils which shall be excavated for the PROJECT WORK. All WORK shall be completed in accordance with these SPECIFICATIONS, the lines and grades, and typical cross-sections shown on the DRAWINGS.

B. All excavation shall be classified, "unclassified excavation," or "muck excavation" or "rock excavation," as hereafter described. All embankment shall be classified "embankment material" as hereafter described.

1.02 RELATED SECTIONS

A. The following is a list of SPECIFICATIONS which may be related to this section:

1. Section 01 57 19, Temporary Environmental Controls

2. Section 31 11 00, Clearing and Grubbing.

3. Section 31 23 19, Dewatering.

4. Section 31 25 00, Erosion and Sedimentation Control

1.03 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. ASTM International (ASTM):

a. D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft3 (600 kN-m/m3)).

b. D4253, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.

1.04 DEFINITIONS

A. Embankment Material shall consist of approved material acquired from excavation or from outside sources, hauled and placed in embankments.

B. Muck Excavation shall consist of the removal of mixtures of soils and organic matter not suitable for foundation material and replacement with approved material.

C. Rock Excavation shall consist of igneous, metamorphic and sedimentary rock which cannot be excavated without the use of rippers, and all boulders or other detached

stones each having a volume of one-half (1/2) cubic yard or more, as determined by physical or visual measurement. It shall also include replacement with approved material as required.

D. Unclassified Excavation shall consist of the excavation of all materials of whatever character required of the WORK, obtained within the PROJECT limits.

1.05 QUALITY ASSURANCE

A. Final topography and/or cross-sections shall be surveyed of areas that are to finished grade and compared to the design section for accuracy.

B. Final grade shall match design grades within the tolerances discussed in PART 3 EXECUTION.

PART 2 PRODUCTS

2.01 MATERIALS

A. Embankment Material may consist of approved material acquired from excavations or material hauled from outside the PROJECT limits.

B. Suitable material identified onsite shall be used first for embankments and backfill.

C. Excess excavated native soils which are not used as embankment or backfill shall become the property of CONTRACTOR and shall be disposed of offsite by CONTRACTOR, in a location acceptable to ENGINEER.

D. Muck Excavation shall also include the replacement of excavated muck with uniformly graded rock, riprap, onsite or imported soils, or other material, whichever is most suitable for the specific situation encountered.

E. ENGINEER will determine which type of aggregate or other material which shall be used after observing the specific site conditions.

F. Structural Backfill:

1. When specified on the DRAWINGS or as required by ENGINEER, Class I structural backfill shall meet the following gradation requirements:

Sieve Size	**% By Weight Passing Square Mesh Sieves**
2-inch	100
No. 4	30 - 100
No. 50	10 – 60
No. 200	5 – 20

2. In addition, this material shall have a liquid limit not exceeding thirty five (35) and a plasticity index of not over six (6).

3. Impervious structural backfill, where shown or specified, shall consist of material having one hundred percent (100%) finer than two (2) inches in diameter and a minimum of thirty-five percent (35%) passing a No. 200 U.S. Standard Sieve.

PART 3 EXECUTION

3.01 GENERAL EXCAVATION/EMBANKMENT

A. General:

1. The excavation and embankment shall be finished to reasonably smooth and uniform surfaces.

2. Variation from the subgrade plane shall not be more than eight-tenths (0.08) foot in soil or more than eight-tenths (0.08) foot above or one-half (0.50) foot below in rock.

3. Where bituminous or concrete surfacing materials are to be placed directly on the subgrade, the subgrade plane shall not vary more than four-tenths (0.04) foot.

4. Materials shall not be wasted without permission of ENGINEER.

5. Excavation operations shall be conducted so that material outside of the limits of slopes will not be disturbed.

6. Prior to beginning grading operations in any area, all necessary clearing and grubbing in that area shall have been performed in accordance with Section 31 11 00, Clearing and Grubbing, of these SPECIFICATIONS.

7. CONTRACTOR shall notify ENGINEER in sufficient time before beginning excavation or embankment such that the necessary topography and/or cross-sections may be taken. CONTRACTOR shall not excavate beyond the dimensions and elevations established, and material shall not be removed prior to surveying the site.

8. When CONTRACTOR’s excavating operations encounter remains of prehistoric people’s dwelling sites or artifacts of historical or archaeological significance, the operations shall be temporarily discontinued.

   a. ENGINEER will contact archaeological authorities to determine the disposition thereof.

   b. When directed, CONTRACTOR shall excavate the site in such a manner as to preserve the artifacts encountered and shall remove them for delivery to the custody of the proper state authorities.

   c. Such excavation will be considered and paid for as extra WORK.

B. Excavation:

1. Unclassified:

   a. All excess suitable material excavated from the PROJECT site and not used for embankment shall be removed from the PROJECT site and become the property of CONTRACTOR.

   b. Where material encountered within the limits of the WORK is considered unsuitable for embankment (fills) on any portion of this PROJECT WORK, such material shall be excavated as directed by ENGINEER and replaced with suitable fill material.

   c. All unsuitable excavated material from excavation consisting of any type of debris (surface or buried), excavated rock, bedrock or rocks larger than six (6) inches in diameter, and boulders shall be hauled from the PROJECT site and disposed of by CONTRACTOR at CONTRACTOR's expense.

   d. Debris is defined as "anything that is not earth which exists at the job site."

2. Muck:

   a. Where excavation to the finished grade section results in a subgrade or slopes of unsuitable soil, ENGINEER may require CONTRACTOR to remove the unsuitable materials and backfill to the finished graded section with approved material.

   b. Disposal of the unsuitable material and replacement with suitable material shall be at CONTRACTOR's expense.

3. Good surface drainage shall be provided around all permanent cuts to direct surface runoff away from the cut face.

4. Rock:

   a. Unless otherwise specified, rock shall be excavated to a minimum depth of 0.5 foot below subgrade within the limits of the channel area, and the excavation shall be backfilled with material shown on the DRAWINGS or as designated by ENGINEER.

   b. Disposal of material and replacement with suitable approved material shall be at CONTRACTOR's expense.

C. Embankment Construction:

1. Embankment construction shall consist of constructing all fill areas, including preparation of the areas upon which they are to be placed, the placing and compacting of approved material within areas where unsuitable materials have been removed, and the placing and compacting of Embankment Material in holes, pits and other depressions within the PROJECT area.

2. Only approved materials shall be used in the construction of embankments and backfills.

3. Approved materials shall consist of clean onsite cohesive soils or approved imported soils.

4. Onsite cohesive soils or imported soils shall be placed and compacted in horizontal lifts, using equipment and procedures that produce recommended moisture contents and densities throughout the lift and embankment height. Onsite or imported cohesive soils shall be compacted within a moisture content range of two percent (2%) below, to two percent (2%) above optimum moisture content and compacted to ninety-five percent (95%) of the Maximum Standard Proctor Density (ASTM D698).

5. When embankment is to be placed and compacted on hillsides, or when new embankment is to be compacted against existing embankments, or when embankment is built one-half (1/2) width at a time, the slopes that are steeper than four-to-one (4:1) when measured longitudinally or at right angles to the adjacent ground shall be continuously benched over those areas where it is required as the WORK is brought up in layers.

    a. Benching shall be well "keyed" and where practical a minimum of eight (8) feet. Each horizontal cut shall begin at the intersection of the original ground and the vertical sides of the previous cuts.

    b. Material thus cut out shall be recompacted along with the new Embankment Material at CONTRACTOR's expense.

6. The ground surface underlying all fills shall be carefully prepared by removing all organic matter, scarification to a depth of eight (8) inches and recompacting to ninety-five percent (95%) of the Maximum Standard Proctor Density (ASTM D698) at optimum moisture content + or - two percent (2%) prior to fill placement.

7. Embankment Material shall be placed in horizontal layers not exceeding 8 inches (loose measurement) and shall be compacted to ninety five percent (95%) of the Maximum Standard Proctor Density (ASTM D698) at optimum moisture content + or - two percent (2%).

    a. Effective spreading equipment shall be used on each lift to obtain uniform thickness prior to compacting.

    b. As the compaction of each layer progresses, continuous leveling and manipulating required to ensure uniform density.

8. For embankments which serve as berms, the downstream portion shall be keyed into the subsurface soils a minimum of three (3) feet to enhance the stability of the slope.

9. Materials which are removed from excavations beneath the water table may be over the optimum moisture content and shall be required to be dried out prior to reusing them.

10. Cross hauling or other action as appropriate will be ordered when necessary to ensure that the best available material is placed in critical areas of embankments,

including the top two (2) feet of all embankments. No additional payment will be made for cross hauling ordered by ENGINEER.

11. Frozen materials shall not be used in construction of embankments.

12. During the construction of the channels, the channel bottom shall be maintained in such condition that it will be well drained at all times.

13. Excavation or embankment (fill), and structural backfill WORK either completed or in a stage of completion that is either eroded or washed away or becomes unstable as a result of either rains, snow, snow melt, channel flows, or lack of proper water control shall be either removed and replaced, recompacted, or reshaped as directed by ENGINEER and in accordance with the DRAWINGS and SPECIFICATIONS at CONTRACTOR's sole expense.

14. Removed unsuitable materials shall be hauled away and disposed of at CONTRACTOR's expense. Placing of replacement materials for removed unsuitable materials shall be purchased, placed, and compacted at CONTRACTOR's expense.

D. Proof Rolling:

1. Proof rolling with a heavy rubber tired roller shall be required, if designated on the DRAWINGS or when ordered by ENGINEER.

2. Proof rolling shall be done after specified compaction has been obtained. Areas found to be weak and those areas which failed shall be ripped, scarified, wetted if necessary, and recompacted to the requirements for density and moisture at CONTRACTOR's expense.

3. Proof rolling shall be done with equipment and in a manner acceptable to ENGINEER. Proof rolling as shown on the DRAWINGS or as ordered by ENGINEER shall not be measured and paid for separately, but shall be included in the unit prices bid for the WORK.

3.02 EXCAVATION AND BACKFILL FOR STRUCTURES

A. Poor foundation material for any of the WORK shall be removed, by CONTRACTOR, as directed by ENGINEER.

1. CONTRACTOR will be compensated for removal and replacement of such materials in accordance with Muck Excavation.

B. CONTRACTOR is cautioned that construction equipment may cause the natural soils to pump or deform while performing excavation WORK inside and on footings, structural floor slabs, or other structure foundation areas.

C. CONTRACTOR shall remove and replace at CONTRACTOR's expense any foundation materials which are:

1. Saturated by either surface or subsurface flows because of the lack of adequate water control or dewatering work by CONTRACTOR;

2. Frozen for any reason; or

3. Disturbed by CONTRACTOR's WORK or caused to become unacceptable for foundation material purposes by means of CONTRACTOR's equipment, manpower, or methods of WORK.

D. Dewatering shall not be conducted by pumping from inside footings, structural floor slabs, or other structure foundation limits. This may decrease the supporting capacity of the soils.

E. Care shall be taken when excavating the foundations to avoid disturbing the supporting materials. Excavation by either hand or careful backhoe soil removal, may be required in excavating the last few inches of material to obtain the subgrade of any item of the concrete WORK.

F. Any over-excavated subgrades that are due to CONTRACTOR's actions, shall be brought back to subgrade elevations, as indicated on the DRAWINGS, by CONTRACTOR and at CONTRACTOR's expense in the following manner:

G. For over-excavations of two (2) inches or less, either backfill and compact with approved granular materials; backfill with one-half (1/2) inch crushed rock; or fill with concrete at the time of the appurtenant structure concrete pour.

H. For over-excavations greater than two (2) inches, backfill and compact with an approved granular material.

1. All granular footings, structural floor slabs, or other structure areas shall be compacted with a vibratory plate compactor prior to placement of concrete, reinforcing, or bedding materials.

2. Backfill, and fill within three (3) feet adjacent to all structures and for the full height of walls, shall be selected non-swelling material.

a. It shall be granular, well graded, and free from stones larger than two (2) inches.

b. Material may be job excavated, but shall selectivity be required as determined by ENGINEER.

c. Stockpiled material, other than topsoil from the excavation, shall be used for backfilling unless an impervious structural backfill is specified.

d. The backfill material shall consist of either clean onsite granular material free of stones larger than two (2) inches in diameter with no more than twenty percent (20%) passing the No. 200 sieve, or equivalent imported materials.

e. All backfill around the structures shall be consolidated by mechanical tamping.

f. The material shall be placed in six-inch (6") loose lifts within a range of two percent (2%) above to two percent (2%) below the optimum moisture content and compacted to ninety-five percent (95%) of Maximum Standard

Proctor Density (ASTM D698) for cohesive soils, or to seventy-five percent (75%) relative density for pervious material as determined by the relative density of cohesionless soils test, ASTM D4253.

3. Impervious structural backfill shall be placed in six-inch (6") loose lifts within a range of two percent (2%) above to two percent (2%) below the optimum moisture content and compacted to ninety-five percent (95%) of Maximum Standard Proctor Density for cohesive soils as determined by ASTM D698.

END OF SECTION

SECTION 31 25 00

EROSION AND SEDIMENTATION CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. This WORK shall consist of temporary measures needed to control erosion and water pollution. These temporary measures shall include, but not be limited to, berms, dikes, dams, sediment basins, fiber mats, netting, gravel, mulches, grasses, slope drains, and other erosion control devices or methods. These temporary measures shall be installed at the locations where needed to control erosion and water pollution during the construction of the PROJECT, and as directed by ENGINEER, and as shown on the DRAWINGS.

B. The Erosion Control Plan presented in the DRAWINGS serves as a minimum for the requirements of erosion control during construction. CONTRACTOR has the ultimate responsibility for providing adequate erosion control and water quality throughout the duration of the PROJECT. Therefore, if the provided plan is not working sufficiently to protect the PROJECT areas, then CONTRACTOR shall provide additional measures as required to obtain the required protection. CONTRACTOR shall include in the BID price for erosion control a minimum of all items shown on the Erosion Control Plan and any additional items that may be needed to control erosion and water pollution.

1.02 RELATED SECTIONS

A. The following is a list of SPECIFICATIONS which may be related to this section:

1. Section 01 57 19, Temporary Environmental Controls
2. Section 31 23 19, Dewatering.
3. Section 31 11 00, Clearing and Grubbing.
4. Section 31 14 13, Topsoil and Wetland Stripping and Stockpiling.

1.03 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. Colorado Department of Public Health and Environment (CDPHE).

1.04 SUBMITTALS

A. Submit the following information:

1. Erosion Control Plan.
2. Construction schedule for Erosion Control per Article Scheduling.
3. Sequencing Plan per Article Scheduling.

4. Plan for disposal of waste material per Article Scheduling.

5. Product data for materials proposed for use.

6. All applicable permits for Erosion Control.

1.05 REGULATORY REQUIREMENTS

A. 401 Construction Dewatering Industrial Wastewater Permit (Construction Dewatering Permit 401):

1. CONTRACTOR shall apply for and obtain a Construction Dewatering Permit 401 from the Colorado Department of Public Health and Environment.

2. All costs for this permit shall be the responsibility of CONTRACTOR.

3. This permit requires that specific actions be performed at designated times.

4. CONTRACTOR is legally obligated to comply with all terms and conditions of the permit including testing for effluent limitations.

5. CONTRACTOR shall allow the Colorado Department of Public Health and Environment or other representatives to enter the site to test for compliance with the permit.

6. Non-compliance with the permit can result in stoppage of all WORK.

B. In the event of conflict between these requirements and erosion and pollution control laws, rules, or regulations of other Federal, State, or local agencies, the more restrictive laws, rules, or regulations shall apply.

1.06 SCHEDULING

A. Sequencing Plan:

1. CONTRACTOR shall submit a sequencing plan for approval for erosion control in conformance with CONTRACTOR’s overall Construction Plan for approval by OWNER.

2. Changes to the Erosion Control Sequencing Plan may be considered by OWNER only if presented in writing by the CONTRACTOR.

B. Temporary Erosion Control:

1. When so indicated in the CONTRACT DOCUMENTS, or when directed by ENGINEER, CONTRACTOR shall prepare construction schedules for accomplishing temporary erosion control WORK including all maintenance procedures.

2. These schedules shall be applicable to clearing and grubbing, grading, structural WORK, construction, etc.

C. CONTRACTOR shall submit for acceptance the proposed method of erosion control on haul roads and borrow pits and a plan for disposal of waste material.

D. CONTRACTOR shall be required to incorporate all permanent erosion control features into the PROJECT at the earliest practicable time as outlined in the accepted schedule. Temporary erosion control measures shall then be used to correct conditions that develop during construction.

E. WORK shall not be started until the erosion control schedules and methods of operations have been accepted.

PART 2 PRODUCTS

2.01 MATERIALS

A. All materials shall be submitted for approval prior to installation.

B. Materials may include hay bales, straw, fiber mats, fiber netting, wood cellulose, fiber fabric, gravel, and other suitable materials, and shall be reasonably clean, free of deleterious materials, and certified weed free.

C. Grass Seed:

1. Temporary grass cover (if required) shall be a quick growing species, suitable to the area, in accordance with local criteria and permit requirements, which will provide temporary cover, and not compete with the grasses sown for permanent cover.

2. All grass seed shall be approved by ENGINEER and in accordance with local regulations prior to installation.

D. Fertilizer and soil conditioners shall be approved by ENGINEER and in accordance with local regulations prior to installation.

PART 3 EXECUTION

3.01 GENERAL

A. All temporary and permanent erosion and sediment control practices shall be maintained and repaired as needed to ensure continued performance of their intended function.

B. OWNER will monitor CONTRACTOR’s erosion control and WORK methods.

1. If the overall function and intent of erosion control is not being met, OWNER will require CONTRACTOR to provide additional measures as required to obtain the desired results.

2. Costs for any additional erosion control measures shall be paid for at contract unit prices.

C. The erosion control features installed by CONTRACTOR shall be adequately maintained by CONTRACTOR until the PROJECT is accepted.

D. Working In or Crossing Watercourses and Wetlands:

1. Construction vehicles shall be kept out of watercourses to the extent possible.

2. Where in-channel WORK is necessary, precautions shall be taken to stabilize the WORK area during construction to minimize erosion.

    a. The channel (including bed and banks) shall always be restabilized immediately after in-channel WORK is completed.

3. Where a live (wet) watercourse must be crossed by construction vehicles during construction, a Temporary Stream Crossing shall be provided for this purpose.

3.02 PROTECTION OF ADJACENT PROPERTIES

A. Properties adjacent to the site of a land disturbance shall be protected from sediment deposition.

B. In addition to the erosion control measures required on the DRAWINGS, perimeter controls may be required if damage to adjacent properties is likely, and may include, but is not limited to:

1. Vegetated buffer strip around the lower perimeter of the land disturbance.

    a. Vegetated buffer strips may be used only where runoff in sheet flow is expected and should be at least twenty (20) feet in width.

2. Sediment barriers such as straw bales, erosion logs, and silt fences.

3. Sediment basins and porous landscape detention ponds.

4. Combination of above measures.

3.03 CONSTRUCTION

A. Stabilization of Disturbed Areas:

1. Temporary sediment control measures shall be established within five (5) days from time of exposure/disturbance.

2. Permanent erosion protection measures shall be established within five (5) days after final grading of areas.

B. Stabilization of Sediment and Erosion Control Measures:

1. Sediment barriers, perimeter dikes, and other measures intended to either trap sediment or prevent runoff from flowing over disturbed areas shall be constructed as a first step in grading and be made functional before land disturbance takes place.

2. Earthen structures such as dams, dikes, and diversions shall be stabilized within five (5) days of installation.

3. Stormwater outlets shall also be stabilized prior to any upstream land disturbing activities.

C. Stabilization of Waterways and Outlets:

1. All onsite stormwater conveyance channels used by CONTRACTOR for temporary erosion control purposes shall be designed and constructed with adequate capacity and protection to prevent erosion during storm and runoff events.

2. Stabilization adequate to prevent erosion shall also be provided at the outlets of all pipes and channels.

D. Storm Sewer Inlet Protection: All storm sewer inlets which are made operable during construction or which drain stormwater runoff from a construction site shall be protected from sediment deposition by the use of filters.

E. Construction Access Routes:

1. Wherever construction vehicles enter or leave a construction site, a Stabilized Construction Entrance is required.

2. Where sediment is transported onto a public road surface, the roads shall be cleaned thoroughly at the end of each day.

3. Sediment shall be removed from roads by shoveling or sweeping and be transported to a sediment controlled disposal area.

4. Street washing shall be allowed only after sediment is removed in this manner.

3.04 DISPOSITION OF TEMPORARY MEASURES

A. All temporary erosion and sediment control measures shall be disposed of within thirty (30) days after final site stabilization is achieved or after the temporary measures are no longer needed as determined by OWNER.

B. Trapped sediment and other disturbed soil areas resulting from the disposition of temporary measures shall be permanently stabilized to prevent further erosion.

C. Substantial Completion of Erosion Control Measures:

1. At the time specified in the CONTRACT DOCUMENTS, and subject to compliance with specified materials and installation requirements, CONTRACTOR shall receive a Substantial Completion Certificate for temporary erosion control measures.

2. Maintenance of Erosion Control Measures after Substantial Completion: CONTRACTOR shall be responsible for maintaining temporary erosion control measures as specified in the DRAWINGS and CONTRACT DOCUMENTS until such time as WORK has been accepted by OWNER as specified in Section 01 77 00, Closeout Procedures.

D. Final Completion and Acceptance of Erosion Control Measures:

1. After ENGINEER and OWNER have determined that the drainage area has stabilized, CONTRACTOR shall remove all remaining temporary erosion control measures.

2. Any damage to the site shall be repaired to the satisfaction of ENGINEER and at no cost to OWNER.

END OF SECTION

SECTION 31 37 00

RIPRAP, BOULDERS, AND BEDDING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. The WORK includes excavation, grading, and installation of riprap, boulders, soil riprap, void-filled riprap, and bedding placed at the locations shown on the DRAWINGS. The materials to be used and the construction of such structures shall be as specified herein.

1.02 RELATED SECTIONS

A. The following is a list of SPECIFICATIONS, which may be related to this section:

1. Section 01 57 19, Temporary Environmental Controls
2. Section 31 23 00, Excavation and Fill.
3. Section 31 23 19, Dewatering.
4. Section 31 23 33, Trenching and Backfilling.
5. Section 31 25 00, Erosion and Sedimentation Controls
6. Section 31 37 19, Grouted Boulders, Stacked Grouted Boulders, and Grouted Rock Retaining Walls

1.03 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Association of State Highway and Transportation Officials (AASHTO):
    a. T85, Standard Method of Test for Specific Gravity and Absorption of Coarse Aggregate.
    b. T96, Standard Method of Test for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
    c. T103, Standard Method of Test for Soundness of Aggregates by Freezing and Thawing.
    d. T104, Standard Method of Test for Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate.
    e. T248, Reducing Field Samples of Aggregate Test Size.

2. ASTM International (ASTM): D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft^3 (600 kN-m/m^3)).

1.04 SUBMITTALS

A. CONTRACTOR shall cooperate with ENGINEER in obtaining and providing samples of all specified materials.

B. CONTRACTOR shall submit certified laboratory test certificates for all items required in this section.

PART 2 PRODUCTS

2.01 MATERIALS

A. RIPRAP

1. Riprap used shall be the type designated on the DRAWINGS and shall conform to Table 1.

Table 1: Riprap Gradation

Riprap Designation	% Smaller Than Given Size By Weight	Intermediate Rock Dimension (inches)	d_{50}* (inches)
Type VL	70 - 100 50 - 70 35 - 50 2 - 10	12 9 6 2	6**
Type L	70 - 100 50 - 70 35 - 50 2 - 10	15 12 9 3	9**
Type M	70 - 100 50 - 70 35 - 50 2 - 10	21 18 12 4	12**
Type H	70 - 100 50 - 70 35 - 50 2 - 10	30 24 18 6	18
Type VH	70 - 100 50 - 70 35 - 50 2 - 10	41 33 24 9	24

*d_{50} = Mean Particle Size

**Mix VL, L and M riprap with 35% topsoil (by volume) and bury it with 4 to 6 inches of topsoil, all vibration compacted, and revegetate.

2. The riprap designation and total thickness of riprap shall be as shown on the DRAWINGS. The maximum stone size shall not be larger than the thickness of the riprap.

3. Neither width nor thickness of a single stone of riprap shall be less than one-third (1/3) of its length.

4. The specific gravity of the riprap shall be two and one-half (2.5) or greater.

5. Riprap specific gravity shall be according to the bulk-saturated, surface-dry basis, in accordance with AASHTO T85.

6. The bulk density for the riprap shall be 1.3 ton/cy or greater.

7. The riprap shall have a percentage loss of not more than forty percent (40%) after five hundred (500) revolutions when tested in accordance with AASHTO T96.

8. The riprap shall have a percentage loss of not more than ten percent (10%) after five (5) cycles when tested in accordance with AASHTO T104 for ledge rock using sodium sulfate.

9. The riprap shall have a percentage loss of not more than ten percent (10%) after twelve (12) cycles of freezing and thawing when tested in accordance with AASHTO T103 for ledge rock, procedure A.

10. Rock shall be free of calcite intrusions.

11. Gradation:

    a. Each load of riprap shall be reasonably well graded from the smallest to the largest size specified.

    b. Stones smaller than the two to ten percent (2 to 10%) size will not be permitted in an amount exceeding ten percent (10%) by weight of each load.

    c. Control of gradation shall be by visual inspection. However in the event ENGINEER determines the riprap to be unacceptable, ENGINEER shall pick two (2) random truckloads to be dumped and checked for gradation.

        1) Mechanical equipment and labor needed to assist in checking gradation shall be provided by CONTRACTOR at no additional cost.

12. Color:

    a. The color of the riprap shall approved by ENGINEER prior to delivery to the PROJECT site.

    b. Color shall be consistent on the entire PROJECT and shall match the color of rock to be used for all other portions of the WORK.

13. Broken concrete or asphalt pavement shall not be acceptable for use in the WORK.

14. Rounded riprap (river rock) is not acceptable, unless specifically designated on the DRAWINGS.

B. BOULDERS

1. Boulders used shall be the type designated on the DRAWINGS and shall conform to Table 2.

Table 2: Boulder Properties

Boulder Classification	Nominal Size (inches)	Range in Smallest Dimension of Individual Rock Boulders (inches)	Maximum Ratio of Largest to Smallest Rock Dimension of Individual Boulders
B24	24	20 - 28	1.50
B30	30	26 - 34	1.50
B36	36	32 - 40	1.50
B42	42	38 - 46	1.50
B48	48	44 - 52	1.50

2. The specific gravity of the boulders shall be two and one-half (2.5) or greater.

3. Boulder specific gravity shall be according to the bulk-saturated, surface-dry basis, in accordance with AASHTO T85.

4. The bulk density for the boulder shall be 1.3 ton/cy or greater.

5. The boulders shall have a percentage loss of not more than forty percent (40%) after five hundred (500) revolutions when tested in accordance with AASHTO T96.

6. The boulders shall have a percentage loss of not more than ten percent (10%) after five (5) cycles when tested in accordance with AASHTO T104 for ledge rock using sodium sulfate.

7. The boulders shall have a percentage loss of not more than ten percent (10%) after twelve (12) cycles of freezing and thawing when tested in accordance with AASHTO T103 for ledge rock, procedure A.

8. Rock shall be free of calcite intrusions.

9. Color:

    a. The color of the boulders shall approved by ENGINEER prior to delivery to the PROJECT site.

b. Color shall be consistent on the entire PROJECT and shall match the color of rock to be used for all other portions of the WORK.

C. SOIL RIPRAP

1. Rock requirements are to comply with riprap as specified in Article Materials.

2. The soil material shall be native or topsoil and mixed with sixty-five percent (65%) riprap and thirty five percent (35%) soil by volume.

3. Soil riprap shall consist of a uniform mixture of soil and riprap without voids.

D. VOID-FILLED RIPRAP

1. Rock requirements are to comply with riprap material specifications in Paragraph A.

2. Samples of riprap and void-fill materials shall be submitted for the review and approval of the ENGINEER prior to construction.

3. Where “Void-Filled Riprap” is designated on the DRAWINGS, riprap shall be mixed with the materials and associated proportions listed in Table 3 and Table 4 to fill the voids of the riprap.

4. If specified, an alternate void-filled riprap mix that includes river cobble shall be used; this mix appears in Table 5 and Table 6.

5. Mix proportions and material gradations in Tables 3 through 6 are approximate and are subject to adjustment by the ENGINEER. No adjustment in unit price for void-filled riprap will be allowed based on modifications to the mix proportions.

Table 3: Mix Requirements for Type VL and L Void-Filled Riprap without River Cobble

Approximate Proportions (loader buckets)	Material Type	Material Description
6	Riprap	Type VL or L
1	Void-fill material	VTC (Vehicle Tracking Control) rock (crushed rock with 100% passing 4-inch sieve, 50-70% passing 3-inch sieve, 0-10% passing 2-inch sieve)
1	Void-fill material	4-inch minus pit run surge (round river rock and sand, well graded, 90-100% passing 4-inch sieve, 70-80% passing 1.5-inch sieve, 40-60% passing 3/8-inch sieve, 10-30% passing #16 sieve).
1	Void-fill material	Type II bedding
½ to 1	Void-fill material	Native topsoil

Note: Mix proportions and material gradations are approximate and are subject to adjustment by the ENGINEER.

Table 4: Mix Requirements for Type M and H Void-Filled Riprap without River Cobble

Approximate Proportions (loader buckets)	Material Type	Material Description
6	Riprap	Type M or H
2	Void-fill material	7-inch minus crushed rock surge (100% passing 7-inch sieve, 80-100% passing 6-inch sieve, 35-50% passing 3-inch sieve, 10-20% passing 1.5-inch sieve)
1	Void-fill material	VTC (Vehicle Tracking Control) rock (crushed rock with 100% passing 4-inch sieve, 50-70% passing 3-inch sieve, 0-10% passing 2-inch sieve)
1	Void-fill material	4-inch minus pit run surge (round river rock and sand, well graded, 90-100% passing 4-inch sieve, 70-80% passing 1.5-inch sieve, 40-60% passing 3/8-inch sieve, 10-30% passing #16 sieve).
1	Void-fill material	Type II bedding
½ to 1	Void-fill material	Native topsoil

Note: Mix proportions and material gradations are approximate and are subject to adjustment by the ENGINEER.

Table 5: Mix Requirements for Type VL and L Void-Filled Riprap with River Cobble

Approximate Proportions (loader buckets)	Material Type	Material Description
6	Riprap	Type VL or L
1	Void-fill material	2 to 4-inch cobble (round washed river rock that is well-graded, 100% passing 6-inch sieve, 35-50% passing 3-inch sieve, 5-20% passing 2-inch sieve)
1	Void-fill material	4-inch minus pit run surge (round river rock and sand, well graded, 90-100% passing 4-inch sieve, 70-80% passing 1.5-inch sieve, 40-60% passing 3/8-inch sieve, 10-30% passing #16 sieve).
1	Void-fill material	Type II bedding
½ to 1	Void-fill material	Native topsoil
Top layer	Top dressing	Additional 4 to 12-inch cobbles (round washed river rock that is well graded, 80-100% passing 12-inch sieve, 35-50% passing 6-inch sieve, 5-20% passing 4-inch sieve) shall be mixed in on the surface of exposed sections of void-filled riprap (covering approximately 15% of the surface) prior to compaction of the void-filled riprap. Cobbles shall be fully embedded into the mass of the void-filled riprap.

Note: Mix proportions and material gradations are approximate and are subject to adjustment by the ENGINEER.

Table 6: Mix Requirements for Type M and H Void-Filled Riprap with River Cobble

Approximate Proportions (loader buckets)	Material Type	Material Description
6	Riprap	Type M or H
2	Void-fill material	7-inch minus crushed rock surge (100% passing 7-inch sieve, 80-100% passing 6-inch sieve, 35-50% passing 3-inch sieve, 10-20% passing 1.5-inch sieve)
1	Void-fill material	2 to 4-inch cobble (round washed river rock that is well-graded, 100% passing 6-inch sieve, 35-50% passing 3-inch sieve, 5-20% passing 2-inch sieve)
1	Void-fill material	4-inch minus pit run surge (round river rock and sand, well graded, 90-100% passing 4-inch sieve, 70-80% passing 1.5-inch sieve, 40-60% passing 3/8-inch sieve, 10-30% passing #16 sieve).
1	Void-fill material	Type II bedding
½ to 1	Void-fill material	Native topsoil
Top layer	Top dressing	Additional 4 to 12-inch cobbles (round washed river rock that is well graded, 80-100% passing 12-inch sieve, 35-50% passing 6-inch sieve, 5-20% passing 4-inch sieve) shall be mixed in on the surface of exposed sections of void-filled riprap (covering approximately 15% of the surface) prior to compaction of the void-filled riprap. Cobbles shall be fully embedded into the mass of the void-filled riprap.

Note: Mix proportions and material gradations are approximate and are subject to adjustment by the ENGINEER.

E. BEDDING:

1. Gradation for granular bedding shall conform to Table 7.

2. Granular bedding designation and total thickness of bedding shall be as shown on the DRAWINGS.

3. Granular bedding shall meet the same requirements for specific gravity, absorption, abrasion, sodium sulfate soundness, calcite intrusion, and freeze-thaw durability as required for riprap.

    a. Broken concrete asphalt pavement or sledge, shall not be acceptable for use in the WORK. Rounded river rock is not acceptable unless specifically designated on the DRAWINGS.

b. The requirements for the wear test in AASHTO T96 shall not apply.

Table 7: Granular Bedding Gradation

	Percent by Weight Passing Square-Mesh Sieves	
U.S. Standard Sieve Size	**Type I (CDOT Sect. 703.01)**	**Type II (CDOT Sect. 703.09 Class A)**
3 inches	-	90 - 100
1½ inches	-	-
¾ inch	-	20 - 90
⅜ inch	100	-
No. 4	95 - 100	0 - 20
No. 16	45 - 80	-
No. 50	10 - 30	-
No. 100	2 - 10	-
No. 200	0 - 2	0 - 3

F. FEATURE BOULDERS:

1. Feature Boulders shall consist of the same material as boulders, differing only by size.

2. Feature Boulders shall meet the same requirements for specific gravity, absorption, abrasion, sodium sulfate soundness, calcite intrusion, and freeze-thaw durability as required for boulders

3. Feature Boulders shall have a minimum dimension of four (4) feet, or as shown on the DRAWINGS.

PART 3 EXECUTION

3.01 PREPARATION

A. Channel slope, bottom, or other areas that are to be protected with riprap, boulders, soil riprap, or void-filled riprap shall be free of brush, trees, stumps, and other objectionable material and be graded to a smooth compacted surface as shown on the DRAWINGS.

B. CONTRACTOR shall excavate areas to receive riprap to the subgrade as shown on the DRAWINGS accounting for granular bedding.

C. CONTRACTOR shall excavate areas to receive boulders, soil riprap, or void-filled riprap to the specified depth (bedding material is not required for boulders, soil riprap, or void-filled riprap).

D. Subgrade Materials:

1. The subgrade materials shall be stable.

2. If unsuitable materials are encountered, they shall be removed and replaced as Muck Excavation in accordance with Section 31 23 00, Excavation and Fill, for subgrade that has been excavated in undisturbed soil.

E. Additional Compaction:

1. Additional compaction shall not be required unless specified by ENGINEER.

2. When subgrade is built up with embankment material it shall be compacted to ninety five percent (95%) maximum density (ASTM D698).

F. Bedding:

1. After an acceptable subgrade is established, bedding shall be immediately placed and leveled to the specified elevation on the DRAWINGS.

2. Immediately following the placement of the bedding material, the riprap shall be placed.

3. If bedding material is disturbed for any reason, it shall be replaced and graded at CONTRACTOR's expense.

4. Contamination:

a. In-place bedding materials shall not be contaminated with soils, debris or vegetation before the riprap is placed.

b. If contaminated, the bedding material shall be removed and replaced at CONTRACTOR's expense.

3.02 PLACEMENT

A. RIPRAP

1. Following acceptable placement of granular bedding, riprap placement shall commence as follows:

a. Machine Placed Riprap:

1) Riprap shall be placed on the prepared slope or channel bottom areas in a manner which will produce a reasonably well graded mass of stone with the minimum practicable percentage of voids.

2) Riprap shall be machine placed, unless otherwise stipulated in the DRAWINGS or SPECIFICATIONS.

3) It is the intent of these SPECIFICATIONS to produce a fairly compact riprap protection in which all sizes of material are placed in their proper proportions. Unless otherwise authorized by ENGINEER, the riprap protection shall be

placed in conjunction with the construction of embankment or channel bottom with only sufficient delay in construction of the riprap protection, as may be necessary, to allow for proper construction of the portion of the embankment and channel bottom which is to be protected.

b. Slope Placement:

1) When riprap is placed on slope, placement shall commence at the bottom of the slope working up the slope.

c. The entire mass of riprap shall be placed on either channel slope or bottom so as to be in conformance with the required gradation mixture and to line, grade, and thickness shown on the DRAWINGS.

d. Riprap shall be placed to full course thickness at one operation and in such a manner as to avoid displacing the underlying bedding material. Placing of riprap in layers, or by dumping into chutes, or by similar methods shall not be permitted.

e. All material used for riprap protection for channel slope or bottom shall be placed and distributed such that there shall be no large accumulations of either the larger or smaller sizes of stone. Some hand placement may be required to achieve this distribution.

f. The basic procedure shall result in larger materials flush to the top surface with faces and shapes arranged to minimize voids, and smaller material below and between larger materials.

g. Surface grade shall be a plane or as indicated, but projections above or depressions under the finished design grade by more than ten percent (10%) of the rock layer thickness shall not be allowed.

h. Smaller rock shall be securely locked between the larger stone. It is essential that the material between the larger stones not be loose or easily displaced by flow or by vandalism.

i. The stone shall be consolidated by the bucket of the backhoe or other means that will cause interlocking of the material.

j. All rock is to be placed in a dewatered condition beginning at the toe of the slope or other lowest point.

k. CONTRACTOR shall maintain the riprap protection until accepted. Any material displaced for any reason shall be replaced to the lines and grades shown on the DRAWINGS at no additional cost to OWNER. If the bedding materials are removed or disturbed, such material shall be replaced prior to replacing the displaced riprap.

2. Hand Placed Riprap:

a. Hand placed riprap shall be performed during machine placement of riprap and shall conform to all the requirements of PART 2, above.

b. Hand placed riprap shall also be required when the depth of riprap is less than two (2) times the nominal stone size, or when required by the DRAWINGS or SPECIFICATIONS.

c. After the riprap has been placed, hand placing or rearranging of individual stones by mechanical equipment shall be required to the extent necessary to secure a flat uniform surface and the specified depth of riprap, to the lines and grades as shown on the DRAWINGS.

3. Soil Replacement Over Riprap:

a. Where riprap is designated to be buried, place onsite excavated material that is free from trash and organic matter in riprap voids by washing and rodding.

b. Prevent excessive washing of material into stream.

c. When voids are filled and the surface accepted by ENGINEER, place a nominal six (6) inches of topsoil over the area, or as designated on the DRAWINGS.

d. Fine grade, seed, and mulch per the SPECIFICATIONS.

B. BOULDERS

1. Following excavation and acceptance of subgrade by ENGINEER Boulder placement shall commence as follows:

a. Boulders shall be placed on the prepared subgrade in a manner which will minimize voids.

b. Voids between boulders exceeding 4" shall be chinked.

2. If Boulders are to be grouted, boulders shall be installed according to Section 31 37 19, Grouted Boulders, Stacked Grouted Boulders and grouted Boulder Retaining Walls.

C. SOIL RIPRAP

1. Adjacent stockpiles of riprap and soil shall be created and mixing done at the stockpile location, not at the location where soil riprap is to be placed.

2. Mix thirty-five percent (35%) soil by volume with stockpiled riprap, using additional moisture and control procedures that ensure a homogenous mixture; where the soil fills the inherent voids in the riprap without displacing riprap.

3. With prior approval of ENGINEER, layering the riprap and soil instead of premixing may be allowed if the native soil is granular.

4. Place a first layer of smaller soil riprap of approximate d_{50} thickness. Then place the top layer with surface rocks that are largely d_{50} or greater, filling voids as necessary with smaller planted riprap. Create a smooth plane as described in Paragraph A.

5. The mixture shall be consolidated by large vibratory equipment or backhoe bucket to create a tight, dense interlocking mass.

6. The soil shall be further wetted to encourage void filling with soil.

7. Any large voids shall be filled with rock and small voids filled with soil.

8. Excessively thick zones of soil prone to washing away shall not be created (for example, no thicknesses greater than six (6) inches).

9. For buried soil riprap, the top surface shall be covered with four (4) inches of topsoil such that no rock points are protruding.

10. The final surface shall be thoroughly wetted for good compaction, smoothed and compacted by vibrating equipment; the surface shall then be hand raked to receive planting or seeding.

D. VOID-FILLED RIPRAP

1. The ENGINEER and/or CONSTRUCTION INSPECTOR shall observe mixing and placing of the material.

2. Approved individual component materials of void-filled riprap mix shall be delivered to site in separate marked stockpiles. Mixing shall be accomplished using a front end loader or other approved means to add the specified number of "loader buckets" of each material to a mixing stockpile. Ensure that each loader bucket comprises an approximately equal volume. If the loader operator is only able to fill the bucket partially full with large riprap (due to the force required to push the bucket into the pile), but uses full buckets of finer material, the mix proportions will not be correct. Avoid picking up excessive amounts of native soil from the subgrade under the stockpiled materials during the loader bucket mixing operations. The ENGINEER may reduce or eliminate the volume of topsoil added to the mixture based on the amount of native soil was incorporated during the bucket mixing operation.

3. Once all the materials have been added to the mixing stockpile in the specified proportions, thoroughly mix the pile using a loader, large track-hoe excavator, or other approved means to fill the voids of the riprap **without displacing the riprap** or creating pockets of finer material absent of riprap.

4. Segregation of materials shall be minimized when hauling from the stockpile to the installation location. Remixing shall occur as necessary to correct for any segregation as the material is placed.

5. The loose material shall be placed in a single lift of sufficient height such that final grade will be achieved upon compaction. Additional mixing with a track excavator shall be required after initial placement to ensure that the void-filled riprap is thoroughly mixed and no segregation or excessive amount of smaller void-fill material is present on the surface. The mixing and placement process shall result in larger riprap (D_{50} size or larger) flush to the top surface with faces and shapes arranged to minimize voids, and smaller material between and below larger materials.

6. If the top of the compacted material is below final grade, placement of only the smaller void-fill materials to achieve final grade will not be permitted. Additional void-filled riprap shall be added and the entire section mixed with a track excavator to eliminate the presence of smaller void-fill material on the surface.

7. Avoid segregation of materials and remix any section where the combined material consists primarily of the void-fill materials. The density and interlocking nature of riprap in the mixed material shall essentially be the same as if the riprap was placed without filling the voids. This requires care and persistence on the part of the CONTRACTOR to install the work and on the part of the ENGINEER to assure that the work is installed correctly.

8. At the direction of the ENGINEER, a 50:50 mixture of pit run and Type II bedding shall be sprinkled on the surface of the void-filled riprap and washed-in with water using a high pressure hose to fill-in small voids. This shall be done just prior to compaction of the void-filled riprap.

9. If specified as part of the cobble mix, the top dressing of cobbles shall also be mixed in on the surface of exposed sections of void-filled riprap material prior to compaction of the riprap material.

10. Compaction of the void-filled riprap shall be performed by running over the void-filled riprap with a large, heavy duty track excavator or dozer. The moisture content of the mixture shall be at optimum conditions prior to compaction and water shall be added, as necessary, at the direction of the ENGINEER. Compaction of void-filled riprap shall be reviewed and approved by the ENGINEER.

11. Where indicated on the DRAWINGS, a surface layer of 4 to 6 inches moist topsoil shall be placed over the void-filled riprap. The topsoil surface layer shall be compacted to approximately 85% of maximum density and within two percentage points of optimum moisture in accordance with ASTM D698. Topsoil shall be added to any areas that settle.

12. CONTRACTOR shall install a test section of at least 100 square feet of void-filled riprap for the review and approval of the ENGINEER prior to installation of the remaining void filled-riprap.

13. Elevation tolerance for the void-filled riprap shall be 0.10 feet. Thickness of void-filled riprap shall be no less than thickness shown and no more than 2-inches greater than the thickness shown.

E. FEATURE BOULDERS

1. Feature Boulders serve an aesthetic function and as such shall be placed and rotated into final position as directed by ENGINEER in order to achieve the desired result.

3.03 REJECTION OF WORK AND MATERIALS:

A. ENGINEER will reject placed riprap, boulders, soil riprap and bedding that do not conform to this section. CONTRACTOR shall immediately remove and re-lay the riprap, boulders, soil riprap, void-filled riprap, and bedding to conform to SPECIFICATIONS.

B. Riprap, boulders, soil riprap, void-filled riprap and bedding that do not conform to this section shall be rejected, whether delivered to the job site or placed.

C. Rejected riprap, boulders, soil riprap and bedding shall be removed from the PROJECT site by CONTRACTOR at CONTRACTOR's expense.

END OF SECTION

SECTION 32 84 00
LANDSCAPE IRRIGATION

PART 1: GENERAL

1.1 SCOPE

Furnish all labor, materials, supplies, equipment, tools and transportation, and perform all operations in connection with and reasonably incidental to the complete installation of the irrigation system, and guarantee/warranty as shown on the drawings, the installation details, and as specified herein.

1.2 ITEMS OF WORK INCLUDED

Items of work specifically included are:

A. Procurement of all applicable licenses, permits, and fees.

B. Coordination of Utility Location. (“Call Before You Dig”)

C. Location of existing mainline and control wires.

D. Verification of existing static pressure and flow rate.

E. Installation, connection of all sensors, and programming of irrigation controller.

F. Connection of electrical power supply to the irrigation control system.

G. Maintenance period.

H. Sleeving for irrigation pipe and wire.

I. As-Built Record Drawings

1.3 ITEMS OF WORK NOT INCLUDED

Items of work specifically excluded are:

A. Payment of all development, plant investment, or any other fees and permits associated with the purchase and installation of the tap.

B. Excavation, installation and backfill of tap into municipal water line.

C. Excavation, installation and backfill of water meter and vault.

D. Provision of electrical power supply to the irrigation control system.

1.4 SUBMITTALS

A. Submit samples under provisions of Contract Documents

B. Deliver four (4) copies of all required submittals to the Owners' Representative within fifteen (15) days from the date of the Notice to Proceed.

C. Materials List: Include, pipe, fittings, mainline components, water emission components, control system components and all other components needed to construct a fully operating automatic irrigation system. At a minimum include all components specifically identified on the irrigation drawings. Quantities of materials need not be included.

D. Manufacturers' Data: Submit manufacturers' catalog cuts, specifications, and operating instructions for equipment shown on the materials list. Highlight specific items to be utilized for construction of the irrigation system.

E. Shop Drawings: Submit shop drawings called for in the installation details. Show products required for proper installation, their relative locations, and critical dimensions. Note modifications to the installation detail.

F. Project Record Drawings: Submit project record (As-Built) drawings to Owner prior to commencement of maintenance period per Contract Documents. Accurate and complete project record drawings will be required before the maintenance period begins.

1.5 RULES AND REGULATIONS

A. Work and materials shall be in accordance with the latest edition of the *National Electric Code*, the *Uniform Plumbing Code* as published by the Western Plumbing Officials Association, and applicable laws and regulations of the governing authorities.

B. When the contract documents call for materials or construction of a better quality or larger size than required by the above-mentioned rules and regulations, provide the quality and size required by the contract documents.

C. If quantities are provided either in these specifications or on the drawings, these quantities are provided *FOR INFORMATION ONLY*. It is the Contractor's responsibility to determine the actual quantities of all material, equipment, and supplies required by the project and to complete an independent estimate of quantities and wastage.

1.6 TESTING

A. Notify the Owners' Representative three (3) days in advance of testing.

B. Pipelines jointed with rubber gaskets or threaded connections may be subjected to a pressure test at any time after partial completion of backfill. Pipelines jointed with solvent-welded PVC joints shall be allowed to cure a minimum of 24 hours before testing. Pipelines installed with thrust blocks shall have the concrete cured for a minimum of seven (7) days before testing.

C. Subsections of mainline pipe may be tested independently, subject to the review of the Owners' Representative.

D. Furnish clean, clear water, pumps, labor, fittings, and all equipment necessary to conduct tests or retests.

E. The test pressure shall not exceed the rated working pressure of the pipe.

F. Hydrostatic Pressure Test:

1. Fill mainline pipe with water, purge all air out of the system. Subject mainline pipe to a hydrostatic pressure of 125 PSI for two hours. Test with mainline components installed. A 2 PSI pressure variation is allowed.

    a. The use of an air compressor to provide pressure is not allowed.

2. Backfill to prevent pipe from moving under pressure. Expose couplings and fittings.

3. Leakage will be detected by visual inspection. Replace defective pipe, fitting, joint, valve, or appurtenance. Repeat the test until the pipe passes test.

    a. Cement or caulking to seal leaks is prohibited.

4. The Owners' Representative reserves the option to furnish the gauges and metering devices for the tests.

G. Operational Test:

1. Prior to the Operational Test the Contractor shall connect and configure all system sensors .

    a. The Contractor shall have the flow sensor operational and learn the flow for all zones to be tested. The flow shall be stored in the controllers memory.

    b. The Contractor shall have the master valve connected and operational.

    c. The Contractor shall have all rain, wind, temperature, weather, soil moisture or other sensors specified on the plan connected and operational.

2. Activate each remote control valve in sequence from controller. The Owners’ Representative will visually observe operation, water application patterns, and leakage.

3. Replace defective remote control valve, solenoid, wiring, or appurtenance to correct operational deficiencies.

4. Replace, adjust, or move water emission devices to correct operation or coverage deficiencies.

5. Replace defective pipe, fitting, joint, valve, sprinkler, or appurtenance to correct leakage problems.

    a. Cement or caulking to seal leaks is prohibited.

6. Repeat test(s) until each lateral passes all tests.

7. The Owners' Representative will measure and record static and dynamic pressure at the point of connection and in the system mainline at various locations.

8. The Owner's Representative will measure and record dynamic pressure at various sprinklers and water emission devices.

1.7 CONSTRUCTION REVIEW

The purpose of on-site reviews by the Owners' Representative is to periodically observe the work in progress and the Contractor's interpretation of the construction documents and to address questions with regards to the installation.

A. Scheduled reviews such as those for irrigation system layout or testing should be scheduled with the Owners' Representative as required by these specifications.

B. Impromptu reviews may occur at any time during the project.

C. Final review will occur at the completion of the irrigation system and Record Drawing (As-Built) submittal.

1.8 GUARANTEE/WARRANTY AND REPLACEMENT

The purpose of this guarantee/warranty is to insure that the Owner receives irrigation materials of prime quality, installed and maintained in a thorough and careful manner.

A. For a period of one year from commencement of the formal maintenance period, guarantee/warranty irrigation materials, equipment, and workmanship against defects. Fill and repair depressions. Restore landscape or structural features damaged by the settlement of irrigation trenches or excavations. Repair damage to the premises caused by a defective item. Make repairs within seven (7) days of notification from the Owners' Representative.

1. Costs for all guarantee/warranty work shall be entirely paid for by the Contractor.

B. Contract documents govern replacements identically as with new work. Make replacements at no additional cost to the contract price.

C. Guarantee/warranty applies to originally installed materials and equipment and replacements made during the guarantee/warranty period.

PART 2: MATERIALS

2.1 QUALITY

Use materials which are new and without flaws or defects of any type, and which are the best of their class and kind.

2.2 SUBSTITUTIONS

Pipe sizes referenced in the Construction Documents are minimum sizes, and may be increased at the option of the Contractor. Substitutions in pressure class of pipe shall be approved by the Irrigation Designer.

2.3 IRRIGATION TAP AND WATER METER

A. Provide materials required by local codes for installation of the municipal water tap and associated piping.

B. Provide materials required by local code for installation of the water meter, vault and associated piping.

2.4 SLEEVING

A. Install separate sleeve beneath paved areas to route each run of irrigation pipe or wiring bundle.

B. Sleeving material beneath hardscapes shall be Schedule 40 PVC for sleeves 2-1/2" and below and PVC Class 200 for sleeves 3" and above. Both has have bell end pipe with solvent welded joints.

C. Sleeving diameter: As indicated on the drawings and installation details or equal to twice the nominal diameter of the pipe or wiring bundle passing through.

1. Size sleeves for wiring bundles per the current NEC Conduit Fill calculations and charts.

2.5 PIPE AND FITTINGS

A. Mainline Pipe and Fittings:

1. Use rigid, unplasticized polyvinyl chloride (PVC) round pipe, National Sanitation Foundation (NSF) approved, extruded from material meeting the requirements of Cell Classification 12454 as defined in ASTM Standard D1784, with an integral belled end.

2. Use Class 200, SDR-21, rated at 200 PSI, for pipe sizes 3-inch and larger conforming to the dimensions and tolerances established by ASTM Standard D2241 and ASTM Standard D2672. Use PVC pipe rated at higher pressures than Class 200 in the case of small nominal diameters which are not manufactured in Class 200.

a. Use solvent weld pipe for mainline pipe with a nominal diameter less than 3-inches or where a pipe connection occurs in a sleeve. Use Schedule 40 PVC fittings

B. Lateral Pipe and Fittings:

1. Use Class 200, SDR-21, rated at 200 PSI, for pipe sizes 3-inch and larger conforming to the dimensions and tolerances established by ASTM Standard D2241 and ASTM Standard D2672. Use PVC pipe rated at higher pressures than Class 200 in the case of small nominal diameters which are not manufactured in Class 200.

C. Specialized Pipe and Fittings:

1. Copper pipe: Use Type K drawn temper (hard or rigid) copper pipe conforming to ASTM Standard B88.

a. Use wrought copper or cast bronze fittings that are dezincification resistant and conform to ASTM Standard B75, soldered or threaded per the installation details. Use a 95% tine and 5% antimony solder. Use a thread sealant approved by the pipe manufacturer.

2. Assemblies calling for threaded pipe connections shall utilize PVC Schedule 80 nipples and PVC Schedule 80 threaded fittings.

3. Joint sealant:

a. Use only Teflon-type tape pipe joint sealant on plastic threads. Use nonhardening, nontoxic pipe joint sealant formulated for use on water-carrying pipes on metal threaded connections.

4. Low Density Polyethylene Hose:

a. Use pipe specifically intended for use as a flexible swing joint.

i. Inside diameter: 0.490+0.010 inch
ii. Wall thickness: 0.100+0.010 inch
iii. Color: Black
iv. Pressure Rating: 80 PSI

b. Use spiral barb fittings supplied by the same manufacturer as the hose.

D. Marking Tape:

1. Mainline Pipe - Christy underground I.D. tape TA.DT.6.P.NPW.

2.6 MAINLINE COMPONENTS

A. Main System Shutoff Valve: As per local practice and in compliance with local code.

B. Backflow Prevention Assembly: As presented in the installation details and in compliance with local code.

C. Master Valve Assembly: As presented in the installation details.

D. Flow Sensor Assembly: As presented in the installation details.

E. Isolation Gate Valve Assembly: As presented in the installation details. Install a separate valve box over a 3-inch depth of 3/4-inch gravel for each assembly.

F. Quick Coupling Valve Assembly: Double swing joint arrangement as presented in the installation details. Install at a height where key can be inserted, turned and valve pressurized without removing threaded handle.

G.

2.7 DRIP IRRIGATION COMPONENTS

A. Remote Control Valve (RCV) Assembly for Drip Laterals:

1. As presented in the installation details. Use wire connectors and waterproofing sealant to join control wires to solenoid valves. Use standard identifications tags marked with controller name and station number. Install a separate valve box over a 3-inch depth of washed pea gravel for each assembly. Use 8 ounce minimum weight non-woven geotextile fabric underneath pea gravel and box assembly to prevent dirt and debris intrusion. Adjust valve flow control per manufacturer’s recommendations

prior to use.

B. Drip Emitter Assembly:

1. Use Rain Bird XB-10PC

2. Use 1/4-inch diameter flexible plastic tubing to direct water from emitter outlet to emission point. Length of emitter outlet tubing shall not exceed five feet. Secure emitter outlet tubing with tubing stakes and install bug cap, both items manufactured by emitter manufacturer.

3. Install an access sleeve for each multiple-outlet emitter located in a turf area.

C. Flush Cap Assembly

1. As presented in the installation details. Locate at the end of each drip irrigation lateral pipe. Install a separate valve box over a 3-inch depth of pea gravel for each assembly. Use 8 ounce minimum weight non-woven geotextile fabric underneath pea gravel and box assembly to prevent dirt and debris intrusion.

2.8 CONTROL SYSTEMS COMPONENTS

A. Irrigation Controller Unit:

1. As called out on irrigation plans.

2. Controller Lightning protection: 3/4" diameter 10-foot copper-clad grounding rod.

3. Wire markers: Pre-numbered or labeled with indelible non-fading ink, made of permanent, non-fading material.

B. Instrumentation:

1. As presented in the drawings and installation details.

C. Control Wire:

1. Use American Wire Gauge (AWG) No.14 solid copper conforming to ASTM B-3 or ASTM B-8. Use American Wire Gauge (AWG) No.12 wire for common wire.

2. Splices: Use wire connectors with waterproof sealant. Wire connector to be of UV radiation resist plastic construction consisting of two pieces, one piece which snap locks into the other. Connector shall be pre-filled with non-hardening silicone gel. Utilize twist style wire connector provided with assembly to connect wires.

a. Wire connectors to meet requirements of UL Standard 486D

b. Utilize DBR/Y-600 Black Splices

3. Encase wiring not located near PVC irrigation pipe in PVC Schedule 80 electrical conduit. Utilize long sweep elbows for changes of direction.

4. Warning tape: Detectable inert plastic film highly resistant to alkalis, acids, or other destructive chemical components likely to be encountered in soils. Tape shall be six inches wide, colored purple.

5. Existing Control Wire: It is assumed that existing 24 VAC control wire, two-wire paths and sensor wire between existing controller sensors and between the controllers and solenoid valves is in workable condition. Any concerns are to be brought to the attention of the Owner prior to installation of the replacement controller.

    a. Contractor shall verify the condition and operation of any existing control wire or sensor wire prior to replacement of the controller at no additional cost. If existing control wire or sensor wire requires replacement contractor shall inform owner of the impact to the cost and schedule of the project.

2.9 OTHER COMPONENTS

A. Tools and Spare Parts: Provide operating keys, servicing tools, test equipment, other items and spare parts indicated in the General Notes of the drawings.

1. Additionally, provide the following:

    a. Two operating keys for each type and size of manually operated valve.

    b. Two keys for each type and size of quick coupler.

    c. Two of each servicing wrench or tool needed for complete access, adjustment, installation of nozzles and repair of all spray, rotary and rotor type sprinklers.

    d. Two 3" diameter pressure gauges and associated fittings to measure system pressure and pressure at spray, rotary and rotor type sprinkers and remote control valves. Pressure gauge shall have a range of 0-160 PSI.

    e. Two sets of keys for each controller, enclosure or equipment that requires keyed access.

        i. If required, keys shall be keyed to match other locks that the Owner possess.

    f. All instruction manuals, repair manuals, operating manuals and original paper work related to the products that were installed during construction of the irrigation system.

PART 3: EXECUTION

3.1 INSPECTION AND REVIEWS

A. Site Inspections:

1. Verify site conditions and note irregularities affecting work of this section. Report irregularities to the Owners' Representative prior to beginning work.
2. Beginning work of this section implies acceptance of all existing conditions.
3. Contractor will be held responsible for coordination between landscape and irrigation system installation.
4. Landscape material locations shown on the Landscape Plan shall take precedence over the irrigation system equipment locations. If irrigation equipment is installed in conflict with the landscape material locations shown on the Landscape Plan, the Contractor will be required to relocate the irrigation equipment, as necessary, at Contractor's expense.

B. Utility Location (Call Before You Dig)

1. Arrange for an coordinate with local authorities the location of all underground utilities.

2. Repair any underground utilities damaged during construction. Make repairs at no additional cost to the contract price.

C. Irrigation System Layout Review: Irrigation system layout review will occur after the staking has been completed. Notify the Owners' Representative three business days in advance of review. Modifications will be identified by the Owners' Representative at this review.

3.2 LAYOUT OF WORK

A. Stake out the irrigation system. Items staked shall include: Sprinklers, pipe, control valves, manual drains, controller, and isolation valves, grounding locations and sleeving.
B. Install all mainline pipe and mainline components inside of project property lines.

3.3 EXCAVATION, TRENCHING AND BACKFILLING

A. Excavate to permit the pipes to be laid at the intended elevations and to permit work space for installing connections and fittings.

B. Minimum cover (distance from top of pipe or control wire to finish grade):

1. 24-inch over mainline pipe and over electrical conduit.

2. 26-inch over control wire.

3. 16-inch over lateral pipe to sprinklers.

4. 12-inches of drip lateral pipe.

C. Backfill only after lines have been reviewed and passed hydrostatic tests and accepted by the Owner.

D. Excavated material is generally satisfactory for backfill. Backfill shall be free from rubbish, vegetable matter, frozen materials, and stones larger than 1/2-inch in maximum dimension. Remove material not suitable for backfill. Backfill placed next to pipe shall be free of sharp objects which may damage the pipe. All soil shall be screened and pass through a square opening 1/2" x 1/2.

E. Backfill unsleeved pipe and sleeves in either of the following manners:

1. Backfill and puddle the lower half of the trench. Allow to dry 24 hours. Backfill the remainder of the trench in 6-inch layers. Compact to density of surrounding soil.

2. Backfill the trench by depositing the backfill material equally on both sides of the pipe in 6-inch layers and compacting to the density of surrounding soil.

F. Enclose pipe and wiring beneath roadways, walks, curbs, etc. in sleeves. Minimum compaction of backfill for sleeves shall be 95% Standard Proctor Density, ASTM D698-78. Conduct one compaction test for each sleeved crossing less than 50 feet long. Conduct two compaction tests for each sleeved crossing greater than 50 feet long. Costs for such testing and any necessary retesting shall be paid for by the Contractor. Use of water for compaction around sleeves, puddling, will not be permitted.

G. Dress backfilled areas to original grade.

H. Where utilities conflict with irrigation trenching and pipe work, contact the Owners' Representative for trench depth adjustments.

3.4 SLEEVING AND BORING

A. Install sleeving at a depth which permits the encased pipe or wiring to remain at the specified burial depth.

B. Extend sleeve ends six inches beyond the edge of the paved surface. Cover pipe ends and mark with stakes. Mark location of sleeve on the concrete with a 1/2-inch diameter brass survey marker embedded in the concrete.

C. Bore for sleeves under obstructions which cannot be removed. Employ equipment and methods designed for horizontal boring.

3.5 ASSEMBLING PIPE AND FITTINGS

A. General:

1. Keep pipe free from dirt and pipe scale. Cut pipe ends square and debur. Clean pipe ends.

2. Keep ends of assembled pipe capped to prevent dirt and debris intrusion. Remove caps only when necessary to continue assembly.

B. Mainline Pipe and Fittings:

1. Use only strap-type friction wrenches for threaded plastic pipe. Tighten threaded plastic pipe per pipe and fitting manufacturers recommendations.

2. PVC Solvent Weld Pipe:

a. Use primer and solvent cement. Join pipe in a manner recommended by the manufacturer and in accordance with accepted industry practices.

b. Cure for 30 minutes before handling and 24 hours before allowing water in pipe.

c. Snake pipe from side to side within the trench.

3. Fittings: The use of cross type fittings is not permitted.

C. Lateral Pipe and Fittings:

1. Use only strap-type friction wrenches for threaded plastic pipe. Tighten threaded plastic pipe per pipe and fitting manufacturers recommendations.

2. PVC Solvent Weld Pipe:
   a. Use primer and solvent cement. Join pipe in the manner recommended by the manufacturer and in accordance with accepted industry practices.
   b. Cure for 30 minutes before handling and 24 hours before allowing water in the pipe.
   c. Snake pipe from side to side within the trench.

3. Fittings: The use of cross type fittings is not permitted.

D. Specialized Pipe and Fittings:
   1. Copper Pipe:
      a. Buff surfaces to be joined to a bright finish. Coat with solder flux.
      b. Solder so that a continuous bead shows around the joint circumference.

   2. Pre-fabricated double swing joints: Install per manufacturer's recommendations.

   3. Low Density Polyethylene Hose: Install per manufacturer's recommendations.

   4. PVC Threaded Connections:

      a. Use only factory-formed threads. Field-cut threads are not permitted.

      b. Use only thread sealant recommended by pipe and fitting manufacturer.

      c. When connection is plastic-to-metal, the plastic component shall have male threads and the metal component shall have female threads.

   5. Make metal-to-metal, threaded connections with Teflon-type tape or pipe joint compound applied to the male threads only.

3.6 INSTALLATION OF MAINLINE COMPONENTS

A. Main System Shut Off Valve: Install where indicated on the drawings.

B. Backflow Prevention Assembly: Install where indicated on the drawings. Install assembly so that its elevation, orientation, access, and drainage conform to the manufacturer's recommendations and applicable health codes.

C. Master Valve Assembly: Install where indicated on the drawings.

D. Isolation Gate Valve Assembly:
   1. Install where indicated on the drawings.
   2. Locate at least 12-inches from and align with adjacent walls or edges of paved areas.

E. Flow Sensor Assembly: Install where indicated on the drawings.

F. Quick Coupling Valve Assembly: Install where indicated on the drawings.

3.7 INSTALLATION OF DRIP IRRIGATION COMPONENTS

A. Remote Control Valve (RCV) Assembly for Drip Laterals:
   1. Flush mainline pipe before installing RCV assembly.
   2. Locate as shown on the drawings. Wire connectors and waterproof sealant shall be used to connect control wires to remote control valve wires. Connectors and sealant shall be installed as per the manufacturer's recommendations.
   3. Install only one RCV to valve box. Locate at least 12-inches from and align with nearby walls or edges of paved areas. Group RCV assemblies together where practical.
   4. Arrange grouped valve boxes in rectangular patterns

B. Drip Emitter Assembly:
   1. Locate as shown on the drawings and installation details.
   2. Flush lateral pipe before installing emitter assembly.
   3. Cut emitter outlet distribution tubing square.
   4. Install an access sleeve as part of each multiple-outlet emitter assembly for emitters located in turf areas.
   5. Use tools and techniques recommended by the manufacturer. Make openings for barb-mounted emitters with the emitter manufacturer's hole-punching tool.

C. Flush Cap Assembly: Install at the end of each drip irrigation lateral pipe as shown on the installation details.

3.8 INSTALLATION OF CONTROL SYSTEM COMPONENTS

A. Irrigation Controller Unit:
   1. The location of the controller unit as depicted on the drawings is approximate; the Owners' Representative will determine the exact site location upon commencement of contract. during sprinkler layout review.

   2. Lightning protection: Ground rods are to have a minimum diameter of 3/4" and a minimum length of 10 feet. These are to be driven into the ground in a vertical position or an oblique angle not to exceed 15 degrees at a location 10 feet from the electronic equipment, the ground plate, or the wires and cables connected to said equipment, as shown in the irrigation details. The rod is to be stamped with the UL logo. A 6 AWG solid bare copper wire (no more than 12 feet long) shall be connected to the ground rod by the installer using a UL approved grounding clamp. This wire shall be connected to the electronic equipment ground lug as shown in the detail above.

   3. Lightning protection: Provide on all remote control valve wiring as recommended by the manufacturer. Provide other components such as

ground rod, grounding wire, etc., to manufacturer's recommendations.

4. Install primary surge protection arrestors on incoming power lines.

5. Install one valve output surge protection arrestor on each control wire and one for the common wire.
6. Attach wire markers to the ends of control wires inside the controller unit housing. Label wires with the identification number (see drawings) of the remote control valve to which the control wire is connected. Connect control wires to the corresponding controller terminal.

B. Instrumentation:
1. Install sensors per the installation details and manufacturer's recommendations. Install at locations shown on the drawings.
2. Install electrical connections between irrigation controller and sensors per manufacturer's recommendations.

C. Control Wire:
1. Bundle control wires where two or more are in the same trench. Bundle with pipe wrapping tape spaced at 10-foot intervals.
2. Provide a 24-inch excess length of wire in an 8-inch diameter loop at each 90 degree change of direction, at both ends of sleeves, and at 100-foot intervals along continuous runs of wiring. Make wiring loop by turning control wire 5 turns around 1-inch pipe. Coil 24-inch length of wire within each remote control valve box.
3. Install common ground wire and one control wire for each remote control valve. Multiple valves on a single control wire are not permitted.
4. If a control wire must be spliced, make splice with wire connectors and waterproof sealant, installed per the manufacturer's instructions. Locate splice in a valve box which contains an irrigation valve assembly, or in a separate 6-inch round valve box. Use same procedure for connection to valves as for in-line splices.
5. Unless noted on plans, install wire parallel with and under PVC mainline pipe. If wire is installed adjacent to section of metal pipe, separate wire from pipe minimum of 6-inches and install wire in PVC conduit.
6. Encase wire not installed with PVC mainline pipe in electrical conduit.

3.9 INSTALLATION OF OTHER COMPONENTS
A. Tools and Spare Parts:
1. Prior to the Pre-Maintenance Review, supply to the Owner operating keys, servicing tools, test equipment, and any other items indicated on the drawings.
2. Prior to Final Review, supply to the Owner the spare parts indicated in the General Notes on the drawings.
B. Other Materials: Install other materials or equipment shown on the drawings or installation details to be part of the irrigation system, even though such items may not have been referenced in these specifications.

3.10 PROJECT RECORD (AS-BUILT) DRAWINGS
A. Maintain on-site and separate from documents used for construction, one complete set of contract documents as Project Documents. Keep documents current. Do not permanently cover work until as-built information is recorded.
B. Record pipe and wiring network alterations. Record work which is installed differently than shown on the construction drawings. Record accurate reference dimensions, measured from at least two permanent reference points, of each irrigation system valve, each backflow prevention device, each controller or control

unit, each sleeve end, each stub-out for future pipe or wiring connections, and other irrigation components enclosed within a valve box.

C. Prior to Final Review, purchase from the Owners' Representative an electronic copy of the drawings. Using appropriate editing software, duplicate information contained on the project drawings maintained on site. Label each sheet "Record Drawing". Completion of the Record Drawings will be a prerequisite for the Final Review.

3.11 MAINTENANCE

A. Upon completion of Final Review, maintain irrigation system for a duration of 30 calendar days. Make periodic examinations and adjustments to irrigation system components so as to achieve the most desirable application of water.

B. Following completion of the Contractor's maintenance period, the Owner will be responsible for maintaining the system in working order during the remainder of the guarantee/warranty period, for performing necessary minor maintenance, for trimming around sprinklers, for protecting against vandalism, and for preventing damage during the landscape maintenance operation.

3.12 CLEAN-UP

A. Upon completion of work, remove from the site all machinery, tools, excess materials, corporate and personal items, and rubbish.

END OF SECTION 32 84 00

SECTION 32 91 13

SOIL PREPARATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Contract Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes requirements for the preparation of soil for seeding, sodding, or planting operations. Soil preparation consists of ripping, fertilizing, soil conditioning, and fine grading the topsoil. Soil preparation as specified herein must precede all seeding, sodding, and planting.

1.3 DEFINITIONS

A. Fertilizer: A substance that is added to soil to help the growth of plants.

B. Soil Amendment: Any substance which is intended to improve the physical, chemical, or other characteristics of the soil.

1.4 SUBMITTALS

A. See Division 01 Section “Submittals” for submittal requirements.

B. Testing Agency Qualifications: Project Manager to approve prior to construction.

C. Soils Test Data: See Quality Control.

D. Product Data (for each type of product):
   1. Include recommendations for application and use.
   2. Include test data substantiating that products comply with requirements.
   3. Material Certificates: For each type of soil conditioner, soil amendment, and fertilizer before delivery to the site, according to the following:
      a. Manufacturer's qualified testing agency's certified analysis of standard products.
      b. State, Federal and other inspection certificates shall accompany invoice for materials showing source or origin.

E. Samples: For each bulk-supplied material, one (1) quart volume of each in sealed containers labeled with content, source, and date obtained. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of composition, color, and texture.

1.5 QUALITY CONTROL

A. Testing Agency: Retain an independent, state-operated, or university operated laboratory experienced in soil science, soil testing, and plant nutrition; with the experience and capability to conduct the testing indicated and that specializes in the types of tests to be performed.
   1. Laboratories: Subject to compliance with requirements, provide testing of materials in the Section by a qualified testing laboratory approved by the Project Manager.
   2. Multiple Laboratories: Work may be divided among qualified testing laboratories specializing in physical testing, chemical testing, and fertility testing.

B. Preconstruction Testing
   1. Engage the approved testing agency to perform preconstruction soil analyses on existing on-site soil, imported topsoil, and pre-amended imported soil.
   2. Notify Project Manager seventy-two (72) hours in advance of the dates and times when laboratory samples will be taken.

C. Soil Sampling Requirements
   1. Sample Collection and Labeling: Have samples taken and labeled by the Contractor in the presence of the Project Manager and under the direction of the testing agency.
   2. Number and Location of Samples: Minimum of five (5) samples per acre collected randomly throughout the areas to receive similar soil preparation, including seed/sod, native seeding, planting beds, and gardens. Provide a site plan of the sampling locations to the Project Manager for approval, prior to sampling.
   3. Procedures and Depth of Samples: Collect samples to a depth of six inches (6”) and combine in a clean plastic container.
   4. Mixing of Samples: Mix samples together thoroughly, removing plant debris and breaking up clods.
   5. Labeling: Label each sample with the date, location keyed to a site plan or other location system, visible soil condition, and sampling depth.

D. Testing Requirements
   1. Soil Texture: Soil-particle, size-distribution analysis by the following methods according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods":
      a. Sieving Method: Report sand-gradation percentages for very coarse, coarse, medium, fine, and very fine sand; and fragment-gradation (gravel) percentages for fine, medium, and coarse fragments; according to USDA sand and fragment sizes.
      b. Hydrometer Method: Report percentages of sand, silt, and clay.
   2. Fertility Testing: Soil-fertility analysis shall, include the following:
      a. Percentage of organic matter.
      b. CEC, calcium percent of CEC, and magnesium percent of CEC.
      c. Soil reaction (acidity/alkalinity pH value).
      d. Buffered acidity or alkalinity.
      e. Lime estimate.
      f. Soil texture estimate.
      g. Nitrogen ppm.
      h. Phosphorous ppm.
      i. Potassium ppm.
      j. Manganese ppm.
      k. Zinc ppm.
      l. Iron ppm.
      m. Boron ppm.
      n. Copper ppm.
      o. Sodium ppm**,** and sodium absorption ratio.
      p. Soluble-salts ppm.
      q. Presence and quantities of problem materials including salts and metals cited in the Standard protocol. If such problem materials are present, provide additional recommendations for corrective action.
      r. Other deleterious materials, including their characteristics and content of each.

E. Recommendations: Based on the test results, provide recommendations for soil treatments, amendments, and conditioners to be incorporated to produce a soil suitable for healthy viable plant growth for the species indicated in the Contract Documents. Include, at a minimum, recommendations for nitrogen, phosphorous, and potassium fertilization, and for micronutrients.
   1. Fertilizers and Soil Amendment Rates: State recommendations in weight per one thousand (1,000) sq. ft. for six inch (6”) depth of soil.

2. Soil Reaction: State the recommended liming rates for raising pH or sulfur for lowering pH according to the buffered acidity or buffered alkalinity in weight per one thousand (1,000) sq. ft. for six inch (6") depth of soil.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and compliance with State and Federal laws if applicable.

B. Bulk Materials:
1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Do not move or handle materials when they are wet or frozen.
4. Accompany each delivery of bulk fertilizers and soil amendments with appropriate certificates.

C. Notify Project Manager of delivery schedule in advance so material can be inspected upon arrival at the project site. Immediately remove unacceptable material from the project site.

1.7 PROJECT/SITE CONDITIONS

A. General: Do not perform work when climate and existing site conditions will not provide satisfactory results.

B. Vehicular site access shall be limited to the area(s) indicated on the Contract Drawings or as defined by the Project Manager.

C. Damage to turf, natural areas, pavements, irrigation systems, underground utilities, and other improvements shall be repaired by the contractor at no additional cost to the Owner.

PART 2 - PRODUCTS

2.1 MATERIALS.

A. Soil Amendments:
1. Sod Areas: 4 cubic yards per 1,000 s.f. of compost tilled into 4" of existing soil.
2. Native Seeding Areas: 4" of compost tilled into 6" of existing soil.
3. Composted material shall consist of fully composted, aged organic matter, free of weed or other noxious plant seeds, lumps, stones, or other foreign contaminants harmful to plant life, and having the following characteristics based on a nutrient test performed no longer than 3 months prior to its incorporation into the project:
   a. Organic matter: twenty-five (25%) percent maximum.
   b. Salt content: Five (5.0) mmhos/cm maximum.
   c. pH: 7.5, maximum.
   d. Carbon to nitrogen ratio shall be less than 20:1.
4. Mountain peat, aspen humus, gypsum and sand will not be accepted.
5. Acceptable product: Class I compost, such as Ecogro or Bio-comp, as produced by A1 Organics, Eaton, CO, or approved equal.

2.2 FERTILIZER

A. General: Fertilizer shall conform to applicable State fertilizer laws. It shall be uniform in composition, dry, and free flowing, and shall be delivered to the site in the original, unopened containers, each bearing the manufacturer's guaranteed analysis. Fertilizer that has become caked or damaged will not be accepted.

B. Turf Grass Lawns: Diamonium phosphate (18-46-0). Nitrogen shall be composed of sulphur-coated Urea only. Provide in sufficient quantity to apply at the rate of one hundred (100) pounds nitrogen per acre, unless otherwise indicated by the soils tests.

2.3 PESTICIDE

A. Post Emergent Pesticide: Roundup (Glyphosate) as manufactured by Monsanto Company, or approved equal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. General: Verify that existing site conditions are as specified and indicated on the Contract Drawings before beginning work under this Section.

B. Grades: Inspect to verify rough grading is within +/- one tenth of one foot (0.1') of grades indicated and specified.

C. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within the work area.

D. Unsatisfactory Conditions: The General Contractor shall notify the Project Manager in writing of any known unsatisfactory site conditions. If the soil is found to be unfit to support planting as described above, it is to be removed and replaced with clean soil from a source approved by the Project Manager.

E. Beginning of soil preparation work means acceptance of existing conditions by the installer.

3.2 PREPARATION

A. Locate all utilities (sewer, water, irrigation, gas, electric, phone, and other conduits and subsurface equipment) prior to commencing work.

B. Contractor shall be responsible for the protection of all new and existing infrastructure, and repair of any damages caused by work under this section, at no cost to the Owner.

C. Weed Seed Eradication: Perform pesticide treatment over the entire area to be planted. Allow sufficient time to successfully complete the entire pesticide treatment process (germinate / terminate) before proceeding with planting.
   1. Pesticide treatment must be completed during the growing season.
   2. Water surface one half (1/2") inch per week for two weeks prior to application if natural precipitation does not supply this amount to encourage weed seed germination.
   3. Notify Project Manager forty-eight (48) hours in advance of each pesticide treatment.
   4. Apply pesticide in accordance with manufacturer's recommendations.

5. Water surface one half (1/2") inch per week if natural precipitation does not supply this amount to encourage weed seed germination.
6. Fourteen (14) days after the first pesticide application, review surface for evidence of plant growth.
7. If there is no evidence of plant growth, obtain Project Manager approval of surface conditions to proceed with Soil Preparation.
8. If more than 10% of the area to be planted contains new plant growth, the pesticide and watering application shall be repeated until new plant growth is satisfactorily eradicated.
9. Remove plant debris from treated area.

D. Areas of Compacted Topsoil: Areas within the work limits, or as defined on Contract Drawings or by the Project Manager, that have vegetation that is sparse, stunted, anemic, weedy or was used as construction staging, a parking area, and/or subjected to heavy use will require ripping to prepare the soil for planting. Scarify compacted soil to an eight-inch (8”) minimum depth to loosen topsoil.

E. Areas of Disturbed Topsoil: Areas disturbed but not severely compacted, as determined by the Project Manager, shall be deep tine aerated or shattered to prepare the soil for revegetation.

F. Areas of Undisturbed Natural Topsoil: Undisturbed sites that are or were supporting healthy plant growth need only surface seedbed preparation prior to sowing seed.

3.3 INSTALLATION

A. Install topsoil as required in Division 31 section “Earth Moving” and Division 32 Section “Topsoil”.

B. Timing: Perform soil preparation just prior to planting operations and in accordance with final planting schedule. Coordinate with irrigation system installation to avoid damage.

C. Soil Preparation in Turf Grass:
1. Apply Soil Amendments at the following rates:
   a. Soil Amendments: four (4) cubic yards per one thousand (1,000) square feet, or per soil test recommendations.
   b. Fertilizer: Diamonium phosphate, Bid quantity to be two (2) pounds of nitrogen per one thousand (1,000) square feet. Apply per manufactures recommendations for the type of planting area, or per soil test recommendations.
   c. Mycorrhizal inoculants: Apply per manufacturer’s instructions and quantities appropriate to the planting type.
2. After applying Soil Amendments, thoroughly till area to depth of six inches (6”) minimum by plowing, rototilling, harrowing, or disking until soil is well pulverized and thoroughly mixed. Soil Conditioners and Fertilizer shall be applied topically once final grade has been established and just prior to sodding or seeding.
3. Take soil samples, in similar locations to pre-construction testing, and test amended soil to ensure the final product meets the laboratory recommendations prior to planting.

D. Soil Preparation in Native Grass Areas:
1. Apply Soil Amendments at the following rates:
   a. Soil Amendments: 4” of Class 1 Organic Compost tilled into 6” of existing soil.
   b. Thoroughly till the area to depth of six inches (6”) minimum by plowing, rototilling, harrowing, or disking until soil is well pulverized and thoroughly mixed.
   c. Take soil samples, in similar locations to pre-construction testing, and test amended soil to ensure the final product meets the laboratory recommendations prior to planting.

E. Fine Grading in all Landscape Areas:
   1. Complete fine grading for all areas prior to seeding or planting. Allow for natural settlement.
   2. For ground surface areas surrounding buildings to be landscaped, maintain required positive drainage away from buildings.
   3. Establish finish grades to within plus or minus one tenth (0.10') foot of grades indicated, in order to prevent "bird-baths" or ponding.
   4. Finish grade shall be below edge of pavement prior to sodding, seeding or planting.
      a. Sodded Areas: Allow one and one half inches (1-1/2") for sod.
      b. Seeding Areas: Allow one inch (1") for seed.
      c. Planting Beds: Allow four inches (4") for mulch.
   5. Compaction of Surface Grade Prior to Landscape Installation: Firm, but not hard, eighty five percent (85%) standard Proctor density within two percent (2%) optimum moisture.
   6. Turfgrass Lawn Areas: Prior to acceptance of grades, hand rake to smooth, even surface, free of debris, clods, rocks and organic matter greater than one inch (1").
   7. Native Seed Areas: Area shall not be graded smooth but left in a rough condition after tilling. Tilling shall occur parallel to the contours only.
   8. Restore planting areas to specified condition if eroded or otherwise disturbed after fine grading and prior to planting.

3.4 CLEANING

A. Protect areas adjacent to soil preparation and planting areas from contamination. Keep adjacent paving and construction clean and work area in an orderly condition.

B. Remove debris and excess materials from site. Clean out drainage inlet structures. Clean paved and finished surfaces soiled as a result of work under this Section, in accordance with Section 208 of the General Specifications or as directed by the Project Manager.

3.5 PROTECTION

A. Provide and install barriers as required and as directed by Project Manager to protect completed areas against damage from pedestrian and vehicular traffic until acceptance by the Owner.

B. Protect areas of in-place soil from additional compaction, disturbance, and contamination. Prohibit the following practices within these areas except as required to perform planting operations:
   1. Storage of construction materials, debris, or excavated material.
   2. Parking vehicles or equipment.
   3. Vehicle traffic.
   4. Foot traffic.
   5. Erection of sheds or structures.
   6. Impoundment of water.
   7. Excavation or other digging unless otherwise indicated.

C. If prepared soil or subgrade is disturbed or contaminated prior to planting, the Contractor shall restore or replace the planting soil as directed by Project Manager at no cost to the Owner.

3.6 ACCEPTANCE

A. Inspection: Provide notice to the Project Manager requesting inspection at least seventy-two (72) hours prior to anticipated date of completion.

B. Contractor shall be responsible for coordinating soil preparation inspections with Denver Water, call (303) 628-6682 at least seventy-two (72) hours prior to installing sod, seed, or landscape plantings.

C. Deficiencies: The Project Manager will specify deficiencies to the Contractor who shall make satisfactory adjustments and shall again notify Project Manager for final inspection.

PART 4 - MEASUREMENT AND PAYMENT (add if necessary)

4.1 MEASUREMENT

A. Measurement will be made by the contract unit specified for Soil Preparation. Measurement shall include the actual number of units of specified material(s) placed and accepted at the locations shown on the Contract Drawings, or as directed by the Project Manager, and in accordance with the Specifications.

4.2 PAYMENT

*A. Payment will be made at the **SF** price, and shall include required materials, transportation, equipment, labor, earthwork, stockpiling, disposing, hauling off, watering, dust control, erosion and sediment control, fine grading, as required in accordance with the Contract Drawings and Specifications.*

END OF SECTION 32 91 13

SECTION 32 92 20

GENERAL SEEDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Contract Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes requirements for the installation of native seed, mulch, erosion control material (if applicable), and maintenance of the seeded areas, to be achieved as outlined in the "Maintenance" section below.

B. Related Sections:
   1. Division 01 Section "Erosion and Sedimentation Control".
   2. Division 01 Section "Tree Retention and Protection".
   3. Division 31 Section "Earth Moving".
   4. Division 31 Section "Watering".
   5. Division 32 Section "Irrigation System".
   6. Division 32 Section "Soil Preparation".
   7. Division 32 Section "Topsoil".
   8. Division 32 Section "Plants".

1.3 DEFINITIONS

A. Finish Grade: Elevation of finished surface of planting soil.

B. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, herbicide, defoliant, or desiccant.

C. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

D. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

E. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or top surface of a fill or backfill before planting soil is placed.

F. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

G. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil, but in disturbed areas such as urban environments, the surface soil can be subsoil.

H. Weeds: Including but not limited to Puncturvine, Field Bindweed, Twitch, Dandelion, Jimsonweed, Diffuse, Spotted and Russian Napweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canada Thistle, Nutgrass, Blackberry, Tansy Ragwort, Bermuda Grass, Johnsongrass, Poison Ivy, Nut Sedge, Nimble Weed, Bent Grass, Garlic Mustard, Perennial Sorrel, and Broom Grass or any weed listed on Colorado Noxious Weed List and Watch List.

1.4 REFERENCES

A. Comply with U.S. Department of Agriculture Rules and Regulations under the Federal Seed Act and be equal to or better in quality than the standards for Certified Seed.

B. Colorado Department of Transportation (CDOT) – Standards Specifications for Road and Bridge Construction.

1.5 SUBMITTALS

A. See Division 01 Section “Submittals” for submittal requirements.

B. Materials: The Contractor shall submit to the Project Manager for approval a complete list of all materials to be used during this portion of the work prior to delivery of any materials to the site. Include complete data on source, amount and quality. This submittal shall in no way be construed as permitting substitution for specific items described on the plans or in these specifications unless approved in writing by the Project Manager.
    1. Certification of Seed: From seed vendor for each seed monostand or mixture stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.
    2. Grass Species (supplied as pure live seed): Submit lab germination test results for all grass species. Submit an affidavit that describes estimated purity for all forb species that are not typically tested.
    3. Pesticides: Include product label and manufacturer's application instructions specific to this Project.
    4. Product Certificates: For soil amendments and fertilizers, from manufacturer.

C. Qualification Data: For qualified landscape Installer.

D. Material Test Reports: For existing in-place surface soil.
    1. Soil Analysis: See Division 32 Section “Soil Preparation”
    2. Analysis for each soil amendment.
    3. Analysis for each amended planting soil.

E. Analysis and standards: Wherever applicable, for non-packaged materials, provide two copies of analysis by recognized laboratory made in accordance with methods established by the Association of Official Agriculture Chemists.

F. Seeding schedule: Submit, in writing, two (2) copies of proposed seeding schedule, indicating dates for site preparation, seeding, mulching, erosion control, and coordination with plant procurement, planting soil preparation, plant delivery and planting. Schedule all Work during specified planting seasons. Once accepted, revise dates only as approved in writing, after documentation of reasons for delays.

G. Maintenance Instructions: Recommended procedures for maintenance of irrigated and non-irrigated native seed areas during a calendar year. Submit before expiration of required initial maintenance periods.

H. Contract Closeout Submittals:
   1. Operating and Maintenance Data: At completion of work, submit one (1) digital copy and two (2) hard copies to the Project Manager in accordance with Division 01 Section “Contract Closeout”. Include directions for irrigation, aeration, mowing, fertilizing, and spraying as required for continued and proper maintenance through full growing season and dormant period.
   2. Warranty for Seeded Areas: At completion of work, furnish written warranty to Parks Project Manager based upon specified requirements.

I. The Project Manager reserves the right to reject the seed at any time prior to acceptance and that fails to meet specification requirements. Promptly remove rejected seed from the site.

1.6 QUALITY CONTROL

A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful native grass establishment.

   1. Professional Membership: Installer shall be a member in good standing of one of the following: National Association of Landcare Professionals (NALP), American Nursery and Landscape Association (ANLA), or the Associated Landscape Contractors of Colorado (ALCC).
   2. Experience: Five years' experience in native seed installation in addition to requirements in Division 01 Section “Quality Control”.
   3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
   4. Personnel Certifications: Installers shall have certification the following categories from the NALP:
      a. Landscape Industry Certified Technician - Exterior, with installation maintenance irrigation specialty area(s).
   5. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.
   6. Pesticide Applicator: State licensed, commercial.

B. Soil-Testing Laboratory Qualifications: An independent laboratory or university laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.

C. Preinstallation Conference: Conduct conference at Project site to coordinate the process with other trades, to coordinate equipment movement within planting areas and to avoid soil compaction, to review proposed methods of installation, performance criteria, and maintenance procedures. Review underground utility location maps and plans. This meeting shall be coordinated by the Contractor, and comply with requirements in Division 01.

D. Standards: All materials and methods used during this portion of the work shall meet or exceed applicable federal, state, county, and local laws and regulations. All seed shall be free from insects and disease. Species shall be true to their scientific name as specified.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Seed: Shall be furnished in bags or containers clearly labeled to show the name and address of the supplier, the seed name, the lot number, net weight, origin, the percent of weed seed content, the guaranteed percentage of purity and germination, pounds of pure live seed (PLS) of each seed species, and the total pounds of PLS in the container. Seed that has become wet, moldy or damaged in transit or in storage will not be acceptable.

B. Other Packaged Materials: Deliver packaged materials in original unopened containers bearing weight, analysis, and name of supplier.

C. Fertilizer: Deliver organic or chemical fertilizer to site in original unopened container bearing manufacturer's guaranteed chemical analysis, name, trade name, trademark and conformance to state law, and bearing name and warranty of producer.

D. Bulk Materials:
   1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
   2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
   3. Accompany each delivery of bulk fertilizers and soil amendments with appropriate certificates.
   4. Seed: Deliver seed materials in original unopened containers, showing bearing weight, analysis and name of supplier.
   5. Fertilizer: Deliver inorganic or chemical fertilizer to site in original unopened container bearing manufacturer's guaranteed chemical analysis, name, trade name, trademark and conformance to state law, and bearing name and warranty of producer.

E. Material will be inspected upon arrival at project site. Project Manager will reject any opened or unacceptable materials as described above. Store all materials in a manner to prevent wetting and deterioration.

F. Immediately remove unacceptable material from job site.

1.8 PROJECT/SITE CONDITIONS

A. Work scheduling: Proceed with and complete landscape work rapidly, as portions of the site become available, working within the specified planting season and approved schedule.

B. Planting Restrictions: Variance from the schedule shall be permitted only with written approval from the Project Manager. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of Substantial Completion**.**

C. Vehicular accessibility on site shall be as directed by Project Manager. Repair damage to prepared topsoil and existing surfaces, caused by vehicular access and movement during work under this section, to original condition at no additional cost to the Owner.

D. Do not drill or sow seed during windy, rainy weather or when ground is frozen or otherwise unable to be tilled.

E. Seeding Season: Seeding shall occur as specified below. The following are typical Colorado schedules. Modify the following for appropriate region. Verify with local producers and contractors prior to finalizing.

Seed Type	**Irrigated Areas Only**	**Non-irrigated Areas**
All Seed Mixes	November 15 – March	November 15 – March 1st

Existing conditions:
   1. Existing Plants: Install sod only after all other landscape and irrigation items have been installed and accepted by the Project Manager.

2. Utilities: Determine location of underground utilities. Perform work in a manner to avoid possible damage. Hand excavate, as required.
3. Excavation: Maintain grade stakes set by others until removal is mutually agreed upon by parties concerned. When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, noxious materials or obstructions, notify Project Manager before planting.
4. If weeds are present on site, treat with pesticide prior to preparing soil for installing seed or sod as specified below.

F. Coordination:
1. Coordinate with construction of utilities on site. Do not begin placing topsoil until underground work is completed in the area.
2. Coordinate with seeding and landscape Contractor(s) approved schedule. Limit construction access to areas where topsoil has been placed if placement is completed more than three (3) days prior to commencement of landscaping in the area. Limit fine grading to areas that can be prepared for planting within twenty-four (24) hours after fine grading.
3. Coordinate with Contractors work requiring access to site over seeded areas.
4. Coordinate with installation of underground irrigation system.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Topsoil: See Division 32 Section “Topsoil”.

B. General:
1. The selected seed mix must be approved by the Project Manager prior to its incorporation into the project.
2. All seed brands shall be free from Colorado prohibited noxious weed seeds, including but not limited to Canada Thistle, Field Bindweed, Johnsongrass, and Leafy Spurge. The Contractor shall furnish to the Project Manager a signed statement certifying that the seed is from a lot that has been tested by a recognized laboratory for seed testing within six months prior to the date of delivery.
3. Computation for quantity of seed required on the project is based on Pure Live Seed (PLS).
4. The formula used for determining the quantity of PLS shall be:
Pounds of Seed x (Purity x Germination) = Pounds of PLS.
5. If seed available on the market does not meet the minimum purity and germination specified, the Contractor must compensate for a lesser percentage of purity or germination by furnishing sufficient additional seed to equal the specified product. Product comparison shall be made on the basis of PLS in pounds, stated on each seed bag.

C. Seed Mixes:

1. PBSI Native Prairie Mix (15 PLS/Acre)
   a. Available from Pawnee Buttes Seed Company

KIND	% MIX	BULK LBS/A
Blue Grama	10	1.5
Buffalograss	16	2.4
Sideoats Grama	18	2.7
Western Wheatgrass	35	5.2
Green Needlegrass	20	3
Sand Dropseed	1	.2

2. PBSI Foothills Native Mix (25 PLS/Acre)
   a. Available at Pawnee Buttes Seed Company

KIND	% MIX	BULK LBS/A
Little Bluestem	10	2.5
Switchgrass	15	3.75
Rocky Mountain Fescue	10	2.5
Sideoats Grama	5	1.25
Big Bluestem	10	2.5
Yellow Indiangrass	10	2.5
Sandberg Bluegrass	10	2.5
Slender Wheatgrass	10	2.5
Western Wheatgrass	10	2.5
Indian Ricegrass	2.5	.63
Blue Grama	2.5	.63
Sand Dropseed	5	1.25

3. PBSI Little League Mix (10 LBS/1000 SQFT)
   a. Available at Pawnee Buttes Seed Company

KIND	% MIX	BULK LBS/A
Tall Fescue	100	10

D. Mulch: Comply with Section 213 – Mulching of the CDOT Standards and Specifications for Road and Bridge Construction.

E. Fertilizer: None required unless otherwise specified by soils test.
   1. Slow Release Granular Organic Fertilizer: Richlawn 5-3-2, Milorganite, Nature Safe, Earthworks or approved equal

F. Water: Contractor to utilize the existing irrigation system and or quick coupler(s) when available. If irrigation or quick coupler(s) are not available then the contractor is responsible for watering. Water shall be free of substances that may be harmful to seed growth. Hoses and other watering equipment necessary to water the seed to be furnished by Contractor.

G. Tackifier: Comply with Section 213 – Mulching of the CDOT Standards and Specifications for Road and Bridge Construction.

H. Soil Amendment/Compost

1. Class I compost to be used on all seeded areas.
   a. 3” depth used for Foothills Native Mix and Little League Mix
   b. 2” depth used for Native Prairie Mix

2.2 PESTICIDES

A. General: Pesticide, registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by Project Manager and authorities having jurisdiction.

B. Pre-Emergent Pesticide (Selective and Non-Selective): Journey pesticide, as manufactured by BASF, 800-545-9525, or equal as approved by Project Manager. Use only with approval by Project Manager and in strict compliance with manufacturer’s instructions.

C. Post-Emergent Pesticide: “Round-up” by Monsanto, or approved equal.

2.3 EROSION-CONTROL MATERIALS

A. Erosion-Control Blankets: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples, 6inches long.

B. Erosion-Control Fiber Mesh: Biodegradable burlap or spun-coir mesh, a minimum of 0.92 lb/sq. yd., with 50 to 65 percent open area. Include manufacturer's recommended steel wire staples, 6 inches (6”) long.

C. Erosion-Control Mats: Cellular, non-biodegradable slope-stabilization mats designed to isolate and contain small areas of soil over steeply sloped surface, of 3 inch (3”) nominal mat thickness. Include manufacturer's recommended anchorage system for slope conditions.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Invisible Structures, Inc.; Slopetame 2.
      b. Presto Products Company, a business of Alcoa; Geoweb.
      c. Tenax Corporation - USA; Tenweb.

2.4 SUBSTITUTIONS

A. All substitutions shall be submitted to and approved by the Project Manager prior to construction.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to be seeded for compliance with requirements and other conditions affecting performance.
   1. Verify that finish grades are consistent with the slopes and grades indicated on the Contract Drawings. Verify grades are in conformance with Division 31 Section “Earth Moving”. Obtain Project Manager’s approval of finished grade prior to proceeding with seeding operations.
   2. Verify soil prepare of all areas to be seeded is in accordance with the requirements of Division 32 Section “Soil Preparation”. When completed, the soil shall be firmed by float dragging, followed by steel raking, to provide for the proper seeded surface. The seed bed shall be totally free from rock or clay clods over one inch (1”) in diameter.

3. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a seeding area. If contamination is present in soil, remove the soil and contamination as directed by the Project Manager and replace with new soil.

B. Verify that irrigation system is operable and provides adequate coverage prior to seeding.

C. Proceed with seeding only after unsatisfactory conditions have been corrected and approved by the Project Manager.

D. Acceptance: Beginning of installation means acceptance of existing conditions by the Contractor.

3.2 PREPARATION

A. Notify the Project Manager at least seven (7) working days prior to start of seeding operations.

B. Protect existing utilities, paving, planting and other facilities from damage caused by seeding operations. Contractor shall repair any damage at no additional cost to the Owner.

C. Locate, protect and maintain the irrigation system during seeding operations. Repair irrigation system components damaged during seeding operations shall be replaced or repaired to current Owner irrigation standards at Contractor's expense.

D. Utilize equipment having low unit pressure ground contact within seeding areas.

E. Limit preparation to areas that can be seeded within twenty-four (24) hours of preparation.

F. Moisten prepared area before seeding if soil is dry. Water thoroughly and allow surface to dry before seeding. Do not create muddy soil.

G. Erosion Control: Take measures and furnish equipment and labor necessary to control and prevent soil erosion, blowing soil and accumulation of wind-deposited materials on the site throughout the duration of work.

3.3 SEEDING

A. Seed within twenty-four (24) hours after preparation of seed bed. Seeding at other times may only be done if approved by the Project Manager.

B. Areas outside Contract Limits disturbed as a result of construction operations shall be restored at Contractor's expense.

C. Seed shall be uniformly applied at the specified rate, (half in one direction and the other half perpendicular to the first application). The direction of the final application shall always be perpendicular to the slope or running in the direction of the contour. Seed shall be installed with drill seeder at a depth between one-quarter inch (1/4") and one-half inch (1/2").

D. Areas that are too small or steep for mechanical seeding may be hand seeded. Seed shall be uniformly applied at the specified rate utilizing a broadcast spreader and then hand raked in to a depth of no more than one-half inch (1/2"), then roll seed bed to ensure proper contact to the soil.

E. Dormant Seeding: No seeding shall be done when the ground is frozen, muddy, covered with snow, or otherwise in a condition unsuitable for seeding. Dormant seeding will not relieve the

Contractor from the warranty or the acceptance requirements specified elsewhere in this specification.

3.4 EROSION CONTROL MATERIALS

A. Review erosion control measures with Project Manager prior to installation.

B. For erosion control mats, install planting soil in two lifts, with second lift equal to thickness of erosion control mats. Install erosion control mat and fasten as recommended by material manufacturer.

C. Fill cells of erosion control mat with planting soil and compact before planting.

D. Install erosion control blanket on slopes exceeding 4:1, and in swales or other areas of concentrated runoff. As shown on the Contract Drawings or as directed by the Project Manager. Install in accordance with manufacturer's instructions.

E. For erosion-control blanket or mesh, install from top of slope, working downward, and as recommended by material manufacturer for site conditions. Fasten as recommended by material manufacturer.

3.5 MULCHING

A. Straw Mulch Application: Comply with Section 213 – Mulching of the CDOT Standards and Specifications for Road and Bridge Construction.

B. Hydromulch Application: Utilize an approved hydromulcher to apply cellulose fiber at a rate of two-thousand (2,000) pounds per acre. Apply tackifier to comply with CDOT Section 213.02 – Mulching. Contractor shall provide verification of application rates in the form of ship tickets.

C. Mulching shall not be installed when surface water is present resulting from rains, melting snow irrigation or other causes.

D. Areas not properly mulched, or any damage that may occur during construction is the responsibility of the Contractor and shall be repaired and re-mulched in an acceptable manner at the Contractor's expense. Mulching removed by wind, rain or other causes prior to acceptance shall be re-established by the Contractor at its own expense.

E. The seeded area shall be mulched within eight (8) hours of seeding. Areas not mulched within twenty-four (24) hours after seeding must be re-prepped and re-seeded with the specified seed mix at the Contractor's expense.

F. Contractor shall remove all hydromulch from surface areas not specified for seeding, including but not limited to plant materials, fences, paved areas, signs, mulch beds, irrigation components and all other objects as directed by the Project Manager.

3.6 PROTECTION

A. Restrict vehicular and pedestrian traffic from seeded areas until vegetation is established. Erect signs and barriers as required or directed by the Project Manager at no additional cost to the Owner.

3.7 MAINTENANCE

A. Refer to Landscape Maintenance section 32 97 00

B. If no native seed maintenance is required per the contract, then establishment is per the native seed warranty. Maintenance of the native seed area is the responsibility of the contractor until Substantial Completion.

C. Guidelines for Irrigated Seeded Areas:

WEEKS AFTER SEEDING	APPLICATION RATE PER WATERING CYCLE	FREQUENCY	MINUTES PER CYCLE FOR FIXED SPRAY NOZZLES	MINUTES PER CYCLE FOR ROTORS	MINUTES PER CYCLE FOR HGIH FREQUENCY NOZZLES	IMPORTANT NOTES
0-2	0.1 INCHES	TWO TO THREE TIMES PER DAY	4	9	12	KEEP SOIL SURFACE CONSISTENTLY MOIST BUT AVOID RUNOFF AND PUDDLING
3-4	0.2 INCHES	ONCE PER DAY	8	18	24	MOSITEN SOIL DAILY TO PREVENT NEW SEEDLINGS FROM DEHYRDATION
5-6	0.3 INCHES	EVERY OTHER DAY	12	27	24	ALL SOIL SURFACE TO DRY OUT BETWEEN WATERINGS BUT MAINTAIN CONSISENT MOISTURE FATHER DOWN
7-8	0.3 INCHES	THREE TIMES PER WEEK	12	27	36	TOIP INCH OF SOIL CAN DRY OUT BETWEEN WATERINGS. MOISTURE IN SOIL PROFILE WILL ENCOURAGE HEALTHLY ROOTS
9-12	0.5 INCHES	TWICE PER WEEK	20	45	36	AS SEEDLINGS GROW LONGER ROOTS, THEY CAN GRADUALLY BE WATERED LESS OFTEN
13-16	0.5 INCHES	ONCE PER WEEK	20	45	60	WATER REGULARLY TO ENCOURAGE HEALTH OF NEW SEEDLINGS
YEAR 2 & BEYOND	0.5 INCHES	ONCE PER MONTH OR AS NEEDED	20	45	60	SCHEDULE WATER TO KEEP UP ON MAINTENANCE AND DESIRED APPERANCE

3.8 WARRANTY

A. Warranty for Seed Areas: Warrant areas in seed to be in a healthy, vigorous growing condition, and for consistency and completion of coverage for a minimum period of one (1) years from date of substantial completion or until the Project Manager is satisfied with germination and a full stand of grass, in a vigorous growing condition, with consistent and complete coverage.

B. Irrigated seed areas shall meet the following satisfactory criteria:
   1. Total vegetation cover in all zones seeded with cover crop shall exceed seventy percent (70%) by aerial cover. Grasses shall be free of weeds, foreign grasses, disease and harmful insects.
   2. By the end of the first full growing season after seeding, total vegetation cover including cover crop shall exceed ninety percent (90%) by aerial cover and ten percent (10%) of all species present shall be native.
   3. By the end of the first full growing season, seedling from twenty percent (20%) of planted forb species shall be present.
   4. At any time during the contract period no more than ten percent (10%) by aerial cover of the seeded area should be dominated by aggressive exotic species such as, but not limited to, red clover (*Trifolium* spp.), white or yellow sweet clover (*Melilotus* spp.), Canada thistle (*Cirsium arvense*), tall fescue (*Festuca elatior*), field bindweed*(*

Convolvulus arvensis) etc. At the end of the fifth year no more than fifty percent (50%), by aerial cover, of the seeded area shall be dominated by non-natives.

5. Until final acceptance seeded areas that fail after having been replaced previously, shall be replaced until it meets establishment as required above. Replacement materials shall be identical to those originally specified. Provide seed tags to the Project Manager for verification.
6. Remedial action: If seeded areas greater than ten (10) square feet fail to meet the terms of the guarantee shown above, the Landscape Contractor will develop and submit to the Owner's Representative a remedial action plan that takes into consideration the site goals and specific deficiencies causing the remedial action. Contractor will implement the remedial action plan and submit a report that describes the remedial action taken. If remedial seeding or planting is required, Contractor will not be required to perform additional remedial seeding or planting in the same area for a minimum of two growing seasons. After two growing seasons following the remedial planting, the performance criteria must be met for the second growing season or additional remedial action must be taken. This guarantee remains in effect until all zones meet the third growing season criteria.
7. Seeded areas will not be accepted in parts. Each time any portion or section of the entire seeded area requires replacement or remedial action, the maintenance period shall extend until all seeded areas meet the minimum establishment requirements stated above.
8. All expense incurred including repairs from vandalism for the replacement and or establishment of the seed areas are the responsibility of the Contractor.

C. Non-irrigated seed areas shall meet the following satisfactory criteria:
   1. Total vegetation cover in all zones seeded with cover crop shall exceed seventy percent (70%) by aerial cover. Grasses shall be free of weeds, foreign grasses, disease, and harmful insects.
   2. During the original warranty period, reseed at once with comparable blend/mix, those areas that have failed to achieve a stand of grass or which in the Project Manager's opinion are unhealthy.
   3. Reseeding will not be allowed in any season considerable unfavorable for seeding by the Project Manager.
   4. Reseed in a manner to achieve quality as originally specified.

3.9 CLEANING

A. Perform cleaning during installation of the work and upon completion of the work. Remove from all excess materials, debris and equipment from site. Repair any damage resulting from seeding operations.

B. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.

C. Remove non-degradable erosion-control measures after grass establishment period.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Measurement will be made by the contract unit specified for General Seeding. Measurement shall include the actual number of units of specified material(s) placed and accepted at the locations

shown on the Contract Drawings, or as directed by the Project Manager, and in accordance with the Specifications.

4.2 PAYMENT

A. Payment will be made at the contract unit price, and shall include required materials, transportation, equipment, labor, earthwork, stockpiling, disposing, hauling off, watering, dust control, erosion and sediment control, fine grading, furnishing and installation of seeds and mulches installation and maintenance of temporary protection by fencing or other means, watering and all maintenance required until Final Acceptance of the work as required in accordance with the Contract Drawings and Specifications.

END OF SECTION 32 92 20

SECTION 32 93 00

LANDSCAPE PLANTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Contract Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes requirements for furnishing, installing, and maintaining live woody plant material.

1.3 DEFINITIONS

A. ANSI: American National Standards Institute. Z60.1 is the national standard for nursery stock.

B. Backfill: The earth used to replace or the act of replacing earth in an excavation.

C. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown wrapped with burlap, tied, rigidly supported, and drum laced with twine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.

D. Bare-Root Stock: Plants with a well-branched, fibrous-root system developed by transplanting or root pruning, with soil or growing medium removed, and with not less than the minimum root spread according to ANSI Z60.1 for type and size of plant required.

E. Caliper: Trunk diameter is measured six-inches (6”) from the ground; if the caliper is greater than four-inches (4”), the measurement is taken at twelve-inches (12”) from the ground.

F. Cane: A cane shall be considered a primary stem which starts from the ground or at a point close to the ground at a point not higher than one-fourth (1/4) the height of the plant, and which reaches the minimum height stated in the plant size specification.

G. Central leader: Also referred to as leader or the dominant leader. A continuation of the main trunk located more or less in the center of the crown, beginning at the lowest main scaffold branch and extending to the top of the tree.

H. Circling root(s): One or more roots whose diameter is greater than ten percent (10%) of the trunk caliper circling more than one-third of the trunk. Circling roots are unacceptable.

I. Clear Trunk: The portion of the trunk below the main crown which may include shortened temporary branches.

J. Co-dominant: Two or more vigorous, upright branches or stems of relatively equal diameter that originate from a common point, usually where the leader was lost or removed. Co-dominant stems are unacceptable.

K. Container-Grown: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed

from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.

L. Critical Root Zone (CRZ): Shall be defined as the tree protection area encompassing from 1.5 (minimum) to 2.0 times the distance between the trunk and drip line, or one linear foot away from the trunk base for every-inch diameter of the trunk, whichever is greater. Review the extent of the CRZ for impacted trees with Project Manager prior to start of work.

M. Crown: The portion of a tree beginning at the lowest main scaffold branch extending to the top of the tree. On younger trees, the crown may be comprised of temporary branches.

N. Cultivar: A named plant selection from which identical or nearly identical plants can be produced, usually by vegetative propagation or cloning.

O. Drip Zone: The outermost edge of the tree's canopy or branch spread. The area within a tree's drip line is all the ground under the total branch spread.

P. Finish Grade: Elevation of finished surface of planting soil.

Q. Included Bark: Bark embedded in the union between a branch and the trunk or between two or more stems that prevents the formation of a normal branch bark ridge. Included bark is unacceptable.

R. Kinked Root: A main root that is sharply bent. Kinked roots are unacceptable.

S. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also include substances or mixtures intended for use as a plant regulator, defoliant, or desiccant. Some sources classify herbicides separately from pesticides.

T. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

U. Root Collar: Also referred to as the root flare. The base of a tree where the main roots and trunk meet.

V. Scaffold Branches: Large main branches that form the main structure of the crown.

W. Stem-girdling Root: A circling, bent, or straight root that touches or rests on the trunk or root flare that can become a permanent root. Stem-girdling roots are unacceptable.

X. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

Y. Temporary Branch: A small branch that is temporarily retained along the lower trunk of young trees.

Z. Trunk: The main stem of a tree, beginning at the root collar and ending at the lowest main scaffold branch.

AA. Taper: The thickening of a trunk or branch toward its base.

1.4 SUBMITTALS

A. See Division 01 Section “Submittals” for submittal requirements.

B. Product Data: For each type of product.
   1. Plant Materials: Include quantities, sizes, quality, and sources for plant materials.

C. Product Samples: At a minimum provide the following samples for approval by the Project Manager, additional product samples may be required at the direction of the Project Manager.
   1. Rock Mulch: one(1) gallon bag minimum.
   2. Organic Mulch: one(1) gallon bag minimum.
   3. Weed barrier.
   4. Fertilizers.
   5. Soil analysis.
   6. List of plant material sources.

D. Pesticides: Product label, Safety Data Sheet (SDS) labels and manufacturer's application instructions specific to Project.

E. Proper Identification: All plants shall be true to name as ordered or shown on planting plans and shall be labeled individually or in groups by species and cultivar (as appropriate).

F. Contractor shall provide a complete list of all plant material for approval by the Project Manager a minimum of ten (10) days prior to delivery. Any substitutions of plant material, including but not limited to size, type, species and variety shall be listed and submitted to the Project Manager for approval.

G. Contractor shall provide the following certificates:
   1. State Inspection Certificate from the origin nursery.
   2. Certificate from origin state.
   3. Quarantine Certificate from origin state.
   4. Any Certificates required by the USDA Animal and Plant Health Inspection Service (APHIS) and ANSI-Z-160 and accompanying Rules and Regulations.

H. Analysis of existing soil shall be per Division 32 Sections “Topsoil” and “Soil Preparation”.

I. Contract Close Out Submittals:
   1. Operating and Maintenance Data: At completion of work, submit One (1) digital copy and two (2) hard copies to the Project Manager in accordance with Division 01 Section “Contract Closeout”. Include recommended procedures for continued and proper maintenance during a full calendar year.
   2. Warranty for Trees, Plants, and Groundcovers: At completion of work, furnish written warranty to the Project Manager based upon specified requirements.

1.5 QUALITY CONTROL

A. The Project Manager reserves the right to reject, at any time or place prior to final acceptance, all plant materials that fail to meet these specifications in the Project Manager’s opinion. Inspection of materials is primarily for quality, size, and variety, but other requirements are not waived even though visual inspection results in approval. Plants are to be inspected where available; however, inspection at the places of supply shall not preclude the right of rejection at the site or at a later time prior to final acceptance. Rejected material shall be removed from the site within twenty-four (24) hours.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Materials: Deliver materials in original containers with tags showing genus, species and size. Protect materials from damage during delivery and while stored at site. The Project Manager reserves the right to inspect containers before or after installation to verify compliance with Specifications.

B. Bulk Materials:
   1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants or critical root zone.
   2. Provide erosion-control measures to prevent erosion or displacement of bulk materials; discharge of soil-bearing water runoff; and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
   3. Accompany each delivery of bulk materials with appropriate certificates.

C. Trees: Nursery stock shall be harvested and planted during the same growing season. Do not prune, except as approved by the City Forester and Project Manager. Protect bark, branches, and root systems from sun scald, drying, sweating, whipping, and other handling and tying damage. Do not bend or tie trees in such a manner as to destroy natural shape. Provide protective covering during delivery. Plant materials delivered without protective covering may be rejected. Do not drop trees during delivery. All trees shall be labeled with a securely attached waterproof tag bearing a legible plant name. Remove all tags and flagging as directed by the Project Manager.

D. Deliver bare-root stock plants within twenty-four (24) hours of digging. Immediately after digging up bare-root stock, pack root system in wet straw, hay, or other suitable material to keep root system moist until planting. Transport in covered, temperature-controlled vehicles, and keep plants cool and protected from sun and wind at all times.

E. Store bulbs, corms, and tubers in a dry place at sixty degrees to sixty-five degrees (60° to 65°) F until planting.

F. Apply antidesiccant to trees and shrubs using power spray to provide an adequate film over trunks (before wrapping), branches, stems, twigs, and foliage to protect during digging, handling, and transportation.
   1. If deciduous trees or shrubs are moved in full leaf, spray with antidesiccant at nursery before moving and again (2) two weeks after planting.

G. Handle planting stock by the root ball only.

H. Deliver trees after preparations for planting have been completed and install immediately. If planting is delayed more than six (6) hours after delivery, set planting materials in shade, protect from weather and mechanical damage, and keep roots moist.
   1. Set balled stock on ground and cover ball with wood chips, or other acceptable material.
   2. Do not remove container-grown stock from containers before planting.
   3. Water root systems of trees stored on site with a fine-mist spray. Water as often as necessary to maintain root systems in a moist condition.

1.7 PROJECT/SITE CONDITIONS

A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.

B. Vehicular accessibility on site shall be as directed by Project Manager. Repair damage to prepared topsoil and existing surfaces, caused by vehicular access and movement during work under this section, to original condition at no additional cost to the Owner.

C. Utilities: Contractor shall be responsible locating utilities and, repair of utilities damaged during the work. Determine location of overhead and underground utilities and perform work in a manner that will avoid damage. Hand excavate, as required. Maintain markings until their removal is mutually agreed upon by the Contractor and Project Manager.

D. Excavation: When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify the Project Manager before planting.

E. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

F. Protection: Erect and maintain barricades, warning signs and lights, and provide guards as necessary or required to protect all persons on the site from exposed excavations.

1.8 COORDINATION AND SCHEDULING

A. Coordinate installation of planting materials during normal planting seasons for each type of plant material required. Planting materials should be planted between April 15 and October 1, or at the direction of the Project Manager. If irrigation is not available at the time of planting then the Contractor is responsible for watering of all plant material and no additional cost to the City, refer to Division 32 Section “Watering”.

B. Plant trees after final grades have been accepted and prior to seeding or sodding, unless otherwise authorized by Project Manager.

1.9 WARRANTY

A. Warranty: The warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Trees, Plants, and Groundcovers shall be warranted for a period of one (2) year after date of Substantial Completion, against defects including death, structural failures, dieback as determined by the City Forester and or Project Manager. Warranty shall not cover defects resulting from lack of adequate maintenance, neglect or abuse by Onwer, hail, or incidents that are beyond Contractor’s control.

C. The warranty shall not be enforced should any plant die due to vandalism after Final Acceptance.

D. Remedial Actions:
   1. Replace any plant materials that have been excessively pruned, more than twenty percent (20%) percent dead, or in an unhealthy or declining condition immediately upon notice from the Project Manager during warranty period.
   2. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.

E. All plants shall be true to name and meet all conditions of these specifications. Any plant that is not true to name as indicated by form, leaf, flower, or fruiting characteristics shall be replaced at the Contractor's expense.

1.10 TREE MAINTENANCE DURING CONSTRUCTION PERIOD

A. Maintain trees by pruning, cultivating, watering, mulching, winter watering, weeding, wrapping, unwrapping, restoring planting saucers, and resetting to proper grades or vertical position, as required to establish healthy, viable plantings. Control as required to keep trees free of insects and disease. Restore or replace damaged tree wrappings, stakes, guying. Trees shall be maintained by the Contractor through the Warranty period of the project.

PART 2 - PRODUCTS

2.1 PLANT MATERIALS

A. General: Furnish and install nursery-grown trees and shrubs conforming to the requirements of ANSI-Z-160, with healthy root systems developed by transplanting or root pruning. Provide well shaped, symmetrical, fully branched, healthy, and vigorous stock free of disease, insects, eggs, larvae, girdling, and defects such as sun scald, injuries, abrasions, and disfigurement. Trees of a larger size than that specified in the plant list may be used with a proportionate increase in size of roots and balls, if acceptable to the Project Manager. The use of larger plants shall be covered by the Contractor at no additional cost to the Owner.

B. Label all plants of each size, caliper and variety and caliper with a securely attached waterproof tag bearing legible designation of botanical and common name.

C. All plants shall be the genus, species, and variety designated on the Contract Drawings. No substitutions will be accepted without the prior written approval of the City Forester and or the Project Manager. Contractor must provide proof of non-availability.

2.2 TREES

A. These specifications shall apply to deciduous, broadleaf evergreen and coniferous species. Note that leaf characteristics will not be evident on deciduous trees during the dormant season.

B. Crown: The form and density of the crown shall be typical for a young specimen of the species/cultivar. Changes in form caused by wind, pruning practices, pests, or other factors shall not substantially alter the form for the species/cultivar. These crown specifications do not apply to plants that have been specifically trained in the nursery to be: topiary, espalier, multi-stem, or clump; or unique selections such as contorted or weeping cultivars.
   1. Trees shall have a single, relatively straight trunk, and central leader, unless noted on plans to be "Multi-trunk" or "Clump". They shall be free of co-dominant stems and vigorous, upright branches that compete with the central leader. If the original leader has been headed, a new leader at least one-half of the diameter of the original leader shall be present.
   2. Main branches shall be evenly distributed along the central leader, not clustered together. They shall form a balanced crown appropriate for the age of the species/cultivar.
   3. Branch diameter shall be no larger than one-half the diameter of the central leader measured one-inch (1") above where the branch is attached.
   4. The attachment of the largest scaffold branches shall be free of included bark.
   5. Temporary branches, unless otherwise specified, should be present along the lower trunk below the lowest scaffold branch, particularly for trees less than one-inch (1") in caliper. These branches should be no greater than three-eighths-inch (3/8") diameter. Clear

trunk shall be no more than thirty percent (30%) of the total height of the tree, unless otherwise noted

C. Trunk: The tree trunk shall be relatively straight, vertical, and free of wounds, except properly made pruning cuts, which shall be closed over or less than three-quarters-inch (3/4") diameter open, sunburned areas, conks (fungal fruiting bodies), wood cracks, bleeding areas, signs of boring insects, galls, cankers, stem-girdling ties, or lesions (mechanical injury).
   1. Trunk caliper and taper shall be sufficient so that the tree will remain vertical without a stake. Trunk caliper at six-inches (6") above the soil media (substrate) surface shall be within the diameter range shown for each container size below and as specified in current edition of ANSI Z60.1.
   2. The cut made when re-growing the top should be just above the major structural roots. The "shank" that results from this procedure should be at a consistent height above the structural roots and no longer than five-inches (5"), to ensure that the trees are consistently planted at the correct depth. The base of the trunk should not have a large pruning cut from re-growing the top.

D. Roots: The root system shall be substantially free of injury from biotic (e. g., insects and pathogens) and abiotic (e. g., pesticide toxicity and salt injury) agents.
   1. The uppermost roots or root collar shall be within the upper two-inches (2") of the soil media (substrate). Depth of the root-ball shall be measured from the top of the ball, which in all cases shall begin at the root flare. Soil above the root flare shall not be included in the root-ball depth measurement, and shall be removed.
   2. The root collar and the inside portion of the root-ball shall be free of defects, including circling, kinked, and stem-girdling roots. Soil removal or root washing near the root collar may be necessary to inspect for the aforementioned root defects.
   3. Roots on the periphery and bottom of the root-ball shall be less than one-eighth-inch (1/8") diameter.
   4. The tree shall be well rooted in the soil media (substrate). Root distribution shall be uniform throughout the soil or media. Structure and growth shall be appropriate for the species/cultivar. When the burlap or container is removed, the root-ball shall remain intact. Trees should have several lateral roots or many fibrous roots spaced evenly around the trunk to provide support so the trees are stable when planted. Trees should have as many small roots as possible. These roots are key to the uptake of sufficient water and nutrients. Fibrous roots can be achieved by root-pruning, using air-pruning containers, or under-cutting or root pruning and transplanting at any stage of production.
   5. As a general rule for young nursery-grown trees, there should be two or more structural roots within one- to three-inches (1" – 3") of the soil surface. "First order lateral roots" is another term that has been used for these roots. If the roots are deeper than three-inches (3") , the stock shall be rejected.
   6. Root-balls that are undersized as specified in current edition of ANSI Z60.1. shall be rejected. Field grown trees for balled and burlap delivery shall have the roots pruned at least six-inches (6") inside the final root-ball size performed within adequate time for the tree to develop fibrous roots at the outer edge of the root-ball prior to harvest and delivery.

E. Leaves: The size, color, and appearance of leaves shall be typical for the time of year and stage of growth of the species or cultivar. Trees shall not show signs of prolonged moisture stress or extended drought as indicated by wilted, shriveled, or dead leaves.

F. Branches: Shoot growth (length and diameter) throughout the crown shall be appropriate for the age and size of the species/cultivar. Trees shall not have dead, diseased, broken, distorted, or otherwise injured branches.

G. All deciduous trees of one species used in formal rows or groupings shall exhibit cultural uniformity, i.e. “matched” in height, crown width and shape, height to first branch, and trunk taper. For this reason it is desired that these trees be produced by a single grower.

H. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated, and only if approved by the City Forester and or the Project Manager.

2.3 SHRUBS

A. Container Grown Shrubs: All specifications for container grown plants shall include both plant size and container size. Plant size intervals and reference to height or spread shall be in accordance with the guidelines for the appropriate plant type set forth in ANSI Z60.1; Section 2.2 - Types of Deciduous Shrubs.

B. Container size shall be by container classification (i.e., not by container volume) as set forth in the ANSI Z60.1 Container Class Table.

C. In all cases, container grown nursery stock shall meet the following general requirement:
1. All container grown nursery stock shall be healthy, vigorous, well rooted, and established in the container in which it is growing. Container grown nursery stock shall have a well-established root system reaching the sides of the container to maintain a firm ball when the container is removed, but shall not have excessive root growth encircling the inside of the container.

D. The container shall be sufficiently rigid to hold the ball shape and to protect the root mass during shipping.

E. Minimum shrub sizes shall conform to the following standards:
1. Tender shrubs (Type 0) that do not produce top growth that is winter hardy:

Height or Spread	**Minimum number of canes**	**Minimum spread of roots**
fifteen-inches (15”)	three (3) canes	Nine-inches (9”)

2. Small shrubs (Type 1) that grow to a mature height of not more than three feet (3’):

Height or Spread	**Minimum number of canes**	**Minimum spread of roots**
fifteen-inches (15”)	four (4) canes	Nine-inches (9”)

3. Intermediate shrubs (Type 2) that grow to a mature height between three feet (3’) and seven feet (7’):

Height or Spread	**Minimum number of canes**	**Minimum spread of roots**
Two feet (2’)	four (4) canes	twelve-inches (12”)

4. Large shrubs (Type 3) that grow to a mature height exceeding seven feet (7’):

Height or Spread	**Minimum number of canes**	**Minimum spread of roots**
four feet (4’)	six canes (6)	twenty-inches (20”)

2.4 PERENNIALS, GRASSES, GROUNDCOVERS, AND VINES

A. All container grown plants shall be healthy, vigorous, well rooted, and established in the container in which they are growing, and be in conformance with ANSI Z60.1. A container grown plant shall have a well-established root system reaching the sides of the container to

maintain a firm root ball, but shall not have excessive root growth encircling the inside of the container. Top growth is to be in conformance with established nursery standards.

2.5 TREE-STABILIZATION MATERIALS

A. Trunk-Stabilization Materials:
1. Deciduous Tree Stakes: Rough-sawn, sound, new softwood with specified wood preservative treatment by pressure process, free of knots, holes, cross grain, and other defects, two-inch (2") diameter by six feet (6'), pointed at one end.
2. Evergreen Tree Stakes: Two foot (2') steel T-posts; green color.
3. Guys and Tie Wires: ASTM A 641/A 641M, Class 1, #14 galvanized-steel wire, two-strand, twisted.
4. Tree-Tie Webbing: UV-resistant nylon webbing with brass grommets, size as indicated.
5. Safety signals for guy and staking wire: one-half-inch (1/2") diameter PVC pipe, length as indicated.

B. Tree-Wrap:
1. Two layers of crinkled paper cemented together with bituminous material, four-inches (4") wide minimum, with stretch factor of thirty-three percent (33%).
2. Tree wrap tape: Tape as approved by the City Forester and or the Project Manager.

2.6 MULCH

A. Organic Mulch: Organic mulch, free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of chipped wood material not larger than four-inches (4") in length. Submit a one (1) gallon bag sample to Project Manager for approval. Mulch is to be weed-free.

2.7 PLANT PIT BACKFILL MATERIAL

A. Unless otherwise directed by the Project Manager, the plant pit backfill material shall consist of the following, thoroughly mixed:
1. Soil originally excavated from the pit: two thirds (2/3) proportion of total mix.
2. Soil Amendment as specified in Division 32 Section "Soil Preparation"; one-third (1/3) proportion of total mix.

B. If imported topsoil is required, it shall meet the requirements specified in Division 32 Section "Topsoil", Article 2.2.

2.8 WATER

A. During the irrigation season (generally May through September), water will be available from on-site quick couplers. When the system is not charged, it shall be the Contractor's responsibility to supply adequate amounts of water from a water truck or other approved source. Hoses and other watering equipment shall be supplied by Contractor.
1. Watering Amount: Ten (10) gallons per caliper-inch.

B. Watering: Refer to Division 32 Section "Watering".

C. Maintenance: Refer to Division 32 Section "Landscape Maintenance".

2.9 MISCELLANEOUS MATERIALS

A. Antidesiccant: Water-insoluble emulsion, permeable moisture retarder, film forming, for trees, as approved by the City Forester and or the Project Manager. Deliver in original, sealed, and fully labeled containers. Mix and apply according to manufacturer's instructions.

B. Pre-Emergent Pesticide: As approved by the City Forester and or the Project Manager.

C. Pesticides: EPA registered and approved, and as approved by the City Forester and the Project Manager.

D. Subdrainage: See Division 33 Section “Subdrainage Systems”.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive landscaping for compliance with requirements and for conditions affecting performance of work of this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.
   1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within the work area.
   2. Verify that adequate overhead clearance exists to planting locations.
   3. Suspend planting operations during periods of excessive moisture until acceptable planting conditions exist.
   4. Uniformly moisten excessively dry soil that is not workable.

B. If contamination is present in the soil within a planting area, notify Project Manager immediately.
   1. If contamination is discovered during Construction the Project Manager will determine the best course of action to remediate the contamination, which may include requesting the Contractor perform the removal of contamination and replacement of clean material.
   2. If contamination is determined to be the result of construction operations, Contractor is to remove contaminated material and replace with clean material at the direction of the Project Manager.

C. Proceed with installation only after unsatisfactory conditions have been corrected and approved by Project Manager.

D. Cooperate with any other contractors and trades, who may be working in and adjacent to the landscape work areas. Examine Contract Drawings which show the development of the entire site and become familiar with the scope of all work required.

3.2 FINISH AND FINE GRADING

A. See Division 31, Sections “Earth Moving and 32 Sections “Soil Preparation” and “Topsoil”.

3.3 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, turf areas and existing plants from damage caused by planting operations. Repair damage to surrounding areas and site elements noted above resulting from planting operations at no additional cost to the Owner.

B. Layout, stake and label all individual tree locations for approval by the Project Manager prior to installing trees.

C. Outline planting beds and mark plant locations within the bed(s) for approval by the Project Manager prior to installing any plant material or mow bands. Make adjustments as directed at no additional cost to the Owner.
   1. If formal arrangements or consecutive order of plants is indicated on Contract Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.

D. Prepare planting area for soil placement and mix planting soil according to Division 32 Section “Soil Preparation”.

3.4 WEED CONTROL

A. Do not proceed with landscape work until weed growth has been controlled and eliminated, per Division 32 Section “Soil Preparation”.

B. See Division 32 Section “Soil Preparation” for detailed weed control measures.

C. Use pesticides only with the written approval of Project Manager, and in strict accordance with manufacturer’s instructions.

3.5 EXCAVATION FOR TREES AND SHRUBS

A. Planting Pits: Excavate by hand or with a backhoe. Scarify sides of tree pit. Tree spade may not be used to dig tree pits.
   1. Balled and Burlapped Trees: Excavate a minimum two times (2X) as wide as ball diameter at base of pit. The base of the root collar shall be three-inches (3”) higher than the grade at which the tree originally grew and finished grade. Slope sides of the pit as shown on the detail.
   2. Container-Grown Trees and Shrubs: Excavate approximately two times (2X) times as wide as container diameter. Plants shall be set one-inch (1”) higher than finished grade.
   3. Do not excavate deeper than depth of the root ball, measured from the base of the root flare to the bottom of the root ball.
   4. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly compact the added soil to prevent settling.

B. Obstructions:
   1. Utilities: Notify Project Manager immediately of utilities that conflict or may potentially conflict with proposed plant locations. In such cases, alternative plant locations will be determined by Project Manager.
   2. Notify the Project Manager prior to planting if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavation.

C. Drainage: Notify the Project Manager if subsoil conditions show evidence of water seepage or retention in tree or shrub pits.
   1. Fill the pit with water and allow it to completely drain before planting occurs.
   2. If water does not drain out of pit within twenty-four (24) hours, notify Project Manager.

3.6 PLANTING TREES AND SHRUBS

A. Balled and Burlapped Stock:
   1. Set balled and burlapped stock plumb and in center of pit with base of root flare three-inches (3”) above adjacent finish grades as indicated.
   2. Remove burlap from top two-thirds (2/3) of balls and partially from sides, but do not remove from under balls. Remove wire baskets and all twine entirely. Remove pallets, if

any, before setting. Do not use planting stock if ball is cracked or broken before or during planting operation.

3. Place backfill around ball in layers, tamping to settle backfill and eliminate voids and air pockets. When pit is approximately one-half backfilled, water thoroughly before placing remainder of backfill. Repeat watering until no more is absorbed. Water again after placing and tamping final layer of backfill.

B. Container Grown Stock:
   1. Carefully remove containers so as not to damage root balls.
   2. Lightly scratch sides of exposed root ball to loosen surface roots.
   3. Set plants plumb and in center of pit with top of ball raised one-inch (1") above adjacent finish grades or as indicated.
   4. Place backfill around ball in layers, tamping to settle backfill and eliminate voids and air pockets. When pit is approximately one-half backfilled, water thoroughly, then place remainder of backfill. Repeat watering until no more is absorbed. Water again after placing and tamping final layer of backfill.

C. Bare-Root Stock: Set and support each plant in center of planting pit or trench with root flare two-inches (2") above adjacent finish grade.
   1. Backfill: As specified in Part 2 of this Section.
   2. Spread roots laterally without tangling or turning toward surface. Plumb before backfilling, and maintain plumb while working.
   3. Carefully work backfill in layers around roots by hand eliminating air pockets. Bring roots into close contact with the soil.
   4. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
   5. Continue backfilling process. Water again after placing and tamping final layer of soil.

D. Tree Staking: Stake trees as shown on the Contract Drawings.

E. Wrapping tree trunks: Wrap trees with tree wrap tape. Start at base of trunk and spiral cover trunk to height of first branches. Overlap wrap, exposing half the width, and securely attach without causing girdling. Use specified tape to secure. Do not use staples. Inspect tree trunks for injury, improper pruning, and insect infestation and take corrective measures required before wrapping.
   1. All deciduous trees shall be wrapped between November 1st and November 15th or per the direction of the City Forester and or the Project Manager. All tree wrap shall be removed by May 15.
   2. Contractor shall be responsible for wrapping and unwrapping trees during the warranty period.

3.7 PRUNING OF PLANTS

A. Prune only damaged or dead branches as directed by the City Forester and or the Project Manager.

3.8 TREE STABILIZATION

A. Trunk Stabilization by Staking: Install trunk stabilization as follows unless otherwise indicated on Contract Drawings.
   1. Site-Fabricated Staking Method: Stake trees as indicated on Contract Drawings.
      a. Drive stakes into undisturbed grade outside tree pit as indicated. Avoid penetrating root balls or root masses.
      b. Securely attach specified wire to stakes.

c. Support trees with specified wire and tree tie webbing at contact points with tree trunk, reaching to specified stake. Allow enough slack to avoid rigid restraint of tree.
d. For guyed trees: Attach thirty-six-inch (36”) long x one-half-inch (1/2”) diameter PVC pipe flagging to each wire.
e. For staked trees: Attach twenty four-inch (24”) long x one-half-inch (1/2”) diameter PVC pipe flagging to each wire.

3.9 MULCHING

A. Trees: Create a forty-eight-inch (48”) diameter formed soil berm around tree and fill with three-inch (3”) deep specified wood mulch. Mulch shall be kept four to six-inches (4”-6”) away from tree trunk.

B. Shrubs:
1. Mulch backfilled surfaces of pits, planting beds areas, and other areas indicated or as directed by the Project Manager.
2. Mulch in shrub bed areas: Apply three-inch (3”)thick layer of mulch and finish level with adjacent finish grades. Do not place mulch against stems of plants.

3.10 INSTALLATION OF MISCELLANEOUS MATERIALS

A. Apply antidesiccant using power spray to provide an adequate film over trunks, branches, stems, twigs, and foliage.

B. When deciduous plants are moved in full-leaf, Project Manager may direct the use of an antidesiccant at nursery before moving and again two (2) weeks after planting. Antidessicant to be supplied and applied by Contractor at no additional cost to the City.

3.11 QUALITY CONTROL

A. Provide quantity, size, genus, species, and variety of trees indicated, complying with current applicable requirements of ANSI Z60.1 “American Standard for Nursery Stock”, and all applicable state and local rules and regulations.

B. Inspection: Contractor shall arrange for the Project Manager to select and/or inspect plant material at the nursery grow site or upon delivery to the site, for compliance with requirements for genus, species, variety, cultivar, size, and quality. Selection and approval of plant material shall be at the discretion of the Project Manager.
1. The Contractor shall schedule inspection of the plants, at either the supplier or on-site, to be completed in one visit. Any further inspection required due to plants being unavailable, rejected, and or not meeting specifications shall be charged to the Contractor at the current hourly rate for the Onwer personnel performing the inspection.
2. The Contractor shall pay all expenses for the Project Manager and City Forester to visit the source for plants including airfare, taxi, hotels and meals.

C. Measurements: Measure trees according to the requirements of the ANSI Z-160, with branches and trunks in their normal position. Do not prune to obtain required sizes. Measure main body of tree for height and spread; do not measure branches or roots tip-to-tip.

3.12 PROTECTION

A. Protect existing utilities, paving and other facilities from damage caused by seeding operations, Contractor shall repair any damage at no additional cost to the Owner.

B. Restrict vehicular and pedestrian traffic from planted areas. Erect signs and barriers as required or directed by the Project Manager at no additional cost to the Owner.

C. Locate, protect and maintain the irrigation system during seeding operations. Repair irrigation system components damaged during seeding operations shall be replaced or repaired to current Owner irrigation standards at Contractor's expense.

D. Erosion Control: Take measures and furnish equipment and labor necessary to control and prevent soil erosion, blowing soil and accumulation of wind-deposited materials on the site throughout the duration of work.

E. At time of Substantial Completion, verify that tree-watering devices are in good working order and leave them in place. Replace improperly functioning devices.

3.13 CLEANING

A. General: Provide and install barriers as required and as directed by Project Manager to protect sodded areas against damage from pedestrian and vehicular traffic until Final Acceptance.

3.14 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus soil including excess subsoil and unsuitable soil, waste material, including, trash, and debris generated during installation off site at no additional cost to the City.

PART 4 - MEASUREMENT AND PAYMENT (add if necessary)

4.1 MEASUREMENT

A. Measurement will be made by the contract unit specified for Trees, Plants, and Groundcovers. Measurement shall include the actual number of units of specified material(s) placed and accepted at the locations shown on the Contract Drawings, or as directed by the Project Manager, and in accordance with the Specifications.

4.2 PAYMENT

*A. Payment will be made at the **EACH** price, and shall include required materials, transportation, equipment, labor, earthwork, loading, transporting, stockpiling, disposing, hauling off, watering, dust control, erosion and sediment control, fine grading, maintenance of temporary protection by fencing or other means, watering and all maintenance required until Final Acceptance of the work as required in accordance with the Contract Drawings and Specifications.*

END OF SECTION 32 93 00

SECTION 33 46 00

SUBDRAINAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. CONTRACTOR shall furnish all labor, tools, and equipment and perform all Work necessary for, or incidental to, the supply and installation of pipe underdrains as shown in the DRAWINGS and specified herein. This WORK includes trenching, placement of a geotextile fabric, rock, HDPE pipe, PVC pipe, and clean-outs to drain water from structure foundations. The WORK shall be coordinated with the work of all other trades and activities on the PROJECT.

B. CONTRACTOR shall furnish and install all supplementary and miscellaneous items, appurtenances and devices incidental to or necessary for a complete installation.

1.02 RELATED SECTIONS

A. The following is a list of SPECIFICATIONS which may be related to this section:

1. Section 01 57 19, Temporary Environmental Controls

2. Section 31 23 19, Dewatering.

3. Section 31 23 33, Trenching and Backfilling.

4. Section 31 25 00, Erosion and Sedimentation Controls

1.03 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Association of State Highway and Transportation Officials (AASHTO):

a. M252, Standard Specification for Corrugated Polyethylene Drainage Pipe.

b. M294, Standard Specification for Corrugated Polyethylene Pipe, 300-mm to 1500-mm Diameter.

2. ASTM International (ASTM):

a. C33, Standard Specification for Concrete Aggregates.

b. D737, Standard Test Method for Air Permeability of Textile Fabrics.

c. D1784, Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.

d. D3034, Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

e. D3212, Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.

f. D3776, Standard Test Method for Mass per Unit Area (Weight) of Fabric.

g. D3786, Standard Test Method for Bursting Strength of Textile Fabrics—Diaphragm Bursting Strength Tester Method.

h. D3887, Standard Specification for Tolerances for Knitted Fabrics

i. D4491, Standard Test Methods for Water Permeability of Geotextiles by Permittivity.

j. D4533, Standard Test Method for Trapezoid Tearing Strength of Geotextiles.

k. D4632, Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.

l. D4751, Standard Test Method for Determining the Apparent Opening Size of a Geotextile.

m. D4833, Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.

n. D6241, Standard Test Method for the Static Puncture Strength of Geotextiles and Geotextile-Related Products using a 50-mm Probe

o. D6707, Standard Specification for Circular-Knit Geotextile for Use in Subsurface Drainage Applications

p. F405, Standard Specification for Corrugated Polyethylene (PE) Pipe and Fittings.

q. F477, Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

1.04 SUBMITTALS

A. Submittals shall include as a minimum the following:

1. Geotextile fabric.

2. Rock gradation results.

3. Polyethylene pipe and fittings (including slot perforation pattern).

4. PVC pipe and fittings (including perforation pattern).

5. Meter vault sections and lid (where required for clean-outs).

1.05 DELIVERY, STORAGE, AND HANDLING

A. Geotextile: During shipment and storage, the rolls of fabric shall be protected against deterioration from the sun, mud, dirt, dust, and other deleterious conditions at all times.

B. Keep Pipe shaded from direct sunlight prior to installation in the trench.

PART 2 PRODUCTS

2.01 GEOTEXTILE FABRIC

A. The fabric shall have complete resistance to deterioration from ambient temperatures, acid, and alkaline conditions, and shall be indestructible to microorganisms and insects. The material shall be resistant to short-term (until placement) deterioration by ultraviolet light or protected until placement, as recommended by the manufacturer, such that no deterioration occurs.

B. Fibers used in the manufacture of geotextiles, and the threads used in joining geotextiles by sewing, shall consist of long chain synthetic polymers composed of at least eighty five percent (85%) by weight polyolefins, polyesters, or polyamides. They shall be formed into a network such that the filaments or yarns retain dimensional stability relative to each other, including selvedges.

C. The property values shown below are not design values, but represent the minimum accepted physical characteristics of the geotextile required. The number represents a value to be confirmed by the manufacturer. These values represent minimum average roll values (for example, any roll tested shall meet or exceed the minimum values in the table).

Property	**Value**	**Test Method**
Grab Strength	120 lbs.	ASTM D4632
Grab Tensile Elongation	55%	ASTM D4632
Burst Strength	225 psi	ASTM D3786
Puncture Resistance	65 lbs.	ASTM D4833
Trapezoid Tear Strength	50 lbs.	ASTM D4533
Apparent Opening Size	70, U.S. Standard Sieve	ASTM D4751
Permittivity	1.7 $sec.^{-1}$	ASTM D4491
Water Flow Rate	140 $gal./min./ft.^2$	ASTM D4491

D. Geotextile fabric for pipe underdrains shall be Mirafi 140N or equivalent.

2.02 DRAIN SLEEVE

Property	Value	Test Method
Weight	3.5 – 3.9 oz./yd^2.	ASTM D3776
Thickness	0.040 in.	
Burst Strength (min)	120 psi	ASTM D3887
Puncture Resistance (min)	180 lbs.	ASTM D6241
Air Permeability	700 ft.^{3}/ft.^{2}/min.	ASTM D737
Apparent Opening Size	30, U.S. Standard Sieve	ASTM D4751
Permittivity (min)	2.4 sec.$^{-1}$	ASTM D4491
Water Flow Rate	300 gal/min/ft.^{2} (2" Constant Head)	ASTM D4491

2.03 ROCK BEDDING

A. Unless otherwise shown in the DRAWINGS, rock shall consist of dense, clean, uniformly graded material with a maximum size of two (2) inches and less than five percent (5%) passing the three-eighths inch (3/8") sieve. Coarse concrete aggregate meeting the requirements of ASTM C33 No. 4 may be used.

2.04 HDPE PIPE AND FITTINGS

A. ADS Heavy Duty Pipe meeting ASTM F405 with slotted or circular perforations providing a minimum inlet area as required by AASHTO M252 or AASTO M294 Class 2 perforations.. The slotted perforation pattern shall be in accordance with AASHTO M252 or AASHTO M294 Class 2 perforations providing a flow rate for six-inch (6") diameter pipe of ninety four hundredths (0.94) GPM at a one-foot (1') pressure head. The pipe is available in ten-foot (10') joints, one hundred (100), and one thousand five hundred (1,500) linear foot rolls. The pipe shall include a factory-installed drain sleeve that meets the requirements of ASTM D6707 (ADS Drain-Sleeve or approved equal).

B. HDPE pipe and fittings shall be made in accordance with ASTM F405.

C. HDPE pipe shall be Type S or approved equal.

2.05 PVC PIPE AND FITTINGS

A. Specifications and Dimensions:

1. PVC pipe and fittings shall be made in accordance with ASTM D1784.

2. The pipe shall be designed, manufactured, tested, inspected and marked in accordance with the provisions of this SPECIFICATION and ASTM D3034. The minimum wall thickness shall be SDR 35.

3. Nominal pipe lengths of pipe shall be twenty (20) feet, with shorter lengths provided as required by DRAWINGS, alignment, and grade.

B. Joint Type:

1. Pipe joints shall be made using an integral bell with an elastomeric gasket push-on type joint. The joint shall comply with the requirements of ASTM D3212.

2. Gaskets shall meet the requirements of ASTM F477.

3. Solvent-cement joints are strictly prohibited.

C. Perforations:

1. PVC piping shown on the DRAWINGS to be perforated shall be perforated to the pattern shown on the DRAWINGS. If no pattern is shown on the DRAWINGS, four (4) one-quarter inch (1/4") diameter holes shall be provided at six-inch (6") centers at the quarter points of the pipe. No perforation shall be made within six (6) inches from either end of the pipe.

2. Laterals, drain lines away from the structure, and the top ten (10) feet of cleanout risers shall have a solid wall.

2.06 METER VAULT

A. The precast concrete meter vault sections and lid shall be to the dimensions shown on the DRAWINGS. The vault shall be furnished by Amcor or equivalent. The lid shall be blank and not be labeled “water.”

PART 3 EXECUTION

3.01 TRENCHING

A. The underdrain shall be trenched into the native soil a maximum of six (6) inches if so shown on the DRAWINGS to the grades shown on the DRAWINGS. The trenches shall slope uniformly at the grade shown on the DRAWINGS.

3.02 GEOTEXTILE FABRIC

A. All perforated pipe shall be wrapped with geotextile fabric.

B. Perforated pipe in cleanout risers shall be wrapped in geotextile fabric. Suitable means shall be found to seal the seam and maintain the position of the fabric during backfilling.

C. Care shall be taken not to tear any geotextile fabric during backfilling.

3.03 ROCK

A. Rock shall be placed on the geotextile fabric to the depth shown prior to placement of the underdrain pipe. After the pipe is in place, rock shall be placed along and over the top of the pipe in a manner that shall not damage the pipe.

3.04 HDPE PIPE AND FITTINGS

A. The pipe shall be installed in accordance with the manufacturer’s written instructions, a copy of which shall be maintained on site during pipe installation.

3.05 PVC PIPE AND FITTINGS

A. General: When laying PVC pipe out on a curve, the joints may be deflected up to seventy five percent (75%) of the maximum value permitted by the manufacturer of the pipe. Tighter curves shall be made by either using shorter lengths of pipe or by using manufactured bends.

B. Perforated Pipe: Perforated pipe shall be placed in the rock bedding as shown on the DRAWINGS.

C. Solid Pipe: Solid PVC pipe shall be placed on six (6) inches of sand bedding, unless the native soil is capable of providing uniform support as approved by ENGINEER or shown on the DRAWINGS.

3.06 CLEAN-OUTS

A. The clean-out risers shall be protected from damage during the backfilling operations.

B. The ring and cap shall be secured in place with a reinforced concrete collar as shown on the DRAWINGS.

END OF SECTION