# CITY OF GREELEY INVITATION FOR BID

## BITTERSWEET PARK IRRIGATION AND WATER CONSERVATION PROJECT

BID #FA19-10-88 DUE NOVEMBER 6, 2019 by 2:00 PM



Serving Our Community It's A Tradition

The Office of Purchasing is a service division established to build effective partnerships through efficient and responsive procurement processes to obtain high quality goods and services for the best value.

### SECTION 00110 BID #FL19-10-088

### INVITATION FOR BID

The City of Greeley, Colorado is requesting **sealed** bids for **Bittersweet Irrigation and Water Conservation Project before November 6, 2019 at 2:00 p.m.** at the Public Works Building, 1001 9<sup>th</sup> Avenue, Greeley, Colorado 80631 at which time and place all bids will be publicly opened and read aloud. No late, faxed or electronic bids will be accepted.

The City of Greeley disseminates all bids and requests for proposals through the Rocky Mountain E-Purchasing System site. Go to <a href="http://www.RockyMountainBidSystem.com">http://www.RockyMountainBidSystem.com</a>, then "Bid Opportunities" and then select "The City of Greeley". Bids submitted to the City of Greeley must include Sections 00120, 00130, 00140 and 00160. Addenda must be acknowledged in Section 00120 of the bidding documents. Bidders failing to acknowledge any and all addenda may be considered non-responsive.

A pre-bid meeting will be held on October 25, 2019 @ 1:00 pm at the Public Works Building, 1001 9<sup>th</sup> Avenue, 1st Floor Conference Room, Greeley, Colorado. All prospective bidders are encouraged to attend.

Each bid shall be accompanied, in a separate sealed envelope, by a certified check drawn on a bank which is insured by the Federal Deposit Insurance corporation or a bidder's bond executed by a surety company authorized to do business in Colorado, made payable to the City of Greeley, Colorado, in an amount not less than five percent (5%) of the proposal sum as security that the successful bidder will enter into a contract to construct this project in accordance with the plans and specifications, and give bonds in the sum as hereafter provided. Checks accompanying bids not accepted will be returned.

The successful responsive and responsible bidder will be required to furnish a satisfactory performance bond and payment bond in the amount of the contract sum.

No bid shall be withdrawn after the opening on the bids without the consent of the City of Greeley, Colorado, for a period of sixty (60) days after the scheduled time of the receiving the bids.

The City of Greeley retains the right to reject any and all bids and to waive any informality as deemed in the best interest of the city.

Questions pertaining to the project may be directed to Sarah Boyd at 970-336-4180.

Linda Ingram
Contract Specialist II

Greeley Website October 16, 2019

### Section 00120

**BID PROPOSAL** 

## PROJECT: BITTERSWEET PARK IRRIGATION AND WATER CONSERVATION PROJECT FL19-10-088

The Undersigned, having become familiar with the local conditions affecting the cost of the work, plans, drawings, and specifications attached herewith, and with advertisement for bids, the form of bid and proposal, form of bond, all of which are issued and attached and on file in the office of the Project Manager, hereby bid and propose to furnish all the labor, materials, necessary tools, and equipment and all utility and transportation service necessary to perform and complete in a workmanlike manner all of the work required in connection with the construction of the items listed on the bidding schedule in accordance with the plans and specifications as prepared by the City of Greeley, Colorado, for the sums set forth in the Bidding Schedule.

The total bid shall be the basis for establishing the amount of the Performance and Payment Bond for this project. The total bid is based on the quantities shown in the bid proposal form and the dimensions shown on the plans.

The undersigned has carefully checked the Bidding Schedule quantities against the plans and specifications before preparing this proposal and accepts the said quantities as substantially correct, both as to classification and the amounts, and as correctly listing the complete work to be done in accordance with the plans and specifications.

The undersigned, agrees to complete and file a Performance and Payment Bond and further agrees to complete the contract within one-hundred twenty (120) Calendar Days from Notice to Proceed. Official notice to proceed will not be issued until adequate Performance and Payment Bonds and other required documents are on file with the City of Greeley.

NOTE: Bidders should not add any conditions or qualifying statements to this bid as otherwise the

	s being non responsive to the Invitation for bids. The following received and the bid, as submitted, reflects any changes resultingue.
ATTEST	DATE
	COMPANY NAME
	BY
	SIGNATURE
	TITI F

BID TAB					
Bittersweet Park Turf Conversion and Pathwa	y Improven	nents Proje	ct		
City of Greeley					
FL19-10-088					
DESCRIPTION	QUANTITY	PAY UNIT	UNIT PRICE		COST OF BID
Mobilization	1	LS		\$	-
Construction Surveying and Staking	1	LS		\$	-
Traffic Control (Pedestrian)	1	LS		\$	-
Irrigation - 2 Wire Option	1	LS		\$	-
Unclassified Excavation (export) from trail installation	455	CY		\$	-
Concrete Trail - 6" depth; 10 ft wide	2,576	SF		\$	-
Crusher Fines Trails - 6" depth; shoulder and trail - unstablized	19,057	SF		\$	-
Crusher Fines Trails - 6" depth; stabilized	2,910	SF		\$	-
Grasscrete Pavement	789	SF		\$	-
Import Fill Material for low spot (near parking lot)	3	CY		\$	-
Hydromulch (cellulose wood fiber) and Tackifier	22	Ac		\$	-
SUBTOTAL					
Turf Conversion Method 1 - Tilling	20.44			1.	
Broad Spectrum Herbicide Application - 1st Application	22.11	Ac		\$	-
Broad Spectrum Herbicide Application - 2nd Application	22.11	Ac		\$	-
Mowing/Raking/Removing Debris	22.11	Ac		\$	-
Fertilizer Application (Fescue & Wheatgrass areas - 4-1-1, 1#N/1000SF)	6.80	Ac		\$	-
Add Class 1 Compost soil amendment- 5 CY/1000 SF	1,481	CY		\$	-
Fertilizer/Soil Conditioner Application (Native Grass areas - 7-2-1, Biosol Forte 1200#/AC and 600#	45.04				
humates)	15.31	Ac		\$	-
Till (8" depth minimum) - rototill	22.11	Ac		\$	-
Disk	22.11	Ac		\$	-
Remove rocks, clods and debris	22.11	Ac		\$	-
Rough grading	22.11	Ac		\$	-
Fine grading	22.11	Ac		\$	-
Misc. Hand work - 20 hrs/ac	22.11 22.11	Ac Ac		\$	-
Drill seed (two direction) with Mycorrhizae	<b>+</b>	AC			
SUBTOTAL Turf Conversion Method 2 - Aerating				\$	-
Broad Spectrum Herbicide Application - 1st Application	22.11	Ac		\$	-
Broad Spectrum Herbicide Application - 2nd Application	22.11	Ac		\$	-
Mowing/Raking/Removing Debris	22.11	Ac		\$	_
Aerate (turfgrass conversions - 5 passes)	6.80	Ac		\$	-
Aerate (grassland conversions - 5 passes)	15.31	Ac		\$	-
Rough grading	22.11	Ac		Ś	-
Fine grading	22.11	Ac		\$	-
Misc. Hand work - 20 hrs/ac	22.11	Ac		\$	-
Drill seed (two direction) with Mycorrhizae	22.11	Ac		\$	-
Drag with drag mat	22.11	Ac		\$	-
Fertilizer Application (Fescue & Wheatgrass areas - 4-1-1, 1#N/1000SF)	6.80	Ac		\$	-
Fertilizer Application (Native Grass areas - 6-1-1, Biosol 20#N/1000SF)	15.31	Ac		\$	-
SUBTOTAL				\$	-
BID TOTAL	,				
VENDOR NAME					
AUTHORIZED SIGNATURE					
ADDRESS					
PHONE NUMBER					
EMAIL ADDRESS					
	<del> </del>			+	
L	1				

### NOTICE OF PRE-BID CONFERENCE

## BITTERSWEET PARK IRRIGATION AND WATER CONSERVATION PROJECT -FA19-05-053

A pre-bid conference will be held:

On June 6, 2019 at 11:00 a.m., Public Works Building, 1001 9<sup>th</sup> Avenue, Greeley, CO 80631-1<sup>st</sup> floor conference room. All bidders are highly encouraged to attend.

Representatives of the City of Greeley will be present to answer questions.

Each bidder shall submit the following declaration of attendance, along with the other bid documents.

*********	*****	
I have attended the pre-bid confe	rence	
I have not attended the pre-bid co	onference	
Name of Contracting Organization		
Authorized Signature	Date	

NOTICE OF AWARD

	DATE:
	TO:
Re:	BITTERSWEET PARK IRRIGATION AND WATER CONSERVATION PROJECT FL19-10-088
	Dear Contractor:
	The City of Greeley, Colorado (hereinafter called "the Owner") has considered the bids submitted for referenced work in response to its Invitation for Bids. You are hereby notified that your bid has been accepted for items and prices stated in the Bid Schedule in the amount of \$ You are required to execute the Contract Agreement, provide the necessary insurance certificates, the Performance and Payment Bonds within ten (10) days from the date of this Notice. If you fail to execute said Contract Agreement and furnish the necessary insurance certificates and bonds within the time allotted from this date, the Owner will be entitled to consider your rights arising out of the Owner's acceptance of your bid as abandoned and to demand payment of bid guaranty as damages. The Owner will be entitled to such other rights as may be granted by law. You are required to return an acknowledged copy of this Notice of Award and enclosures to Purchasing.
	CITY OF GREELEY, COLORADO
	By: Joel Hemesath
	Title: Director of Public Works
	ACKNOWLEDGMENT: Receipt of the foregoing Notice of Award accompanied with a Performance and Payment Bond form and a signed copy of the Contract Document is hereby acknowledged this day of, 20
	Bidder:
	By:

### **CONTRACT**

THIS AGREEMENT made and entered into this day of, 20, by and between the City of Greeley, Colorado, and under the laws of the state of Colorado, party of the first part, termed in the Contract Documents as the "Owner" and party of the second part, termed in the Contract Documents as "Contractor."
WITNESSETH: In consideration of monetary compensation to be paid by the Owner to the Contractor at the time and in the manner hereinafter provided, the said Contractor has agreed, and does hereby agree, to furnish all labor, tools, equipment and material and to pay for all such items and to construct in every detail, to wit:
PROJECT: BITTERSWEET PARK IRRIGATION AND WATER CONSERVATION PROJECT FL19-10-088
at the price bid on the Proposal Form of \$ all to the satisfaction and under the general supervision of the Project Manager for the City of Greeley, Colorado.
The Contract Documents consist of this Agreement, the Conditions of the Contract (General, Supplementary and other Conditions), the Drawings, the Specifications, all Addenda issued prior

all are as fully a part of the Contract as if attached to this Agreement or repeated herein.

The Project Manager named herein shall interpret and construe the Contract Documents, reconciling any apparent or alleged conflicts and inconsistencies therein; and all of the work and all details thereof shall be subject to the approval and determination of the Project Manager as to whether or not the work is in accordance with Contract Documents. Said City Project

to and all Modifications issued after execution of this Agreement. These form the Contract, and

Manager shall be the final arbiter and shall determine any and all questions that may arise concerning the Contract Documents, the performance of the work, the workmanship, quality of materials and the acceptability of the completed project. The decision of the Project Manager on all questions shall be final, conclusive and binding.

AND FOR SAID CONSIDERATION IT IS FURTHER PARTICULARLY AGREED BETWEEN THE PARTIES TO THIS AGREEMENT.

1. That construction and installation of the above enumerated work for the Owner shall be completed and ready for use in accordance with the time of completion described in the Bid form of this Contract. That the above enumerated work shall begin within ten (10) days of the official "Notice to Proceed". (Contract shall become void if work is not started at specified time.)

- 2. That said work and materials for the project covered by the Contract Documents shall be completely installed and delivered to the Owner, within the time above stated, clear and free from any and all liens, claims, and demands of any kind.
- 3. The full compensation to be paid the Contractor by the Owner pursuant to the terms of this Contract shall be payable as provided in the Contract Documents.
- 4. This Contract consists of the following component parts, all of which are as fully a part of the Contract as herein set out verbatim, or if not attached, as if hereto attached:

Section 00110: Invitation for Bid Section 00120: Bid Proposal Section 00130: Bid Schedule Section 00140: Bid Bond

Section 00160: Pre-bid meeting Section 00210: Notice of Award

Section 00310: Contract

Section 00320: Performance Bond Section 00330: Payment Bond

Section 00340: Certificate of Insurance Section 00350: Lien Waiver Release

Section 00360: Debarment/Suspension Certification Statement

Section 00410: Notice to Proceed

Section 00420: Project Manager Notification

Section 00430: Certificate of Substantial Completion

Section 00440: Final Completion

Section 00510: General Conditions of the Contract

Section 00520: Subcontractors List Section 00620: Special Provisions

Addenda	Number	Inclusive
AUUCIUA	INCHINC	HILLIUSIVE

Any modifications, including change orders, duly delivered after execution of this Agreement.

**IN WITNESS WHEREOF**, the parties have caused this instrument to be executed as of the day and year first above written.

City of Greeley, Colorado	Contractor
Approved as to Substance	
	Authorized Signature
City Manager-Roy Otto	
Reviewed as to Legal Form OFFICE OF THE CITY ATTORNEY	Printed Name
	Title
City Attorney-Doug Marek	
Certification of Contract Funds Availability	
Director of Finance-Renee Wheeler	

### PERFORMANCE BOND

Bond No
KNOWN ALL MEN BY THESE PRESENTS: 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 GREELEY, 1000 10th Street, Greeley, CO. 80631, a Municipal Corporation, hereinafter referred to as "the Owner" in the penal sum of
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 present.
THE CONDITIONS OF THIS OBLIGATION are such that whereas the Principal entered into a certain Contract Agreement with the Owner, dated the day of, 20, a copy of which is hereto attached and made a part hereof for the performance of
City of Greeley Project,

### **BITTERSWEET PARK IRRIGATION AND WATER CONSERVATION PROJECT- FL19-10-088**

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions and agreements of said Contract Agreement during the original term thereof, and any extensions thereof which may be granted by the Owner, with or without Notice to the Surety and during the life of the guaranty period, and if he shall satisfy all claims and demands incurred under such Contract Agreement, and shall fully indemnify and save harmless the Owner from all cost and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the Owner all outlay and expense which the Owner may incur in making good any default, and 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 Contract 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 Contract Agreement or to the work or to the specifications.

Performance Bond Page 2	
IN WITNESS WHEREOF, this instruction in the second	ment is executed this day of,
	settlement between the Owner and Contractor shall abridge ler, whose claims may be unsatisfied.
IN PRESENCE OF:	PRINCIPAL
	By:
(Corporate Seal)	(Address)
IN PRESENCE OF:	OTHER PARTNERS
	By:
	By:
	Ву:
IN PRESENCE OF:	SURETY
(Attorney-in-Fact)	By:

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

(Address)

(SURETY SEAL)

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

### **PAYMENT BOND**

Bond No
KNOWN ALL MEN BY THESE PRESENT: 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 GREELEY, 1000 10th Street, Greeley, Co. 80631, a Municipal Corporation, hereinafter referred to as "the Owner", in the penal sum of 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 Contract Agreement with the Owner, dated the day of, 20, a copy of which is hereto attached and made a part hereof for the performance of

## BITTERSWEET PARK IRRIGATION AND WATER CONSERVATION PROJECT FL19-10-088

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 Contract Agreement, and any 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 Contract 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 Contract Agreement or to the work or to the specifications.

Payment Bond Page 2	
IN WITNESS WHEREOF, this ins 20	trument is executed this day of,
	nal settlement between the Owner and Contractor shall abridge under, whose claim may be unsatisfied.
IN PRESENCE OF:	PRINCIPAL
	By:
(Corporate Seal)	(Address)
IN PRESENCE OF:	OTHER PARTNERS
	By:
	By:
	By:
IN PRESENCE OF:	SURETY
(Attorney-in-Fact)	By:

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

(Address)

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

(SURETY SEAL)

Client#: 12170

### ACORD...

### CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY) 05/14/2013

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

	• ,				
PRODUCER		CONTACT NAME:			
ABC Insurance Company P. O. Box 1234 Anywhere, USA		PHONE (A/C, No, Ext):	FAX (A/C	( C, No):	
		E-MAIL ADDRESS:		·	
		PRODUCER CUSTOMER ID #:			
			INSURER(S) AFFORDING COVERAGE	NAIC#	
INSURED		INSURER A: Financia	al Rating of A		
Sample Certificate		INSURER B:			
		INSURER C:			
		INSURER D :			
		INSURER E :			
		INSURER F:			
COVERAGES	CERTIFICATE NUMBER:		REVISION NUMBER	۶.	

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

3	TYPE OF INSURANCE	ADDL INSR	SUBR	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMIT	s
	ENERAL LIABILITY						EACH OCCURRENCE DAMAGE TO RENTED	\$1,000,000
	X COMMERCIAL GENERAL LIABILITY						PREMISES (Ea occurrence)	\$100,000
	CLAIMS-MADE X OCCUR						MED EXP (Any one person)	\$5,000
							PERSONAL & ADV INJURY	\$1,000,000
							GENERAL AGGREGATE	\$2,000,000
G	EN'L AGGREGATE LIMIT APPLIES PER:	_					PRODUCTS - COMP/OP AGG	\$2,000,000
	POLICY PRO- JECT LOC							\$
	UTOMOBILE LIABILITY						COMBINED SINGLE LIMIT (Ea accident)	\$1,000,000
	ANY AUTO						BODILY INJURY (Per person)	\$
	ALL OWNED AUTOS						BODILY INJURY (Per accident)	\$
	SCHEDULED AUTOS  HIRED AUTOS						PROPERTY DAMAGE (Per accident)	\$
-	X NON-OWNED AUTOS						,	\$
	NON-OWNED AUTOS							\$
	UMBRELLA LIAB OCCUR						EACH OCCURRENCE	\$
	EXCESS LIAB CLAIMS-MAD	E					AGGREGATE	\$
	DEDUCTIBLE							\$
	RETENTION \$							\$
	ORKERS COMPENSATION ND EMPLOYERS' LIABILITY						X WC STATU- TORY LIMITS OTH- ER	
Α	NY PROPRIETOR/PARTNER/EXECUTIVE	N/A					E.L. EACH ACCIDENT	\$100,000
(1	FFICER/MEMBER EXCLUDED?  Mandatory in NH)	_   N/A					E.L. DISEASE - EA EMPLOYEE	\$100,000
	yes, describe under ESCRIPTION OF OPERATIONS below						E.L. DISEASE - POLICY LIMIT	\$500,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required) City of Greeley is named as Additional Insured on General Liability. Waiver of subrogation is included on Work Compensation. This insurance is primary and noncontributory to insurance policies held by the City.

City of Greeley 1000 10th St Greeley, CO 80631-3808	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.		
	AUTHORIZED REPRESENTATIVE		

**CANCELLATION** 

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**CERTIFICATE HOLDER** 

### LIEN WAIVER RELEASE

TO: City of Greeley, Colorado (hereinafter referred to as "the OWNER".)

FROM: (hereinafter referred to as "the CONTRACTOR")

## PROJECT: **BITTERSWEET PARK IRRIGATION AND WATER CONSERVATION PROJECT FL19-10-088**

- 1. The CONTRACTOR does hereby release all Mechanic's Liens Rights, Miller Act Claim (40 USCA 270), Stop Notice, Equitable Liens and Labor and Material Bond Rights resulting from labor and/or materials, subcontract work, equipment or other work, rents, services or supplies heretofore furnished in and for the construction, design, improvement, alteration, additions to or repair of the above described project.
- 2. This release is given for and in consideration of the sum of \$ and other good and valuable consideration. If no dollar consideration is herein recited, it is acknowledged that other adequate consideration has been received by the CONTRACTOR for this release.
- 3. In further consideration of the payment made or to be made as above set forth, and to induce the OWNER to make said payment, the CONTRACTOR agrees to defend and hold harmless the OWNER, employees, agents and assigns from any claim or claims hereinafter made by the CONTRACTOR and/or its material suppliers, subcontractors or employees, servants, agents or assigns of such persons against the project. The CONTRACTOR agrees to indemnify or reimburse all persons so relying upon this release for any and all sums, including attorney's fees and costs, which may be incurred as the result of any such claims.
- 4. It is acknowledged that the designation of the above project constitutes an adequate description of the property and improvements for which the CONTRACTOR has received consideration for this release.
- 5. It is further warranted and represented that all such claims against the CONTRACTOR or the CONTRACTOR's subcontractors and/or material suppliers have been paid or that arrangements, satisfactory to the OWNER and CONTRACTOR, have been made for such payments.
- 6. It is acknowledged that this release is for the benefit of and may be relied upon by the OWNER, the CONTRACTOR, and construction lender and the principal and surety on any labor and material bond for the project.

Lien Waiver Release Page 2

***(partial) release of a	all rights, claims and de ning to the above refere	emands of the CONT enced project. If pa	*** (full, final and complete) RACTOR against the OWNER artial, all rights and claims on th, 20 .
Dated this	day of	, 20	
CONTRACTOR			
Ву:			
Title:			
STATE OF	) )ss. )		
The foregoing instrume	nt was acknowledged b	efore me this	day of,
20 by			
My Commission expires:	1		
		Notary Public	
***Strike when not app	licable		

# SECTION 00360 BITTERSWEET PARK IRRIGATION AND WATER CONSERVATION PROJECT FL19-10-088

Debarment/Suspension Certification Statement

The proposer certifies that neither it nor its principals are presently debarred, suspended, proposed for debarment, declared ineligible or voluntarily excluded from participation in this transaction by any Federal, State, County, Municipal or any other department or agency thereof. The proposer certifies that it will provide immediate written notice to the City if at any time the proposer learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstance.

DUNS # (Optional)	
Name of Organization	
Address	
Authorized Signature	
Title Date	

NOTICE TO PROCEED

Month , 20

TO: NAME
PROJECT: BITTERSWEET PARK IRRIGATION AND WATER CONSERVATION PROJECT FL19-10-088
To Whom It May Concern:
You are hereby notified to commence work on the above-referenced project in accordance with the Contract Agreement dated Month $$ , 20 $$ .
You are to complete this project by Month , 20
CITY OF GREELEY, COLORADO
By:
Title:

Signature

PROJECT MANAGER NOTIFICATION

	, 20
	, =======
TO:	

PROJECT: **BITTERSWEET PARK IRRIGATION AND WATER CONSERVATION PROJECT FL19-10-088** 

The Owner hereby designates Sarah Boyd as its Project Manager and authorizes this individual, under the authority of the Director of Public Works to make all necessary and proper decisions with reference to the project. Contract interpretations, change orders and other requests for clarification or instruction shall be directed to the Project Manager. The Director of Public Works shall be authorized to bind the Owner with respect to any decision made in accordance with the contract document.

### CERTIFICATE OF SUBSTANTIAL COMPLETION

TO: **CONTRACTOR** 

PROJECT: BITTERSWEET PARK IRRIGATION AND WATER CONSERVATION PROJECT

FL19-10-088

Project or designated portion shall include: Describe Scope.

The work performed under this contract has been reviewed and found to be substantially complete. The Date of Substantial Completion of the Project or portion thereof designated above is hereby established as Month , 20 .

The date of commencement of applicable warranties required by the Contract Documents is stipulated in Section 00440 - Certificate of Final Acceptance.

### DEFINITION OF DATE OF SUBSTANTIAL COMPLETION

The Date of Substantial Completion of the Work or designated portion thereof is the date certified by the Project Manager when construction is sufficiently complete, in accordance with the Contract Documents, so the Owner can occupy or utilize the Work or designated portion thereof for the use for which it is intended, as expressed in the Contract Documents.

A list of items to be completed or corrected, prepared by the Contractor and verified and amended by the Project Manager is attached hereto. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. The date of commencement of warranties for items on the attached list is as stipulated in Section 00440 – Certificate of Final Acceptance.

The Owner shall operate and maintain the Work or portion of the Work described above from the Date of Substantial Completion and be responsible for all costs associated with the completed work excluding cost related to warrantee work.

The Contractor will complete or correct the Work on the list of items attached hereto within days from the above Date of Substantial Completion.	thin
Contractor  Owner	

Certificate of Substantial Completion

Page 2

(Note--Owner's and Contractor's legal and insurance counsel should review and determine insurance requirements and coverage; Contractor shall secure consent of surety company, if any.)

### CERTIFICATE OF FINAL ACCEPTANCE

TO: **CONTRACTOR** 

## PROJECT NAME: **BITTERSWEET PARK IRRIGATION AND WATER CONSERVATION PROJECT - FL19-10-088**

The work performed under this contract has been reviewed and found to meet the definition of final acceptance. This Certificate of Final Acceptance applies to the whole of the work.

The Date of Final Acceptance of the Project designated above is hereby established as: Month , 20 at 2:00 pm. This date is also the date of commencement of applicable warranties associated with the Project described above and as required by the Contract Documents.

### DEFINITION OF DATE OF FINAL ACCEPTANCE

The Date of Final Acceptance of the Work is the date certified by the City of Greeley's Project Manager when the work is 100% complete, in accordance with the Contract Documents, as amended by change order(s), or as amended below:

Amendment to the Certificate of Final Completion (if any): Decribe Ammendments.

The Contractor and/or the City Of Greeley shall define any claims or requests for additional compensation above (or as attachments to this document).

Final Acceptance shall not be achieved until the Contractor provides the City Of Greeley with all contract specified Contractor and Sub-contractor close out documents including final lien waivers, releases, insurances, manuals, training, test results, warranties, and other documents required by the Contract Documents, as amended.

Upon issuance of the Certificate of Final Acceptance the Contractor may submit an application for payment requesting final payment for the entire Work. Liquidated damages (if any) will be assessed at this time.

Contractor's acceptance of the final payment shall constitute a waiver by the Contractor of all claims arising out of or relating to the Work; except as noted under 'Amendment to the Certificate of Final Acceptance' above.

Agreed:			
	20		20
Contractor's Representative	DATE	Project Manager (COG)	DATE

# CITY OF GREELEY GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION (REVISED NOVEMBER 2016)

## ARTICLE 1 DEFINITIONS

- 1.1 **Bidder**: An architect, engineer, individual, firm, partnership, corporation or combination thereof, submitting a Bid for the Work.
- 1.2 **Change Notice**: A document issued to the Contractor specifying a proposed change to the Contract Documents. Unless otherwise expressly stated on the face of the Change Notice, a Change Notice is a proposal which may result in a Change Order.
- 1.3 **Change Order**: A document issued to the Contractor modifying the Contract.
- 1.4 **Construction Contract**: The Contract Documents, including the Contract for construction (hereinafter "the contract") executed by the Contractor and the Owner covering the performance of the Work including the furnishing of labor, superintendence, materials, tools and equipment as indicated in the Contract Documents.
- 1.5 **Contract Documents**: Documents applicable to and specific to the construction of an individual Project, including the Contract and all other documents executed by the Contractor and Owner covering the performance of the work including but not limited to Specifications, Insurance Requirements, Contract Drawings, Conditions of the Contract (General and Supplementary), Owner-Contractor Agreement, all Addenda, all change orders issued after execution of the Contract, Performance and Payment Bonds, and any other special provisions.
- 1.6 **Contract Drawings(Project Drawings)**: Contract drawings, The plans, to include but not limited to plans, profiles, typical cross sections, general cross-sections, elevations, schedules, schematics, notes and details which show locations, character, dimensions, and details of the Work.
- 1.7 **Contractor:** The individual, firm, partnership, or corporation, or combination thereof, private, municipal, or public, including joint ventures, which, as an independent contractor, has entered into a contract with the Owner, who is referred to throughout the Contract Documents by singular number and masculine gender.
- 1.8 **Days**: Unless otherwise designated, days mean calendar days.
- 1.9 **Extra Work**: Work not provided for in the Contract as awarded but found to be essential to the satisfactory completion of the Contract, within its intended scope. Reimbursement for extra work is governed by Article 28, CHANGES, or Article 31, CONTRACTOR PROPOSALS.

- 1.10 **Field Order**: A written order issued to a contractor by the Owner, or Project Manager, effecting a minor change or clarification with instructions to perform work not included in the contract. The work will eventually become a Change Order. A field Order is an expedient process used in an emergency or need situation that in many cases does not involve an adjustment to the contract sum or an extension of the contract sum or an extension of the contract time.
- 1.11 **Final Acceptance**: The formal written acceptance by the Owner of the completed Work.
- 1.12 **Force Account**: A method of payment, other than lump sum or unit price, for Work ordered by Change Order or by written notice from the Owner. Reimbursement for force account work is governed by Article 36, FORCE ACCOUNT WORK.
- 1.13 **Furnishing**: Manufacturing, fabricating and delivering to the site of the Work materials, plant, power, tools, patterns, supplies, appliances, vehicles and conveyances necessary or required for the completion of the Work.
- 1.14 **General Conditions (GC)**: A section of the Contract Documents which specifies, in general, the contractual conditions.
- 1.15 **General Terms**: Directed, required, permitted, ordered, designated, selected, prescribed or words of like import shall be understood to mean the direction, requirement, permission, order, designation, selection or prescription of the Project Manager. Approved, satisfactory, equal, necessary or words of like import shall be understood to mean approved by, acceptable to, satisfactory to, equal, necessary in the opinion of the Project Manager.
- 1.16 **Indicated**: A term meaning as shown on the Contract Drawings, or as specified and detailed in the Contract Documents.
- 1.17 **Installation, Install, or Installing**: Completely assembling, erecting and connecting material, parts, components, appliances, supplies and related equipment specified or required for the completion of the Work.
- 1.18 **Limit of Work**: Boundary within which the Work, excepting utility and drainage work in Public Right Of Way and Easements, is to be performed.
- 1.19 **Notice to Proceed**: Written notice from the Owner to the Contractor to proceed with the Work.
- 1.20 **Notice of Termination**: Written notice from the Owner to the Contractor to stop work under the Contract on the date and to the extent specified in the Notice of Termination.
- 1.21 **Owner**: The City of Greeley.
- 1.22 **Permanent Drainage Easement**: Area required to construct and maintain permanent drainage facilities for retention, release, and passage of surface water.
- 1.23 **Permanent Utility Easement**: Area required to construct and maintain utility facilities.

- 1.24 **Project**: That specific portion of the Work indicated in the Contract Documents.
- 1.25 **Project Manager**: The Owner's designated representative. The Project Manager has the authority to delegate portions of his responsibilities to others.
- 1.26 **Provide**: In reference to work to be performed by the Contractor, provide means furnish and install completely in place.
- 1.27 **Punch List**: Work determined to be incomplete or unacceptable at time of inspection for substantial completion.
- 1.28 **Samples**: Physical examples which illustrate materials, equipment, fixtures and workmanship which establish standards by which the Work will be judged.
- 1.29 **Schedule**: Acceptable schedules are BAR or GANTT Chart or CPM schedule.
- 1.30 **Shop Drawings**: Documents furnished by the Contractor to illustrate specific portions of the Work. Shop Drawings include drawings, diagrams, illustrations, schedules, charts, brochures, tables and other data describing fabrication and installation of specific portions of the Work.
- 1.31 **Specifications**: A document applicable to construction contracts containing the Technical Provisions.
- 1.32 **Subcontractor**: Any person, firm or corporation, other than the employees of the Contractor, who contracts with the Contractor to furnish labor, material or labor and materials, under this Contract.
- 1.33 **Special Provisions**: Provisions especially applicable to this Contract which invoke, modify and supplement the General Conditions which are included in the Contract Documents.
- 1.34 **Substantial Completion**: The state in the progress of Work when the Work, or a designated portion thereof, is sufficiently complete in accordance with the Contract Documents, so that Owner may access, occupy, use, and enjoy the Project, or designated portion thereof, for its intended purpose. Substantial Completion shall not occur until a temporary or permanent Certificate of Occupancy is issued and only minor punch list items remain for such Work.
- 1.35 **Technical Provisions**: Those provisions which specify the materials and execution of construction for work entering into the project.
- 1.36 **Work**: The construction, labor, materials, equipment, and contractual requirements as indicated in the Contract Documents, including alterations, amendments, or extensions thereto made by authorized changes.
- 1.37 **Work Site**: The area enclosed by the Limit of Work indicated in the Project Drawings and boundaries of local streets and public easements in which the Contractor is to perform work under the Contract. It shall also include areas obtained by the Contractor for use in connection with the Contract, when contiguous to the Limit of Work.

## ARTICLE 2 INTERPRETATION

- 2.1 The documents comprising the Contract Documents are complementary and indicate the construction and completion of the Work. Anything mentioned in the Contract Specifications and not shown on the Contract Drawings, or shown on the Contract Drawings and not mentioned in the Contract Specifications, shall be of like effect as if shown or mentioned in both.
- 2.2 Where "as indicated", "as detailed", or words of similar import are used, it shall be understood that the reference is made to the specifications or drawings accompanying this Contract unless stated otherwise.
- 2.3 References to Articles or Sections include sub articles or subsections under the Article Reference (for example, a reference to Article 2 is also a reference to 2.1 through 2.9, and references to paragraphs similarly include references to subparagraphs).
- 2.4 Referenced Standards: Material and workmanship specified by the number, symbol, or title of a referenced standard shall comply with the latest edition or revision thereof and amendments and supplements thereto in effect on the date of the Invitation to Bid except where a particular issue is indicated.
- 2.5 Precedence of Contract Documents: Except as provided by Paragraph 2.1 of this Article, the Construction Contract governs over other Contract Documents, except that a Change Order governs over the Contract and previously issued Change Orders. The Contract Conditions govern over the General Conditions.
- 2.6 Explanations: Should it appear that the Work to be done or any of the matters relative thereto are not sufficiently detailed or explained in the Contract Documents, the Contractor shall apply to the Owner for such explanation provided as part of the Contract. Disputes over questions of fact which are not settled by agreement shall be decided by Owner. Such decision thereon will be final, subject to remedies under Article 35, DISPUTES.
- 2.7 Should there be any conflict, detailed instructions govern over general instructions, detail drawings have precedence over small scale drawings, and dimensions have precedence over scale.
- 2.8 Omissions and Misdescriptions: The Contractor shall carefully study and compare all drawings, specifications, Contract Documents and other instructions; shall verify all dimensions on the Contract Drawings before laying out the Work; shall notify the Project Manager of all errors, inconsistencies or omissions which he may discover; and obtain specific instructions in writing before proceeding with the Work. The Contractor shall not take advantage of apparent errors or omissions which may be found in the Contract Documents, but the Project Manager shall be entitled to make such corrections therein and interpretations thereof as he may deem necessary for the fulfillment of their intent. The Contractor shall be responsible for all errors in construction which could have been avoided by such examination and notification, subject to remedies under Article 35, Disputes.

## ARTICLE 3 ENTITY OF CONTRACTOR

3.1 If the Contractor hereunder is comprised of more than one legal entity, each such entity shall be jointly and severally liable hereunder.

## ARTICLE 4 LIABILITY AND INDEMNIFICATION

4.1 It is agreed that the Contractor assumes responsibility and liability for damages, loss or injury of any kind or nature whatever to persons or property caused by or resulting from or in connection with any act, action, neglect, omission, or failure to act when under a duty to act on the part of the Contractor or any of his officers, agents, employees, or subcontractors in his or their performance of the Work. The Contractor shall indemnify and hold harmless the Government, the State, the Owner and the Project Manager and their members, officers, agents, or employees from claims, losses, damages, charges, costs, or expenses, including attorney's fees, whether direct or indirect, to which they or any of them may be put or subjected to by reason of any such loss or injury.

# ARTICLE 5 PROTECTION OF EXISTING VEGETATION, STRUCTURES, UTILITIES, AND IMPROVEMENTS AND LAND SURVEY MONUMENTS

- A Contractor shall preserve and protect existing vegetation such as trees, shrubs, and grass on or adjacent to the work site which are not indicated to be removed and which do not unreasonably interfere with the construction work and he shall replace in kind any vegetation, shrubs and grass damaged by him at his own expense.
- 5.2 The Contractor shall protect from damage all utilities, structures, or improvements on or near the site of the Work and shall repair or restore any damage to such utilities, structures, or improvements resulting from failure to comply with the requirements of the Contract or the failure to exercise reasonable care in the performance of the Work. If the Contractor fails or refuses to repair any such damage promptly, the Owner may have the necessary work performed and charge the cost thereof to the Contractor.
- 5.3 All land survey monuments shall be protected from any damage by any work and/or shall be replaced by a licensed land surveyor licensed in the state of Colorado at the contractor's expense before final acceptance is issued.

## ARTICLE 6 CONTRACTUAL RELATIONSHIPS

6.1 No contractual relationship will be recognized under the Contract other than the contractual relationship between the Owner and the Contractor.

## ARTICLE 7 ASSIGNMENT

7.1 The performance of the Work under the Contract shall not be assigned except upon written consent of the Owner. Consent will not be given to any proposed assignment which would relieve the Contractor or his surety of their responsibilities under the Contract. The Contractor shall not assign any monies due or to become due to him under the Contract without the previous written consent of the Owner.

## ARTICLE 8 SUBCONTRACTORS

8.1 Unless otherwise required by the Contract Documents or the Bidding Documents, the Contractor, as soon as practicable after the award of the Contract, not to exceed 3 days, shall furnish to the Owner and the Project Manager, in writing the names of the subcontractors, persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each of the principal portions of the Work. The Project Manager will promptly reply to the Contractor in writing whether or not the Owner or the Project Manager, after due investigation, has reasonable objection to any such proposed person or entity. Failure of the Owner or Project Manager to reply promptly shall constitute notice of no reasonable objections.

## ARTICLE 9 CONDITIONS AFFECTING THE WORK

9.1 The Contractor shall be responsible for taking steps reasonably necessary to ascertain the nature and location of the Work, and the general and local conditions which can affect the Work or the cost thereof. Failure by the Contractor to do so will not relieve him from responsibility for successfully performing work without additional expense to the Owner. The Owner will not be responsible for any understanding or representations concerning conditions, unless such understanding or representations are expressly stated in the Contract.

## ARTICLE 10 GRATUITIES AND CONFLICTS OF INTEREST

- 10.1 The Owner may, by written notice to the Contractor terminate the right of the Contractor to proceed under this Contract if it is found that gratuities (in the form of entertainment, gifts, or otherwise) were offered or given by the Contractor, or any agent or representative of the Contractor or any director, officer or employee of the Owner or its Project Manager with a view toward securing a contract or securing favorable treatment with respect to the awarding or amending, or the making of any determinations with respect to the performance of such contract. The Owner's determination shall be final subject only to judicial review.
- 10.2 In the event this Contract is terminated for any reason, the Owner shall be entitled to pursue the same remedies against the Contractor as it could pursue in the event of a breach of the Contract by the Contractor.

- No member, officer or employee of the Owner or of a local public body during his tenure or for one year thereafter shall have any interest, direct or indirect, in this Contract or the proceeds thereof. "Local public body" means the State, any political subdivision of the State, or any agency of the State or any political subdivision thereof.
- The rights and remedies of the Owner provided in this article are not exclusive and are in addition to any other rights and remedies provided by law or under the Contract.

## ARTICLE 11 WARRANTY OF WORK

- 11.1 Except where longer periods of warranty are indicated for certain items, the Contractor warrants work under the Contract to be free from faulty materials and workmanship for a period of not less than two years from date of Final Acceptance, which two year period shall be covered by the Performance Bond and Payment Bond as specified in this Contract. The Contractor shall immediately remedy, repair, or replace, without cost to the Owner and to the entire satisfaction of the Owner, defects, damages, or imperfections due to faulty materials or workmanship appearing in said work within said period of not less than two years. Remedied work shall carry the same warranty as the original work starting with the date of acceptance of the replacement or repair. Payment to the Contractor will not relieve him of any obligation under this Contract.
- 11.2 The Contractor, at no additional expense to the Owner, shall also remedy damage to equipment, the site, or the building or the contents thereof which is the result of any failure or defect in the Work, and restore any work damaged in fulfilling the requirements of the Contract. Should the Contractor fail to remedy any such failure or defect within a reasonable time but no longer than ten (10) days after receipt of notice thereof, the Owner will have the right to replace, repair, or otherwise remedy such failure or defect at the Contractor's expense.
- 11.3 Subcontractors', manufacturers', and suppliers' warranties and guarantees, expressed or implied, respecting any part of the Work and any material used therein shall be deemed obtained and shall be enforced by the Contractor for the Benefit of the Owner without the necessity of separate transfer or assignment thereof.
- 11.4 The rights and remedies of the Owner provided in this Article are in addition to and do not limit any rights and remedies afforded by the Contract or by law.

## ARTICLE 12 MATERIAL

12.1 Unless otherwise indicated in this Contract, equipment, material and products incorporated in the Work covered by this Contract shall be new and of the grade specified in the Contract for the purpose intended. Unless otherwise specifically indicated, reference to equipment, material, product or patented process by trade names, make, or catalog number, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition, and the Contractor may, at his option, use any equipment, material, article, or process which is equivalent to that named, subject to the requirements of Paragraph 12.2 of this Article.

- 12.2 Within the scope of his authority, the Project Manager shall be the sole judge of the quality and suitability of proposed alternative equipment, material, article or process. The burden of proving the quality and suitability of the alternative shall be upon the Contractor. Information required by the Project Manager in judging an alternative shall be submitted for approval by the Contractor at the Contractor's expense prior to installation.
- 12.3 Where use of an alternative material involves redesign of or changes to other parts of the Work, the cost and the time required to affect such redesign or change will be considered in evaluating the suitability of the alternative material. Redesign and changes in other parts of the Work shall be at the Contractor's expense.
- No action relating to the approval of alternative materials will be taken by the Project Manager until the request for substitution is made in writing by the Contractor accompanied by complete data as to the quality and suitability of the materials proposed. Such request shall be made in ample time to permit approval without delaying the Work.
- 12.5 Disposal of material outside the Work Site: The Contractor shall make his own arrangements for legally disposing of waste and excess materials outside the Work Site and he shall pay costs therefore.
- 12.6 Property rights in materials: The Contractor shall have no property right in materials after they have been attached or affixed to the Work or the soil, or after payment has been made by the Owner to the Contractor for materials delivered to the site of the Work, or stored subject to or under the control of the Owner as provided in Article 24, PROGRESS PAYMENTS.

## ARTICLE 13 WORKMANSHIP AND UNAUTHORIZED WORK

- 13.1 Work under this Contract shall be performed in a skillful and workmanlike manner. The Project Manager may, in writing, require the Contractor to remove from the work any employee the Project Manager determines incompetent, careless or otherwise objectionable.
- 13.2 Unauthorized work: Work performed beyond the lines and grades shown on the Contract Drawings, approved Working and Shop Drawings and Extra work done without written authorization, will be considered as unauthorized work, and the Contractor will receive no compensation therefore. If required by the Owner, unauthorized work shall be remedied, removed, or replaced by the Contractor at the Contractor's expense. Upon failure of the Contractor to remedy, remove or replace unauthorized work, the Owner may take courses of action set out in Paragraph 15.3 of Article 15, INSPECTION.

## ARTICLE 14 SUPERINTENDENCE BY CONTRACTOR

14.1 The Contractor shall give his personal superintendence to the Work or have a competent foreman or superintendent, hereinafter designated his authorized representative, satisfactory to the Owner, on the Work Site at all times during progress, with authority to act for him. There shall be provided at all times, a reasonable method of communication directly to the Contractor if the Owner experiences any problems or difficulties with the Superintendent.

## ARTICLE 15 INSPECTION/TESTING

- 15.1 Work (which term includes but is not restricted to materials, workmanship and manufacture and fabrication of components) will be subject to inspection and test by the Project Manager at all reasonable times and at all places prior to acceptance. Such inspection and test is for the sole benefit of the Owner and shall not relieve the Contractor of the responsibility of providing quality control measures to assure that the Work strictly complies with the Contract Documents. No inspection or test by the Project Manager shall be construed as constituting or implying acceptance. Inspection or test shall not relieve the Contractor of responsibility for damage to or loss of the material prior to acceptance, nor in any way affect the continuing rights of the Owner after acceptance of the completed Work.
- The Contractor shall, at his own expense, replace any material or correct any workmanship found not to conform to the contract requirements, unless the Owner consents in writing to accept such material or workmanship with an appropriate adjustment in contract price. The Contractor shall promptly segregate and remove rejected material from the premises at his own expense.
- 15.3 If the Contractor does not promptly replace rejected material or correct the rejected workmanship, the Owner (1) may, by separate contract or otherwise, replace such material or correct such workmanship and charge the cost thereof to the Contractor, or (2) may terminate the Contractor's right to proceed in accordance with Article 38, TERMINATION FOR DEFAULT--DAMAGES FOR DELAY--TIME EXTENSIONS.
- 15.4 The Contractor shall give the Project Manager ample notification of inspections and tests, and the Project Manager will perform, except as otherwise specifically provided, said inspections and tests in such manner as not to unnecessarily delay the work. The Owner will have the right to charge to the Contractor any additional cost of inspection or test or when reinspection or retest is necessitated by prior rejection.
- 15.5 Should it be considered necessary, before acceptance of the entire work, to make an examination of work already completed by removing or tearing out same, the Contractor shall on request promptly furnish all necessary facilities, labor and material therefore. If such work is found to be defective or nonconforming in any material respect, due to the fault of the Contractor or his subcontractors, he shall defray the expenses of such examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the Contract, an equitable adjustment will be made in the contract price to compensate the Contractor for the additional services involved in such examination and reconstruction. If completion for the work has been delayed thereby, he will, in addition, be granted an equitable extension of time.
- 15.6 The Project Manager shall have access to the work during its construction. Work done and materials provided will be subject to the Project Manager's on-site and off-site inspection and approval. When work is to be performed during hours other than during his normal schedule, the Contractor shall so advise the Project Manager not less than 24 hours in advance. The Contractor shall provide access to the work for authorized representatives of the Owner.

15.7 The Project Manager's inspection and approval of work or materials shall not relieve the Contractor of any of his obligations to fulfill the requirements of the Contract Documents. Work and materials not meeting the requirements of the Contract shall not be incorporated in the Work. Unsuitable or substandard work or materials may be rejected by the Project Manager, notwithstanding that such work or materials may have been previously inspected by the Project Manager, or that payment therefore has been included in a progress payment.

## ARTICLE 16 PERMITS AND COMPLIANCE WITH LAWS

16.1 The Contractor shall without additional expense to the Owner be responsible for obtaining necessary licenses and permits and for complying with applicable Federal, State, County and Municipal laws, codes and regulations in connection with the commencement of the work. The Contractor is required to supply the Project Manager with complete and final copies of license and permits including final inspection documentation. The Contractor shall be required to obtain permits at his own expense. The Contractor shall protect, indemnify and hold harmless the Owner and the Project Manager and their members, officers, agents and employees against claims and liabilities arising from or based on the violation of requirements of law or permits whether by the Contractor, his employees, agents or subcontractors.

## ARTICLE 17 RIGHTS IN LAND IMPROVEMENT

17.1 The Contractor shall make no arrangements with any person to permit occupancy or use of any land, structure or building within the work site for any purpose whatsoever, either with or without compensation, in conflict with any agreement between the Owner and any owner, former owner or tenant of such land, structure or building. The Contractor shall not occupy Owner property outside the work site without obtaining prior written approval from the Owner.

## ARTICLE 18 DAMAGE TO THE WORK AND RESPONSIBILITY FOR MATERIALS

- 18.1 The Contractor shall be responsible for materials delivered and work performed until completion and final acceptance of the entire construction thereof.
- The Contractor shall bear the risk of injury, loss or damage to any and all parts of the work for whatever cause, whether arising from the execution or from the non-execution of work. The Contractor shall rebuild, repair or restore work and materials which have been damaged or destroyed from any cause before completion and acceptance of the work and shall bear the expense thereof. The Contractor shall provide security and drainage and erect temporary structures as necessary to protect the work and materials from damage.
- The Contractor shall be responsible for materials not delivered to the site for which any progress payment has been made to the same extent as if the materials were so delivered.

## ARTICLE 19 EMERGENCIES

19.1 In an emergency affecting the safety of life, the work, or adjacent property, the Contractor shall notify the Project Manager as early as possible that an emergency exists. In the meantime, without special instruction from the Project Manager as to the manner of dealing with the emergency, the Contractor shall act at his own discretion to prevent such threatened loss or injury. As emergency work proceeds, the Project Manager may issue instruction, which the Contractor shall follow. The amount of compensation to which Contractor is entitled on account of emergency work will be determined in accordance with Article 28, CHANGES.

## ARTICLE 20 NOTICE TO PROCEED

20.1 The Owner will issue a Notice to Proceed to the Contractor within 15 days after the Contractor has executed the Contract and has delivered the specified bonds and Certificates of Insurance as required by the Owner. Except as specifically authorized in writing by the Owner, the Contractor is not authorized to perform work under the Contract until the effective date of the Notice to Proceed. Within 10 days after the effective date of such Notice to Proceed, the Contractor shall commence work and shall diligently prosecute the Work to completion within the time limits specified. These time periods may be modified by mutual written agreement of both the Owner and Contractor.

## ARTICLE 21 PROGRESS SCHEDULE AND REQUIREMENTS FOR MAINTAINING PROGRESS

- 21.1 The Contractor shall, at the pre-construction meeting, prepare and submit to the Project Manager for approval a practicable schedule, showing the order in which the Contractor proposes to carry on the work, the date on which he will start the several salient features (including procurement of materials, plant and equipment) and the contemplated dates for completing the same. The schedule shall be in the form of a progress chart of suitable scale to indicate appropriately the percentage of work scheduled for completion at any time. The Contractor shall update the chart with the actual progress monthly or at such intervals as directed by the Project Manager, and shall immediately deliver three copies thereof. If the Contractor fails to submit a progress schedule within the time herein prescribed, the Project Manager may withhold approval of progress payment estimates until such time as the Contractor submits the required progress schedule.
- 21.2 The Contractor shall prosecute the work in accordance with the latest approved Progress Schedule. In the event, that the progress of items along the critical path is delayed, the Contractor shall revise his planning to include additional forces, equipment, shifts or hours as necessary to meet the time or times of completion specified in this Contract. Additional costs resulting therefrom will be borne by the Contractor. The Contractor shall make such changes when his progress at any check period does not meet at least one of the following two tests:
- 21.2.1 The percentage of dollar value of completed work with respect to the total amount of the Contract is within ten percentage points of the percentage of the Contract time elapsed, or;
- 21.2.2 The percentage of dollar value of completed work is within ten percentage points of the dollar value which should have been performed according to the Contractors own network analysis previously approved by the Project Manager.

21.3 Failure of the Contractor to comply with the requirements under this provision will be grounds for determination that the Contractor is not prosecuting the work with such diligence as will ensure completion within the time of completion specified in this Contract. Upon such determination, the Owner may terminate the Contractor's right to proceed with the work, or any separate part thereof, in accordance with Article 38, TERMINATION FOR DEFAULT--DAMAGES FOR DELAY--TIME EXTENSIONS of these General Conditions.

### ARTICLE 22 SUSPENSION OF WORK

- 22.1 The Owner reserves the right to suspend, delay or interrupt execution of the whole or any part of the work for such period of time as he may determine to be appropriate for his convenience.
- 22.2 If the performance of all or any part of the work is, for an unreasonable period of time, suspended, delayed, or interrupted by an act of the Owner in the administration of this Contract or by his failure to act within the time specified in this Contract (or if no time is specified, within a reasonable time), an adjustment shall be made for any increase in the cost of performance of this Contract (excluding profit) necessarily caused by such unreasonable suspension, delay, or interruption and the contract modified in writing accordingly. However, no adjustment shall be made under this clause for any suspension, delay, or interruption to the extent (1) that performance would have been so suspended, delayed or interrupted by any other cause, including the fault or negligence of the Contractor or (2) for which an equitable adjustment is provided for or excluded under any other provision of this Contract.
- 22.3 No claim under this clause shall be allowed (1) for any costs incurred more than 20 days before the Contractor shall have notified the Owner in writing of the act of failure to act involved (but this requirement shall not apply as to a claim resulting from a suspension order), and (2) unless the claim, in an amount stated is asserted in writing as soon as practicable after the termination of such suspension, delay, or interruption, but not later than the date of final payment under the Contract.

## ARTICLE 23 FINAL INSPECTION AND ACCEPTANCE

- 23.1 Final inspection: When the Contractor notifies the Project Manager in writing that the work has been completed, the Owner will make the final inspection for the purpose of ascertaining that the work has been completed in accordance with the requirements of the Contract Documents.
- Acceptance of the work: When the Owner has made the final inspection and has determined that the work has been completed in accordance with the Contract Documents, the Owner will accept the work. Immediately upon and after Final Acceptance, the Contractor will be relieved of the duty of maintaining and protecting the work as a whole. The Contractor will be relieved of his responsibility for injury to persons or property or damage to the work which occurs after Final Acceptance, except that the Contractor will not be relieved of his responsibility for injury to persons or property arising from his duties and obligations under Article 4, LIABILITY AND INDEMNIFICATION.

- Final Acceptance shall be final and conclusive, and no further performance of work shall be required except with regards to latent defects, fraud or such gross mistakes as may amount to fraud, or with regard to the Owner's rights under any warranty or guarantee. All punch list items must be completed and building permits provided to Owner before final acceptance is issued.
- Date of Substantial Completion for all Work shall be within the number of calendar days bid by the Contractor on the Bid proposal.
- Date of Final Completion shall be the date specified on the Certificate of Final Completion.

## ARTICLE 24 PROGRESS PAYMENTS

- 24.1 The Owner will make progress payments monthly as the work proceeds, on estimates approved by the Project Manager. Payment will be made within 15 days after progress estimates are approved by the Project Manager and Department Head. On request of the Project Manager, the Contractor shall furnish a detailed estimate of the total contract price each showing the amount included therein for each principal category of the work, to provide a basis for determining the amount of progress payments. In the preparation of estimates, the Owner, at its sole discretion, may authorize material delivered on the site and preparatory work done to be taken into consideration which is to be submitted at the pre-construction meeting.
- In making such progress payments, five percent of the estimated amount will be retained until Final Acceptance of the Contract work; in addition, the Owner shall retain from all Progress payments an amount equal to all statutory claims filed against the Contractor. Also, whenever the work is substantially complete, the Owner if it considers the amount retained to be in excess of the amount adequate for its protection, may release to the Contractor all or a portion of such excess amount. Substantial completion as used in this Paragraph 24.2 shall mean the following: Substantial completion of the work or a portion thereof shall be when, as determined by both the Project Manager and the Owner, the construction is sufficiently completed in accordance with the Contract Documents and any modification thereto as provided in the Contract to permit the Owner to occupy the work or a portion of the work for the use which it is intended.
- Material and work covered by progress payments shall become the sole property of the Owner. This provision shall not be construed as relieving the Contractor from the sole responsibility for material and work upon which payments have been made, the restoration of damaged work or as waiving the right of the Owner to require the fulfillment of the terms of the Contract.

## ARTICLE 25 PAYMENT TO SUBCONTRACTORS

25.1 The Contractor shall pay all subcontractors for and on account of work performed by such subcontractors in accordance with the terms of their respective subcontract. Prior to final payment an unconditional lien waiver release form will be required by the Owner.

## ARTICLE 26 PAYMENT OF TAXES

- The price or prices for the work will include full compensation for taxes that the Contractor is or may be required to pay. The Contractor shall bear the risk of any added or increased taxes occurring during the prosecution of the work. A change in taxes shall under no circumstances entitle the Contractor to an adjustment under the Contract.
- The Contractor's attention is directed to the fact that this project is exempt from payment of City of Greeley Sales and Use taxes, and such taxes must not be included in the amount of bid.
- The Contractor shall pay all sales and use taxes required to be paid, shall maintain such records in respect of his work, which shall be separate and distinct from all other records maintained by the Contractor and shall be available for inspection by the Owner at any and all reasonable times, and shall furnish the Owner with such data, as may be necessary to enable the Owner to obtain any refunds of such taxes which may be available to the Owner under the laws, ordinances, rules or regulations applicable to such taxes. The Contractor shall require each of his subcontractors to pay all sales and use taxes required to be paid and to maintain such records and furnish the Contractor with such data as may be necessary to enable the Owner to obtain a refund of the taxes paid by such subcontractors.

## ARTICLE 27 FINAL PAYMENT

- 27.1 After the Work has been accepted by the Owner, subject to the provisions of Article 11, WARRANTY OF WORK and Article 23, FINAL INSPECTION AND ACCEPTANCE of these General Conditions, a final payment due the Contractor under this Contract shall be paid upon the presentation of properly executed voucher and after the Contractor shall have furnished the Owner with a release of all claims against the Owner arising by virtue of this Contract, other than claims in stated amounts as may be specifically excepted by the Contractor from the operation of the release. If the Contractor's claim to amounts payable under the contract has been assigned under the assignment of Claims Act of 1940, as amended (31 U.S.C. 203, 41 U.S.C. 15), a release may also be required of the assignee.
- 27.2 If any mechanic's or material man's lien or notice of claim of such lien is filed or recorded against the project for labor, materials, supplies or equipment claimed to have been furnished to or incorporated into the Work, or for other alleged contribution thereto, the Owner will have the right to retain from payments otherwise due the Contractor, in addition to other amounts properly withheld under this Article or under other provisions of the Contract, an amount equal to such lien or liens claimed.
- Further, the Owner will have the right to retain from final payment an amount equal to all liquidated damages claimed by the Owner.
- 27.4 Retainages held by the Owner for any state or federal statutory claim arising out of the project will be held by the Owner in addition to all retainages held under the provisions of the Contract.

# ARTICLE 28 CHANGES

- 28.1 The Owner may, at any time, without notice to the sureties, by written notice or order designated or indicated to be a Change Notice or Change Order, make any change in the work within the general scope of the Contract in accordance with all of the Owner's processes and procedures whether or not set forth herein, including but not limited to changes:
- 28.1.1 In the Contract (including drawings and designs);
- 28.1.2 In the method or manner of performance of the work;
- 28.1.3 In Owner furnished facilities, equipment, materials, services, or site; or
- 28.1.4 Directing acceleration in performance of the work.
- 28.2 Any other order (which terms as used in Paragraph 28.2 of this Article shall include direction, instruction, interpretation, or determination) from the Project Manager, which causes any change, shall be treated as a Change Notice under this Article provided that the Contractor gives the Project Manager written notice stating the date, circumstances and source of the order, and that the Contractor regards the order as a Change Notice. The Contractor shall notify the Project Manager when he receives direction, instruction, interpretation or determination from any source which may cause any change in the work. Such notification shall be given to the Project Manager before the Contractor acts on said direction, instruction, interpretation or determination.
- 28.3 Except as herein provided, no order, statement, or conduct of the Architect/ Project Manager or any other person shall be treated as a change under this Article or entitle the Contractor to an equitable adjustment hereunder.
- If any change under this Article causes an increase or decrease in the Contractor's cost of, or the time required for, the performance of any part of the Work under this Contract, whether or not changed by an order, an equitable adjustment will be made and the Contract modified accordingly by a written Change Order; provided, however, that except for claims based on errors in the Contract Documents, no claim for change under Paragraph 28.2 of this Article will be allowed for costs incurred more than 20 days before the Contractor gives written notice as herein required; and provided that in the case of errors in the Contract Documents for which the Owner is responsible, the adjustment will include increased cost, reasonably incurred by the Contractor in attempting to comply with such errors in the Contract Documents. No claim shall be made for the type of errors in the Contract Documents which are set forth in Article 2, INTERPRETATION.
- 28.5 If the Contractor intends to assert a claim for an equitable adjustment under this Article, he shall, within 30 days after receipt of a written Change Order under Paragraph 28.1 of this Article or the furnishing of a written notice under Paragraph 28.2 of this Article, submit to the Project Manager a written statement setting forth the general nature and monetary extent of such claim, unless this period is extended in writing by the Owner. The statement of claim hereunder may be included in the notice under Paragraph 28.2 of this Article.
- No claim by the Contractor for an equitable adjustment hereunder will be allowed unless asserted as described in Paragraphs 28.4 and 28.5 above.

- 28.7 Payment will not be made under the provisions of this Article for such work or materials which are so required to be done or furnished in or about or for the performance of the Work and which are not mentioned, specified or indicated or otherwise provided for in this Contract or in the Contract Documents so far as such work or materials may be, in the opinion of the Project Manager, susceptible of classification under or reasonably inferred to be included in the Bid Items of the Bid Form.
- In case the Contractor is ordered to perform work under this Article for which payments are not determined under Paragraph 28.7 of this Article, which in the opinion of the Owner it is impracticable to have performed by the Contractor's own employees, the Contractor will, subject to the approval of the Owner, be paid the actual cost to him of such work and, in addition thereto, a negotiated amount to cover the Contractor's superintendence, administration and other overhead expenses. The terms and conditions of any subcontract which the Contractor may propose to enter into in connection with work under the provision of this Article shall be subject to the written approval of the Project Manager before such subcontract is made. The contractor shall be responsible for the work of the subcontractors and shall be liable therefore as if he had performed the work directly.
- 28.9 In cases other than those described in Paragraphs 28.7 and 28.8 above, the Owner and the Contractor (on his own behalf and on behalf of his subcontractors) shall endeavor to negotiate a reasonable contract price and line adjustment in a Change Order on terms appropriate to the changed work. The Contractor will be required to submit a sufficiently detailed price proposal supported with sufficient documentation that (1) the Owner can determine that the proposal reflects all impacts on the Contract from work additions, deletions and modifications shown in the Change Notice being priced, (2) the proposed prices are set out in such a way that their reasonableness can be evaluated against prices based on adequate price competition, bid unit prices, established catalog or market prices of commercial items sold in substantial quantities to the general public, prices set by law or regulation, recognized published price lists and indices, independently developed cost estimates and other appropriate price comparisons, and (3) contract provisions relating to Contract changes costing over \$100,000.00 are complied with. If any prices or other aspects are conditional, such as on firm orders being made by a certain date or the occurrence or nonoccurrence of an event, the Contractor shall identify these aspects in his proposal. A negotiated Change Order shall set out prices, scheduling requirements, time extensions and all costs of any nature arising out of the issuance of a Change Notice except for those cost and time aspects explicitly reserved on the face of the Change Order. Except for these explicit reservations, the execution of a Change Order by both parties will be deemed accord and satisfaction of all claims of any nature arising from the issuance of the Change Notice negotiated.
- 28.10 In the event the Contractor and the Owner are unable to agree upon the Contractor's entitlement to an equitable adjustment or upon the amount thereof, or in the event that it is in the best interest of the Owner to have the Work proceed pending negotiation of amount of an equitable adjustment, the Owner may direct the Contractor to perform the Work in accordance with the Owner order, direction, instruction, interpretation, or determination, with any Contract price adjustments and progress payments for the Work to be determined on a Force Account basis in accordance with Article 36. The Contractor shall continue diligently to perform the Contract in accordance with the Owner's order, direction, instruction, interpretation, or determination during negotiations with respect to the Contractor's entitlement to an equitable adjustment hereunder or to the amount of any Contract price adjustment or time extension. The Contractor and the Owner may agree on certain aspects of an equitable adjustment and take those aspects out of operation of Force Account provisions. In the

event a mutually agreeable equitable adjustment cannot be made, the Contractor shall continue diligently to perform the orders as he proceeds with his remedies under Article 35, DISPUTES, and shall continue to receive compensation on a Force Account basis.

- For contract changes, the Owner, State and Government or their representative shall have the audit and inspection rights as described below:
- 28.11.1 Where the agreed payment method for any contract changes is to be by cost reimbursement, time and material, labor hours or any combination thereof, the Contractor shall maintain and the Owner or its representatives shall have the right to examine books, records, documents and other evidence and accounting principles and practices sufficient to reflect properly all direct and indirect costs of whatever nature claimed to have been incurred and anticipated to be incurred for the performance of the contract changes under this sub article.
- 28.11.2 Contract changes exceeding \$100,000.00 in cost: For submitted cost and pricing data in connection with pricing a contract modification referred to in this sub article, unless such pricing is based on bid unit prices, adequate price competition, established catalog or market prices of commercial items sold in substantial quantities to the public, or prices set by law or regulation, the Owner or his representatives and the Comptroller General of the United States and his representatives who are employees of the United States shall have the right to examine all books, records, documents and other data of the Contractor related to the negotiation of or performance under the contract Change Orders for the purpose of evaluating the accuracy, completeness and currency of the cost or pricing data submitted. The right of examination shall extend to all documents necessary to permit adequate evaluation of the cost or pricing data submitted, along with the computations and projections used therein.
- 28.11.3 Contract changes exceeding \$10,000.00 but not \$100,000.00 in cost: The Owner or his representatives prior to the execution of any contract Change Order in this sub article or for a period of twelve months after execution shall, unless such pricing is based on bid unit prices, adequate price competition, established catalog of market prices or commercial items sold in substantial quantities to the public, or prices set by law or regulation, have the right to examine all books, records, documents, and other data of the Contractor relating to the negotiation and contract Change Order for the purpose of evaluating the accuracy, completeness, and currency of the data is submitted upon which negotiation is or has been based. To the extent the examination reveals inaccurate, incomplete or noncurrent data, the Project Manager may renegotiate the contract Change Order price based on such data.
- 28.11.4 Contract changes of less than \$10,000.00 in cost: The Owner may require from the Contractor appropriate documentation to support the prices being negotiated for contract changes under this sub article, and may refuse to complete negotiations until satisfactory documentation is submitted.
- 28.11.5 Availability: The materials described in Paragraphs 28.11.1 and 28.11.2 above shall be available at the office of the Contractor at all reasonable times for inspection, audit or reproduction until three years from the date of final payment under this Contract and for records which relate to Article 35, DISPUTES, or litigations or the settlement of claims arising out of the negotiation or the performance of contract changes over 100,000.00, records shall be made available until such litigations or claims have been resolved.

- 28.11.6 The Contractor shall insert a clause containing all the provisions in this Paragraph 28.11, including this subparagraph 28.11.6, in all subcontracts hereunder except altered as necessary for proper identification of the contracting parties and Owner.
- 28.11.7 For the purposes of Paragraph 28.11 of this Article, costs shall include liquidated damages which would be assessed if extension(s) of time were not granted by contract Change Order.
- 28.11.8 The requirements of this audits and records article are in addition to other audit, inspection and record keeping provisions elsewhere in the Contract Documents.
- 28.12 Changes involving aggregate increases and decreases in excess of \$100,000.00 shall be subject to the following:
- A change involves aggregate increases and decreases in excess of \$100,000.00 if the total value of work affected, without regard to the arithmetic sign, exceeds this amount; for example, a change order adding work in the amount of \$75,000.00 and deleting work in the amount of \$50,000.00 will be considered to involve aggregate increases and decreases of \$125,000.00.
- 28.12.2 The Contractor shall submit in support of all items not based upon unit prices or lump sum prices contained in the Contract or upon the established prices at which commercial items are sold in substantial quantities to the public, statements by his vendors that the prices charged the Contractor are not greater than the prices charged by the respective vendors to their most favored customers for the same items in similar quantities.
- 28.12.3 Price reductions for Defective Cost or Pricing Data--Pricing Adjustments: If any price, including profit and fee, negotiated in connection with any price adjustment was increased by any significant sums because:
- 28.12.3.1 The Contractor furnished cost or pricing data which were not complete, accurate, and current as certified in the Contractor's Certificate of Current Cost or Pricing Data;
- 28.12.3.2 A subcontractor, pursuant to Paragraph 28.13 of this Article entitled Subcontractor Cost or Pricing Data--Pricing Adjustments or any subcontract provision therein required, furnished costs or pricing data which were not complete, accurate, and current as certified in the Subcontractor's Certificate of Current Cost or Pricing Data;
- 28.12.3.3 The subcontractor or his prospective subcontractor furnished cost or pricing data which were required to be complete, accurate, and current and to be submitted to support a subcontract cost estimate furnished by the Contractor but which were not complete, accurate, and current as of the date certified in the Contractor's Certificate of Current Cost or Pricing Data; or
- 28.12.3.4 The Contractor or a subcontractor or his prospective subcontractor furnished any data, not within subparagraphs 28.12.3.1, 28.12.3.2, or 28.12.3.3 above, which were not complete, accurate, and current as submitted, the price shall be reduced accordingly and the Contract shall be modified in writing as may be necessary to reflect such reduction. Any reduction in the Contract Price due to defective subcontract data of a prospective subcontractor, when the subcontract was not subsequently awarded to such subcontractor, will be limited to the amount (plus applicable overhead

and profit markup) by which the actual subcontract, or actual cost to the Contractor if there was no subcontract, was less than the prospective subcontract cost estimate submitted by the Contractor, provided the actual subcontract price was not affected by defective cost or pricing data.

- 28.13 Subcontract Cost of Pricing Data-- Pricing Adjustment:
- 28.13.1 When negotiating a change involving increases or decreases in excess of \$100,000.00, the Contractor shall require subcontractors hereunder to submit cost or pricing data under the following circumstances. Prior to award of any cost-reimbursement type, incentive or price redeterminable subcontract;
- 28.13.1.2 Prior to the award of any subcontract the price of which is expected to exceed \$100,000.00;
- 28.13.1.3 Prior to the pricing of any subcontract change modifications for which the price is expected to exceed \$100,000.00, except in the case of 28.13.1.2 and 28.13.1.3 where the price is based on adequate price competition, established catalog or market prices, commercial items sold in substantial quantities to the general public, or prices set by law or regulation.
- 28.13.2 The Contractor shall require subcontractors to certify to the best of their knowledge and belief that the cost and pricing data submitted under subparagraph 28.13.1 of this Article are accurate, complete, and current as of the date of execution, which date shall be as close as possible to the date of agreement on the negotiated price of the contract Change Order.
- 28.13.3 The Contractor shall insert the substance of Paragraph 28.13 of this Article, including this subparagraph 28.13.3, in each subcontract hereunder which exceeds \$100,000.00.

# ARTICLE 29 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

- 29.1 The Contractor shall furnish a Performance Bond in the amount equal to one hundred percent (100%) of the Contract Sum as security for the faithful performance of this Contract and also a Labor and Material Payment Bond in an amount not less than one hundred percent (100%) of the Contract Sum or in a penal sum not less than that prescribed by State, or local law, as security for the payment of all persons performing labor on the Project under this Contract and furnishing materials in connection with this Contract. The Performance Bond and the Labor and Material Payment Bond may be in one or in separate instruments in accordance with local law and shall be delivered to the Owner not later than the date of execution of the Contract.
- 29.2 Performance Bonds, Labor and Material Payment Bonds and other such sureties shall provide that the surety and the Contractor are both jointly and severally liable and obligated under respective Bond or other surety agreement and shall incorporate acknowledge of applicable provisions of state law into all documents furnished in connection with the project.

# ARTICLE 30 DIFFERING SITE CONDITIONS

The Contractor shall within 10 days of actual or constructive notice of a differing site condition, promptly, and before such conditions are disturbed, notify the Project Manager in writing of: (1) subsurface or latent physical conditions at the site differing materially from those indicated in

the Contract Documents, or (2) unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract. The Project Manager will promptly investigate the conditions, and if such conditions materially differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performance of any part of the work under the Contract, whether or not changed as a result of such conditions, an equitable adjustment may be made subject to Owner's approval and the Contract modified in writing accordingly.

- No claim of the Contractor under this Article will be allowed unless the Contractor has given the notice required in Paragraph 30.1 of this Article.
- 30.3 No claim by the Contractor for an equitable adjustment hereunder will be allowed if asserted after final payment under this Contract.

# ARTICLE 31 CONTRACTOR PROPOSALS

- 31.1 The Contractor may at any time submit to the Project Manager for his review proposed modifications to the Contract Documents, supported by a cost/price proposal. Upon acceptance of the proposed modifications by the Owner, a Change Order will be issued. Denial of the proposed modification will neither provide the Contractor with any basis for claim for damages nor release the Contractor from contractual responsibilities. An equitable adjustment in the form of a contract price reduction will be made if the change results in a reduction of the cost of performance and the Contractor will not be entitled to share in said savings unless the proposal is made under Paragraph 31.2 of this Article. Except as provided in Paragraph 31.2 of this Article, the Contractor will not be compensated for any direct, incidental or collateral benefits or savings the Owner receives as a result of the proposal.
- 31.2 Value Engineering Change Proposals: The Contractor may submit to the Project Manager one or more cost reduction proposals for changing the Contract requirements. The Proposals shall be based upon a sound study made by the Contractor indicating that the proposal:
- 31.2.1 Will result in a net reduction in the Total Contract amount;
- Will not impair any essential function or characteristic of the Work such as safety, service life, reliability, economy of operation, ease of maintenance and necessary standardized features.
- 31.2.3 Will not require an unacceptable extension of the contract completion time; and
- Will require a change in the Contract Documents and such change is not already under consideration by the Owner.
- 31.3 The Owner may accept in whole or in part any proposal submitted pursuant to the previous Paragraph 31.2 by issuing a Change Order which will identify the proposal on which it is based. The Change Order will provide for an equitable adjustment in the Contract Price and will revise any other affected provisions of the Contract Documents. The equitable adjustment in the Contract price will be established by determining the net savings resulting from the accepted change. The net savings resulting from the change will be shared between the Contractor and the Owner on the basis of 50 percent for the Contractor and 50 percent for the Owner and will be limited to this

contract for any one Value Engineering Change Proposal. Net savings will be determined by deducting from the estimated gross savings, the Contractor's costs of developing and implementing the proposal (including any amount attributable to a subcontractor) and the estimated amount of increased costs to the Owner resulting from the change, such as evaluation, implementation, inspection, related items, and the Owner-furnished material. Estimated gross savings will include Contractor's labor, material, equipment, overhead, profit and bond. The Contract price will be reduced by the sum of the Owner's costs and share of the net savings. For the purpose of this Article, the applicable provisions of Article 28, CHANGES, shall be used to determine the equitable adjustment to the Contract price.

- 31.4 The Owner will not be liable for delay in acting upon, or for failure to act upon, any proposal submitted pursuant to Paragraph 31.2 of this Article. The decision of the Owner as to the Acceptance or rejection of any such proposal under the Contract will be final. The submission of a proposal by the Contractor will not in itself affect the rights or obligations of either party under the Contract.
- The Contractor shall have the right to withdraw part or all of any proposal he may make under Paragraph 31.2 of this Article at any time prior to acceptance by the Owner. Such withdrawal shall be made in writing to the Project Manager. Each such proposal shall remain valid for a period of 60 days from the date submitted. If the Contractor wishes to withdraw the proposal prior to the expiration of the 60-day period, he will be liable for the cost incurred by the Owner in reviewing the proposal.
- 31.6 The Contractor shall specifically identify any proposals under Paragraph 31.2 of this Article with the heading "Value Engineering Change Proposal", or the proposal will be considered as made under Paragraph 31.1 of this Article.
- 31.7 The Contractor, in connection with each proposal he makes for a Contract Change Notice under this Article shall furnish the following information:
- 31.7.1 a description of the difference between the existing Contract requirement and the proposed change, and the comparative advantages and disadvantages of each, justification when a function or characteristic of an item is being altered, and the effect of the change on the performance of the end item;
- an analysis and itemization of the requirements of the Contract which must be changed if the Value Engineering Change Proposal is accepted and a recommendation as to how to make each such change (e.g., a suggested specification revision);
- 31.7.3 a separate detailed cost estimate for both the existing Contract requirement and the proposed change to provide an estimate of the reduction in costs, if any, that will result from acceptance of the Value Engineering Change Proposal taking into account the costs of development and implementation by the Contractor;
- 31.7.4 a prediction of any effects the proposed change would have on collateral costs to the Owner such Government-furnished property costs, costs of related items, and costs of maintenance and operation;

- 31.7.5 a statement of the time by which a contract modification accepting the Value Engineering Change Proposal must be issued so as to obtain the maximum cost reduction, noting any effect on the contract completion time or delivery schedule; and
- 31.7.6 identification of any previous submission of the Value Engineering Change Proposal to the Owner, including the dates submitted, the numbers of contracts involved, and the previous actions by the Owner, if known.

# ARTICLE 32 EXTENSION OF TIME

- 32.1 In addition to the provisions stated in Article 38, the Contractor will be granted an extension of time and will not be assessed liquidated damages for any portion of the delay in completion of the Work, performed under the latest approved progress schedule, arising from acts of God, war, fires, floods, epidemics, quarantine restrictions, freight embargoes, or weather more severe than the norm, provided that the aforesaid causes were not foreseeable and did not result from the fault or negligence of the Contractor, and provided further that the Contractor has taken reasonable precautions to prevent further delays owing to such causes, and has notified the Project Manager in writing of the cause or causes of delay within five days from the beginning of any such delay. Within 15 days after the end of the delay, the Contractor shall furnish the Project Manager with detailed information concerning the circumstances of the delay, the number of days actually delayed, the appropriate Contract Document references, and the measures to be taken to prevent or minimize the delay. Failure to submit such information will be sufficient cause for denying the delay claims. The Owner will ascertain the facts and the extent of the delay, and its findings thereon will be final and conclusive to provisions under Article 35, DISPUTES. The extension of time granted for these reasons shall not be the basis for additional compensation for any costs incurred during the time of delay.
- 32.1.1 Every effort shall be made by the Contractor to complete the project within the "Contract Time". The "Contract Time" anticipates "Normal" weather and climate. The Contractor's schedule must anticipate normal adverse weather delays on all weather dependent activities. The following specifies the procedure for determining time extensions for unusually severe weather. Listed below are the anticipated numbers of calendar days lost to normal adverse weather for each month.

Monthly Anticipated Calendar Days Lost to Adverse Weather Conditions

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
(7)	(4)	(4)	(4)	(6)	(3)	(4)	(2)	(3)	(3)	(2)	(5)

The above schedule of anticipated adverse weather days will constitute the base line for monthly (or portion thereof) weather time evaluations. It is assumed that the work will be carried out Mondays through Fridays (holidays excepted) unless and approved construction schedule or written authorization from the Owner indicates otherwise.

An actual adverse weather day must prevent work for 50 percent or more of the Contractor's workday. When the Contractor anticipates documenting a weather day, he/she shall first notify the Project Manager or his/her designee observing the construction to determine whether or not work can proceed or if work is delayed due to adverse weather or the effects thereof. If in agreement, the Contractor shall formally request a weather day in writing to the Owner's Project Manager or his/her designee. The Contractor shall also notify the Owner's Project Manager in writing or his/her

designee of any disagreement as to whether or not work could have proceeded on a given date within 2 calendar days of that date. The final decision regarding an adverse weather day will be made by the Project Manager or his/her designee.

The number of workdays delayed due to adverse weather or the effects thereof will then be converted to Calendar Days. Weekends and holidays will only count as calendar day delays if a workday delayed due to adverse weather is counted before and after the weekend/holiday. The number of calendar days of delay due to adverse weather or the impact thereof will then be compared to the monthly adverse weather schedule above. The Contract time period will then be increased by change order for the number

of calendar days that are in excess of the above schedule and a new Contract Completion day and date will be set.

- 32.1.2 An extension of time will not be granted for a delay caused by a shortage of materials, except Owner-furnished materials, unless the Contractor furnishes to the Project Manager documentary proof that he has diligently made every effort to obtain such materials from every known source within reasonable reach of the Work. The Contractor shall also submit proof that the inability to obtain such materials when originally planned did in fact cause a delay in final completion of the Work which could not be compensated for by revising the sequence of his operations. Only the physical shortage of material will be considered under these provisions as a cause for extension of time. No consideration will be given to any claim that material could not be obtained at reasonable, practical, or economical costs, unless it is shown to satisfaction of the Project Manager that such material could have been obtained only at exorbitant prices, entirely inconsistent with current rates taking into account the quantities involved and the usual practices in obtaining such quantities.
- 32.2 A Change Order will be furnished to the Contractor within a reasonable period of time after approval of a request for extension of time, specifying the number of days allowed, if any, and the new date for completion of the Work or specified portions of the Work.
- 32.3 See also Article 38, TERMINATION FOR DEFAULT--DAMAGES FOR DELAY--TIME EXTENSIONS.

# ARTICLE 33 NOTICE OF POTENTIAL CLAIM

- The Contractor will not be entitled to additional compensation otherwise payable for an act or failure to act by the Owner, the happening of any event or occurrence, or any other cause, unless he shall have given the Project Manager a written notice of potential claim therefore as specified in this Article.
- 33.2 The written notice of potential claim shall set forth the reasons for which the Contractor believes additional compensation will or may be due, the nature of the costs involved, and insofar as possible, the amount of the potential claim. If based on an act or failure to act by the Owner, such notice shall be given to the Project Manager prior to the time that the Contractor has started performance of work giving rise to the potential claim for additional compensation. Notice shall be given within five days after the happening of the event or occurrence giving rise to the potential claim.
- 33.3 It is the intention of this Article that differences between the parties arising under and by virtue of the contract shall be brought to the attention of the Project Manager at the earliest possible time in order that such matters may be settled, if possible, or other appropriate action promptly taken.

The notice requirements of this Article are in addition to those required in other Articles of the General Conditions.

# ARTICLE 34 SUBMITTAL OF CLAIMS

- 34.1 Claims filed by the Contractor shall contain sufficient detail to enable the Owner to ascertain the basis and amount of said claims. The Owner will review and evaluate the Contractor's claims. It will be the responsibility of the Contractor to furnish when requested by the Project Manager such further information and details as may be required to determine the facts or contention involved in his claims. Failure to submit such information and details will be sufficient cause for denying the Contractor's claims.
- 34.2 Each claim the Contractor may make for equitable adjustment on account of delay for any cause shall be accompanied by a progress schedule reflecting the effects of the delay and proposals to minimize these effects. If no progress schedule has been submitted to the Project Manager reflecting conditions prior to the delay for which relief is sought, then a progress schedule so reflecting these conditions shall be prepared and submitted with the claim.
- Depending upon the grounds for relief and the nature of relief sought, additional submittals and conditions upon submitting claims may be required elsewhere in these General Conditions.
- In no event shall claims be made after final payment is made under Article 27, FINAL PAYMENT, of these General Conditions.
- 34.5 Inasmuch as notice of potential claim requirements of Article 33, NOTICE OF POTENTIAL CLAIM, are intended to enable the Project Manager to investigate while facts are fresh and to take action to minimize or avoid a claim which might be filed thereafter, the Contractor's failure to make the required notice on time is likely to disadvantage the Owner. Therefore no claim for which a notice of potential claim is required will be considered unless the Contractor has complied with the notice of Article 33, NOTICE OF POTENTIAL CLAIM.

# ARTICLE 35 DISPUTES

- 35.1 General: Notwithstanding any other provisions of this Contract, disputes and disagreements by and between the Owner and the Contractor shall be resolved through progressive, sequential process of negotiation, mediation, and in certain cases, arbitration. For contracts which are for \$250,000 or less, amounts in dispute which are less than \$10,000 shall not progress beyond negotiation and shall ultimately be decided by the Owner if not by mutual agreement. For contracts which are for more than \$250,000, amounts in dispute which are less than \$25,000 should not progress beyond negotiation. For all contracts, amounts in dispute greater than those amounts set forth above, but less than \$100,000 shall be resolved through a sequential process of negotiation, mediation, and binding arbitration. Amounts in dispute which are \$100,000 or more shall be resolved through a sequential process of negotiation, mediation, and thence either arbitration or litigation.
- 35.2 Negotiation: In the event of disputes, unsettled claims, questions or disagreements between the contractor and the City relating to or arising out of the provisions of this Contract, the representatives of those parties shall meet promptly in recognition of mutual interests and in a good

faith effort to resolve the dispute. Either the Contractor or the City shall arrange for this meeting at a time and place within the City of Greeley, mutually acceptable to both parties, within fifteen (15) days of notification of the dispute, unsettled claim, question, or disagreement between the parties. Seven (7) days prior to the meeting, the initiating party shall deliver to the other party, a written and complete summary of the evidence and arguments substantiating its claim. If the parties do not reach a solution within thirty (30) days after said initial meeting, then upon notice of either party to the other, the dispute, claim, question, or difference, may be referred to a mediator pursuant to Section 35.3. The parties can extend the negotiation period by mutual written agreement.

35.3 If the dispute, claim, question, or difference is not resolved by negotiation Mediation: within thirty (30) days after the initial meeting between the parties or within the extended period agreed upon, the parties agree to next request that the American Arbitration Association provide a mediator to assist the Owner and Contractor in resolving the dispute, claim, question, or difference. The rules of mediation shall be the Construction Industry Mediation Rules of the American Arbitration Association. A different mediation/dispute resolution agency may be selected for mediation upon the mutual written agreement between the parties. The dispute resolution agency shall select a qualified mediator who shall have a background in construction. The selected mediator may be rejected by the parties only for bias. The mediator shall have thirty (30) days from the time of appointment to meet with the parties and sixty (60) days from the time of the appointment to resolve the dispute unless the parties mutually consent to an extension of the sixty day deadline. All reasonable fees, costs, and expenses of the mediator, the mediator's association and the mediation agency, shall be borne equally by the parties. Each party shall bear the expense of its own counsel, experts, witnesses, and preparation and presentation of proofs at mediation.

The Contractor shall not cause a delay of work during mediation proceedings except by mutual agreement. All mediation proceedings shall be conducted in the City of Greeley, unless an alternate location is agreed upon in writing by the Owner and the Contractor.

### Amounts in dispute which are less than \$10,000 shall not progress beyond mediation.

- Litigation prerequisites: The procedures enumerated in Sections 35.2 and 35.3 shall be a prerequisite to the filing of any litigation between the parties to the Contract. Failure of the Contractor to follow the provisions of Section 35.2 and Section 35.3 shall be a complete defense, and grounds for immediate dismissal of any litigation filed prior to Contractor engaging in negotiation and mediation with the City of Greeley as provided above. Litigation may be filed only if the amount in dispute is \$100,000 or more. In the event litigation is filed by and between the parties after mediation, venue and jurisdiction of any and all suits and causes of action in connection with this Contract shall lie exclusively in Weld County, Colorado.
- 35.5 Arbitration: After mediation, instead of litigation, any remaining unresolved controversy or claim arising out of or relating to this Contract or the performance or breach thereof, may be settled by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association. For amounts in dispute which are \$100,000 or more, arbitration shall be engaged only upon mutual written agreement by the Owner and the Contractor, and the written agreement shall specify whether the arbitration shall be binding or nonbinding; however, amounts in dispute which are less than \$100,000 shall necessarily be settled by binding arbitration. The sole arbitrator shall be appointed by the Arbitration Association, unless a different arbitrator or dispute resolution agency is mutually agreed upon. The award of the arbitrator shall be accompanied by a reasoned opinion, and shall include findings of fact and conclusions. All fees and expenses of

the arbitration, including the expense of each party's counsel, experts, witnesses, and preparation and presentation of proofs, shall be borne by the party against whom arbitration judgment is made.

35.6 Litigation: Each party shall bear its own litigation fees and expenses, including the expense of its counsel, experts, witnesses, and preparation and presentation of proofs, regardless of the prevailing party.

### ARTICLE 36 FORCE ACCOUNT WORK

- This Article shall become operative upon failure of the Contractor and the Owner to arrive at an amount of compensation under Article 28, CHANGES. In the event that no equitable adjustment is arrived at either by mutual agreement or pursuant to the Article 35, DISPUTES, the compensation paid hereunder will be the total compensation.
- Work Performed by or for Contractor: The Contractor will be paid for labor, materials, and equipment as hereinafter provided, except where agreement has been reached to pay in accordance with Paragraph 36.3 of this Article. The following percentages, as full compensation for profit, overhead and small tools, will be added to the totals computed as provided in subparagraphs 36.2.1 through 36.2.3 of this Article.

Labor 25 percent Materials 20 percent Equipment 10 percent

Labor, materials, and equipment shall be furnished by the Contractor or by a subcontractor. When work paid on a force account basis is performed by forces other than the Contractor's, the Contractor shall reach agreement with such other forces as to the distribution of the payment made by the Owner for such work and, except as specified herein, no additional payment therefore will be made by the Owner by reason of performance of work by a subcontractor or by others. In addition to the markups, if any, for labor, equipment, and materials, for subcontracted work, the Contractor may add an additional five percent markup. The cost of subcontracted work will be the actual cost to the contractor for work performed by a subcontractor as computed in accordance with this Paragraph 36.2 and its subparagraphs 36.2.1, 36.2.2, and 36.2.3.

- 36.2.1 Labor: The cost of labor used in performing the work, whether the employer is the Contractor or a subcontractor, will be the sum as determined on the basis of the following three subparagraphs:
- 36.2.1.1 The gross actual wages, including income tax withholdings but not including employer payments to or on behalf of workmen for health and welfare, pension, vacation, insurance and similar purposes.
- 36.2.1.2 To the gross actual wages, as defined in the previous subparagraph,
- 36.2.1.1, will be added a percentage based upon current State and Federal laws and applicable labor contracts concerning payments made to or on behalf of workmen other than actual wages, which percentage will constitute full compensation for all payments imposed by State and Federal laws and for all other payments made to or on behalf of the workmen, other than actual wages as defined in the previous subparagraph 36.2.1.1 and the subsistence and travel allowance as specified

in the following subparagraphs 36.2.1.3. The Contractor shall compute a separate percentage for each craft, or a composite percentage for all crafts, if so approved by the Owner. Computed percentages shall be submitted to the Project Manager for approval by the Owner.

- 36.2.1.3 Subsistence and travel allowance paid to workmen as required by established agreements.
- 36.2.1.4 The charges for labor shall include all classifications up to but not including foremen, and when authorized by the Owner, shall include foremen engaged in the actual and direct performance of the work. Labor charges shall not include charges for assistant superintendents, office personnel, timekeepers, and maintenance mechanics, unless authorized by the Owner in advance of the start of work.
- 36.2.2 Materials: The cost of materials required for the accomplishment of the work will be delivered cost to the purchaser, whether contractor or subcontractor, from the supplier thereof, except as the following are applicable:
- 36.2.2.1 If a cash or trade discount by the actual supplier is offered or available to the Contractor, it shall be credited to the Owner notwithstanding the fact that such discount may not have been taken.
- 36.2.2.2 If materials are procured by the Contractor by a method which is not a direct purchase from and a direct purchase from and a direct billing by the actual supplier, the cost of such materials will be deemed to be the price paid to the actual supplier, as determined by the Owner. No additional markup for supplier work will be allowed except to the extent of actual cost to the Contractor in handling the material, not to exceed five percent of the price paid to actual supplier.
- 36.2.2.3 If the materials are obtained from a supply or source owned wholly or in part by the Contractor, payment therefore will not exceed the price paid for similar materials furnished from said source on Contract Items or the current wholesale price for such materials delivered to the work site, whichever price is lower.
- 36.2.2.4 If the cost of the materials is, in the opinion of Owner, excessive, then the cost of such materials will be deemed to be the lowest current wholesale price at which such materials are available in the quantities concerned, delivered to the job site, less discounts as provided in subparagraph 36.2.2.1 of this Article.
- 36.2.2.5 If the Contractor does not furnish satisfactory evidence of the cost of such materials from the actual supplier thereof, the cost will be determined in accordance with subparagraph 36.2.2.4 of this Article.
- 36.2.2.6 The Contractor shall have no claims for costs and profit on Owner-furnished materials.
- 36.2.3 Equipment: The Contractor will be paid for the use of contractor-owned or rented equipment at the rental rates shown in the Colorado State Department of Highways Construction Equipment Rental Rate Schedule, except as modified below, which edition shall be the latest edition in effect at the time of commencement of the Force Account work. For equipment used in excess of eight hours per day, the rental rate shall be 60 percent of the listed hourly rate. If it is deemed

necessary by the Contractor to use equipment not listed in the C.D.O.H. Construction Equipment Rental Rate Schedule, the Contractor shall furnish the necessary cost data and paid invoices to the Project Manager for his use in establishment of such rental rate.

- 36.2.3.1 The rates paid as above provided will include the cost of fuel, oil, lubricants, supplies, small tools, necessary attachments, repairs and maintenance, depreciation, storage, insurance and incidentals.
- 36.2.3.2 Equipment operators will be paid for as stipulated in subparagraph 36.2.1 of this Article.
- 36.2.3.3 Equipment shall be in good working condition and suitable for the purpose for which the equipment is to be used.
- 36.2.3.4 Unless otherwise specified, manufacturer-approved modifications shall be used to classify equipment for the determination of applicable rental rates. Equipment which has no direct power unit shall be powered by a unit of at least the minimum rating recommended by the manufacturer of that equipment.
- 36.2.3.5 Individual pieces of equipment or tools having a net individual value of \$300 or less, whether or not consumed by use, will be considered to be small tools and no payment will be made therefore.
- 36.2.3.6 Compensation will not be allowed while equipment is inoperative due to breakdown. Except as specified in paragraph 36.2.3.7 of this Article, time will be computed in half and full hours. In computing the time for use of equipment, less than 30 minutes shall be considered one half hour.
- 36.2.3.7 Equipment at the Work Site: The time to be paid for use of equipment on the work site will be the time the equipment is in operation on the force account work being performed. The time will include the time required to move the equipment to location of the force account work and return it to the original location or to another location requiring no more time than that required to return it to its original location. Moving time will not be paid for if the equipment is used at the site of the force account work on other than such force account work. Loading and transporting costs will be allowed, in lieu of moving time, when the equipment is moved by means other than its own power. No payment for loading and transporting will be made if the equipment is used at the site of the force account work on other than such force account work.
- 36.3 Special Items of Work: If the Owner and the Contractor, by agreement, determine that (a) an item of force account work does not represent a significant portion of the total Contract price, and (b) such items of work cannot be performed by the forces of the Contractor or the forces of any of his subcontractors, and (c) it is not in accordance with the established practice of the industry involved to keep the records which the procedure outlined in Paragraph 36.2 of this Article would require, charges for such special force account work items may be made on the basis of invoices for such work without complete itemization of labor, materials, and equipment rental costs. To such invoiced price, less a credit to the Owner for any cash or trade discount offered or available, will be added five percent of the discounted price, in lieu of the percentages provided in Paragraph 36.2 of this Article. In no event will the price paid exceed the current fair market value of such work plus five percent.

- Records: The Contractor shall maintain his records to provide a clear distinction between the direct costs of work paid for on a force account basis and costs of other operations.
- 36.4.1 The Contractor shall prepare and furnish to the Project Manager, on the following work day, report sheets in duplicate of each day's work paid for on a force account basis. The daily report sheets shall itemize the materials used and shall cover the direct cost of labor and the charges for equipment, whether furnished by the Contractor, subcontractor, or other forces, except for charges described in Paragraph 36.3 of this Article. The daily report sheets shall provide names or identifications and classifications of workmen and the hourly rate of pay and hours worked. In addition, a report of the size, type and identification number of equipment and hours operated shall be furnished to the Project Manager. Daily report sheets shall be signed by the Contractor or his authorized agent.
- Material changes shall be substantiated by valid copies of vendor's invoices or conformed copies, certified true by the Contractor. Such invoices shall be submitted with the daily report sheets. Should the vendor's invoices not be submitted within 20 days after the date of delivery of the material or 15 days after acceptance of the work, whichever comes first, the Owner reserves the right to establish the cost of such materials at the lower current wholesale prices at which such materials are available in the quantities concerned delivered to the location of the work, less any discounts provided in subparagraph 36.2.1. of this Article.
- 36.4.3 The Project Manager will compare his records with the daily report sheets furnished by the Contractor, make any necessary adjustment and compile the costs of work paid for on a force account basis on daily force account work report forms. When these daily reports are agreed upon and signed by the Project Manager, they shall become the basis of payment for the work performed, but shall not preclude subsequent adjustment based on a later audit.
- 36.4.4 The Contractor's original cost records pertaining to work paid for a on a force account basis shall be retained and shall be open to inspection and audit as required by Article 28, CHANGES, and any other provisions of the Contract.
- 36.5 If, in the Project Manager's opinion, the Contractor or any of his subcontractors, in performing Force Account work, is not making efficient use of labor, material or equipment or is proceeding in a manner which makes Force Account work unnecessarily more expensive to the Owner, the Project Manager may, in whole or part, direct the Contractor in the deployment of labor, material and equipment. By way of illustration, inefficiency may arise in the following ways: (1) the timing of the work, (2) the use of unnecessary labor or equipment, (3) the use of a higher percentage of apprentices than in non-force account work, (4) failure to procure materials at the lowest price, or (5) using materials of quality higher than necessary.

# ARTICLE 37 TERMINATION FOR CONVENIENCE OF THE OWNER

37.1 The performance of Work under this contract may be terminated by the Owner in accordance with this Article in whole, or from time to time in part, whenever such termination is in the best interest of the Owner. Such termination shall be effected by delivery to the Contractor of a Notice of Termination specifying the extent to which performance of work under the Contract is terminated, and the date upon which such termination becomes effective.

- 37.2 After receipt of a Notice of Termination, and except as otherwise directed by the Owner, the Contractor shall:
- 37.2.1 Stop work under the Contract on the date and to the extent specified in the Notice of Termination.
- Place no further orders or subcontracts for materials, services or facilities, except as may be necessary for completion of such portion of the work under the Contract as is not terminated;
- 37.2.3 Terminate all orders and subcontracts to the extent that they relate to the performance of work terminated by the Notice of Termination;
- 37.2.4 Assign to the Owner in the manner, at the times, and to the extent directed by it, all of the rights, title and interest of the Contractor under the orders and subcontracts so terminated, in which case the Owner will have the right, in its discretion, to settle or pay any or all claims arising out of the termination of such orders and subcontracts:
- 37.2.5 Settle outstanding liabilities and claims arising out of such termination of orders and subcontracts, with the approval or ratification of the Owner to the extent it may require, which approval or ratification shall be final for the purposes of this Article;
- 37.2.6 Transfer title and deliver to the Owner in the manner, at the times, and to the extent, if any directed by it, (a) the fabricated or unfabricated parts, work in process, completed work, supplies and other material procured as part of, or acquired in connection with the performance of, the work terminated by the Notice of Termination, and (b) the completed or partially completed plans, drawings, information, and other property, which, if the Contract had been completed, would have been required to be furnished to the Owner;
- 37.2.7 Use his best efforts to sell, in the manner, at the times, to the extent, and at the price or prices direction or authorized by the Owner, property of the types referred to in (37.2.5) above; provided, however, that the Contractor (a) shall not be required to extend credit to any purchaser and (b) may acquire any such property under the conditions prescribed by and at a price or prices approved by the Owner; provided further that the proceeds of any such transfer or disposition will be applied in reduction of any payments to be made by the Owner to the contractor under this Contract or will otherwise be credited to the price or cost of the work covered by this Contract or paid in such other manner as the Owner may direct;
- 37.2.8 Complete performance of each part of the work as shall not have been terminated by the Notice of Termination; and
- 37.2.9 Take such action as may be necessary, or as the Project Manager may direct, for the protection and preservation of the property related to this Contract which is in the possession of the Contractor and in which the Owner has or may acquire an interest.

- After receipt of a Notice of Termination, the Contractor shall submit to the Project Manager his termination claim, in the form and with certification prescribed by the Owner. Such claims shall be submitted promptly but in no event later than the earliest of the following: (1) one year from the effective date of termination or (2) thirty days after the remainder of the project has been accepted by the owner.
- 37.4 Subject to the provision of Paragraph 37.3, the contractor and the Owner may agree upon the whole or any part of the amount or amounts to be paid to the Contractor by reason of the total or partial termination of work pursuant to this Article, which amount or amounts may include an allowance for profit on work done; provided that such agreed amount or amounts, exclusive of settlement costs, shall not exceed the total contract price as reduced by the amount of payments otherwise made and as further reduced by the Contract price of work terminated. The Contract will be amended accordingly, and the Contractor will be paid the agreed amount.
- In the event of failure of the Contractor and the Owner to agree, as provided in Paragraph 37.4, upon the whole amount to be paid the Contractor by reason of the termination of work pursuant to this Article, the Owner will pay the Contractor the amounts determined by the Owner as follows, but without duplication of any amounts agreed upon in accordance with Paragraph 37.4;
- With respect to contract work performed prior to the effective date of the Notice of Termination, the total (without duplication of any items) of:
- 37.5.1.1 The cost of such work;
- 37.5.1.2 The cost of settling and paying claims arising out of the termination of work under subcontracts or orders as provided in subparagraph 37.2.5 above, exclusive of the amounts paid or payable on account of supplies or materials delivered or services furnished by the subcontractor prior to the effective date of the Notice of Termination of work under this Contract, which amounts shall be included in the cost on account of which payment is made under 37.5.1 above.
- 37.5.1.3 A sum, as profit on 37.5.1.1 above, determined by the Owner to be fair and reasonable; provided, however, that if it appears that the Contractor would have sustained a loss on the entire Contract had it been completed, no profit shall be included or allowed under this subparagraph 37.5.1.3 and an appropriate adjustment shall be made by reducing the amount of the settlement to reflect the indicated rate of loss.
- 37.5.2 The reasonable cost of the preservation and property incurred pursuant to subparagraph 37.2.9 and any other reasonable cost incidental to termination of work under this Contract, including expense incidental to the determination of the amount due to the Contractor as the result of the termination of work under this Contract.
- 37.5.3 The total sum to be paid to the contractor under paragraph 37.5.1 above will not exceed the total contract price as reduced by the amount of payments otherwise made and as further reduced by the Contract price of the work terminated.

- 37.6 In arriving at the amount due the Contractor under this Article, there will be deducted (1) any claim which the Owner may have against the Contractor in connection with this Contract, (2) the agreed price for, or the proceeds of sale, of materials, supplies or other things acquired by the contractor or sold, pursuant to the provisions of this Article, and not otherwise recovered by or credited to the Owner and (3) the full amount of any statutory or other claim against the Contractor filed with the Owner.
- 37.7 Unless otherwise provided for in this Contract, or by applicable statute, the Contractor, from the effective date of termination and for a period of three years after final settlement under this Contract, shall preserve and make available to the Owner at all reasonable times at the office of the Contractor but without direct charge to the Owner, all his books, records, documents, electronic/digital media and other evidence bearing on the costs and expenses of the Contractor under this Contract and related to the work terminated hereunder, or to the extent approved by the Owner, or other authentic reproductions thereof.
- 37.8 The Contractor shall insert in all subcontracts that the subcontractor shall stop work on the date of and to the extent specified in a Notice of Termination from the Owner and shall require that any tier subcontractors insert the same provision in any tier subcontracts.
- 37.9 Under no circumstances is the Contractor entitled to anticipatory, unearned profits or consequential damages as a result of a termination or partial termination under this Article.

# ARTICLE 38 TERMINATION FOR DEFAULT

- 38.1 If, in the opinion of the Owner, the Contractor has failed to prosecute work, the Owner will notify the Contractor. The Contractor will then have 5 days to remedy the failure to prosecute work or to obtain the Owner's authorization for the delay or an extension of time as set forth in Article 32.
- 38.2 If the Contractor refuses or fails after reasonable notice as set forth above to prosecute Work, or any separable part thereof, with such diligence as will insure its completion within the time specified in this Contract, or refuses or fails to complete said Work within such time, the Owner may, by written notice to the Contractor, terminate for default his right to proceed with the Work or such part of the Work as to which there has been unauthorized delay. In such event the Owner may take over the work and prosecute the same to completion, by Contractor or otherwise, and may take possession of and utilize in completing the Work such materials, appliances, and plant as may be on the Work Site and necessary therefore. Whether or not the Contractor's right to proceed with the Work is terminated, he and his sureties shall be liable for any damage to the Owner resulting from his refusal or failure to complete the Work in the specified time.
- 38.3 If the Owner so terminates the Contractor's right to proceed, the resulting damage will consist of liquidated damages until such time as may be required for final completion of the Work together with any increased costs incurred by the Owner in completing the Work as further set forth in Article 41.
- 38.4 If, after Notice of Termination of the Contractor's right to proceed under the provisions of this Article, it is determined for any reason that the Contractor was not in default under the provisions of this Article or that the Contractor was entitled to an extension of time under Article 32,

EXTENSION OF TIME, the rights and obligations of the parties shall be the same as if the Notice of Termination had been issued pursuant to Article 37, TERMINATION FOR CONVENIENCE OF THE OWNER.

38.5 The right to terminate for default and any other rights and remedies of the Owner provided in this clause are in addition to any other rights and remedies provided by law or under this Contract.

# ARTICLE 39 TERMINATION OF RIGHT TO PROCEED FOR CERTAIN DEFAULTS

- 39.1 In addition to the Owner's right to terminate for default under other Articles of this Contract, the Owner will have the right to terminate the Contractor's performance of work in whole or in part for default for any of the following reasons:
- 39.1.1 The Contractor's or subcontractor's performance of work is in violation of the terms of the Contract.
- The Contractor or subcontractor has violated an authorized order or requirement of the Owner.
- 39.1.3 Abandonment of Contract.
- 39.1.4 Assignment or subcontracting of the Contract or any work under the Contract without approval of the Owner.
- 39.1.5 Bankruptcy or appointment of a receiver for the Contractor's property.
- 39.1.6 Performance of the Contractor in bad faith.
- 39.1.7 Contractor allowing any final judgment to stand against him for a period of 48 hours (excluding weekends and legal holidays).
- If, in the opinion of the Owner, the Contractor is in default of the Contract, the Owner will notify the Contractor. If the Contractor fails to remedy or commence to remedy the default within five days after receipt of such notice, the Owner may terminate the Contractor's right to proceed with the Work or that portion of the Work which the Owner determines is most directly affected by the default.
- 39.3 If, after Notice of Termination of Contractor's right to proceed under this Article it is determined for any reason Contractor was not in default, the rights and obligations of the parties shall be the same as if the Notice of Termination had been issued pursuant to Article 37, TERMINATION FOR CONVENIENCE OF THE OWNER.

# ARTICLE 40 RIGHTS AND OBLIGATIONS OF PARTIES AT TERMINATION FOR DEFAULTS

40.1 This Article shall apply to terminations for defaults covered in Article 15, 38, and 39 of these General Conditions.

- 40.2 On receipt of a Notice of Termination from the Owner, the Contractor shall:
- 40.2.1 Stop all work under the Contract on the date and to the extent specified in the Notice of Termination.
- 40.2.2 Place no further orders or subcontracts for materials, equipment or services except as they relate to the performance of work covered by the Notice of Termination.
- 40.2.3 Cancel or terminate all orders or subcontracts to the extent that they relate to the performance of work covered by the Notice of Termination.
- 40.2.4 Comply with all other requirements of the Owner as may be specified in the Notice of Termination.
- 40.3 Upon the Owner termination of the Contractor's right to proceed with the Work because of the Contractor's default under the Contract, the Owner will have the right to complete the Work by whatever means and method it deems advisable. The Owner shall have the right to take possession of and use any or all the Contractor's materials, plat, tools, equipment and property of any kind provided by or on behalf of the Contractor for the purpose of the Work, or a portion of them, without being responsible to the Contractor for fair wear and tear. The Contractor shall have no rights in such property during their use by the Owner. The Owner will not be required to obtain the lowest prices for completing the Work but shall make such expenditures as, in the Owner's sole judgment, best accomplish such completion.
- The expense of completing the Work, together with a reasonable charge for engineering, managerial and administrative services, as certified by the Owner, will be charged to the Contractor and the expense so charged will be deducted by the Owner out of such monies as may be due or may at any time thereafter become due to the Contractor. In case such expense is in excess of the sum which otherwise would have been payable to the Contractor under the Contract, the Contractor or his surety shall promptly pay the amount of such excess to the Owner upon notice from the Owner of the excess so due. The Owner may, in its sole discretion, withhold all or any part of any progress payments otherwise due the Contractor until completion and final settlement of the Work covered by the Notice of Termination of Contractor's right to proceed.
- 40.5 The Contractor shall insert in all subcontracts that the subcontractor will stop work on the date of or to the extent specified in a Notice of Termination from the Owner and shall require the subcontractors to insert the same provision in any tier subcontracts.
- The Contractor shall immediately upon receipt communicate any Notice of Termination issued by the Owner to the affected subcontractors and suppliers at any tier.
- 40.7 Rights of Surety: The Surety on the Performance Bond provided for in this Contract shall not be entitled to take over the Contractor's performance of work in case of termination under this Article, except with the consent of the Owner.

### ARTICLE 41 LIQUIDATED DAMAGES

- Time is of the essence of the Contract. In the event the Contractor fails to achieve Substantial Completion of the Work within the Contract Time, or fails to meet any other time requirement or the time limit set forth in the Contract, after due allowance for any extension or extensions of time made in accordance with the Contract, the Contractor shall pay to the Owner as fixed, agreed and liquidated damages, pursuant to the clause of the Contract entitled TERMINATION FOR DEFAULT—DAMAGES FOR DELAY—TIME EXTENSIONS, the sum of \$500.00 for each calendar day of delay unless otherwise stated in the Special Provisions. Such liquidated damages shall be assessed for each and every day that the Contractor shall be in default. The Owner shall have the right to deduct said liquidated damages from any amount due or that may become due the Contractor, or to collect such liquidated damages from the Contractor or its surety.
- Liquidated damages in the amount stipulated do not include any sums of money to reimburse the City for actual damages which may be incurred between Substantial Completion and Final Completion because of the Contractor's failure to achieve Final Completion within the Contract Time. For such delay in Final Completion, the Contractor shall reimburse the City, as a mitigation of City damages and not as a penalty, those administrative costs incurred by the City as a result of such failure.
- Liquidated damages in the amounts stipulated do not include any sums of money to reimburse the City for extra costs which the City may become obligated to pay on other contracts which were delayed or extended because of the Contractor's failure to complete the Work within the Contract Time. Should the City incur additional costs because of delays or extensions to other contracts resulting from the Contractor's failure of timely performance, the City will assess these extra costs against the Contractor, and these assessments will be in addition to the stipulated liquidated damages.
- The City reserves all of its rights to actual damages from the Contractor for injury or loss suffered by the City from actions or omissions of the Contractor, including but not limited to any other breach or default of the Contract, outside of the scope of the above sections.

# ARTICLE 42 USE AND POSSESSION PRIOR TO COMPLETION

The Owner shall have the right to take possession of or use any completed or partially completed parts of the Work. Such possession or use will not be deemed an acceptance of Work not completed in accordance with the Contract. While the Owner is in such possession, the Contractor, notwithstanding the provisions of Article 18, DAMAGE TO WORK AND RESPONSIBILITIES FOR MATERIALS, will be relieved of the responsibility for loss or damage to the work other than that resulting from the Contractor's fault or negligence or breach of warranty. If such prior possession or use by the Owner delays the progress of the Work or causes additional expense to the Contractor, an equitable adjustment in the Contract price or the time of completion will be made, and the Contract will be modified in writing accordingly.

# ARTICLE 43 RIGHTS IN SHOP DRAWINGS AND WORKING DRAWINGS

- 43.1 Shop Drawings and Working Drawings, submitted to the Project Manager by the Contractor, subcontractor or any lower tier subcontractor pursuant to the Work, may be duplicated by the Owner and the Owner may use and disclose, in any manner and for any purpose, Shop Drawings and Working Drawings delivered under this Contract.
- This Article, including this Paragraph 43.2, shall be included in all subcontracts hereunder at all tiers.

# ARTICLE 44 PATENT AND COPYRIGHT

44.1 The Contractor shall warrant that the materials, equipment or devices used on or incorporated in the Work shall be delivered free of any rightful claim of any third party for infringement of any United States patent or copyright. If notified promptly in writing and given authority, information and assistance, the Contractor shall defend, or may settle, at his expense, any suit or proceeding against the Owner or the Project Manager based on a claimed patent or copyright infringement which would result in a breach of his warranty. The Contractor shall pay all damages and costs awarded therein against the Owner or the Project Manager due to such breach. If any use of materials, equipment or devices is held to constitute an infringement and such use is enjoined, the Contractor shall, at his expense and option, either procure for the Owner the right to continue using said materials, equipment or devices, or replace same with noninfringing materials, equipment or devices, or modify same so it becomes noninfringing. The Contractor shall report to the Owner promptly and in reasonable written detail, each notice or claim of patent or copyright infringement based on the performance of this Contract of which the Contractor has knowledge. In the event of any claim or suit against the Owner on account of any alleged patent or copyright infringement arising out of the performance of this Contract or out of the use of any supplies furnished or work or services performed hereunder, the Contractor shall furnish to the Owner when requested by the Owner, all evidence and information in possession of the Contractor pertaining to such suit or claim. Such evidence and information shall be furnished at the expense of the Owner except where the Contractor has agreed to indemnify the Owner. This clause shall be included in all subcontracts.

# ARTICLE 45 HISTORICAL, SCIENTIFIC AND ARCHAEOLOGICAL DISCOVERIES

All articles of historical, scientific or archaeological interest uncovered by the Contractor during progress of the Work shall be preserved in accordance with applicable law and reported immediately to the Project Manager. Further operations of the Contractor with respect to the find, including disposition of the articles, will be decided by the Owner in accordance with applicable law.

### ARTICLE 46 SUBSTITUTIONS

Where reference is made to one or more proprietary products but restrictive descriptive material of only one manufacturer is used, it is understood that the products of other manufacturers will be accepted, provided they equal or exceed the standards set forth in the plans and

specifications and are compatible with the intent and purpose of the design, subject to the written approval of the Owner and the Project Manager. If the descriptive material is not restrictive, the products of other manufacturers specified will be accepted without prior approval provided they are compatible with the intent and purpose of the design.

The Contractor may propose the substitutions of any material as a supplement to his bid with the monetary amount, additive or deductive as may be the case, clearly stated. Manufacturer's information, catalog numbers, and complete descriptive information shall be included with the proposed substitution. This shall be completely apart and separate from the base bid quotation and shall be solely for the information of the Owner, and the use of such proposed substitutions shall be strictly at the decision of the Owner. If substitution is accepted by the Owner, the Contract sum shall be adjusted from the base bid either up or down as indicated on the supplementary list.

# **ARTICLE 47 INSURANCE**

### 47.1 General

- 47.1.1 The Contractor shall provide from insurance companies, acceptable to the Owner, the insurance coverage designated hereinafter and pay all costs. The Contractor also indemnifies the Owner as further described in Article 4.
- 47.1.2 Before commencing work under this Agreement, the Contractor shall furnish the Owner with certificates of insurance specified herein showing the type, amount, class of operations covered, effective dates, and date of expiration of policies. Furthermore, each such certificate shall contain a valid provision or endorsement that the policy may not be cancelled, terminated, changed or modified without first giving ten (10) days written notice to the Owner, which notice must be sent registered mail, return receipt requested, to the Project Manager.
- 47.1.3 In case of the breach of any provision of this Article, the Owner, at his option, may take out and maintain, at the expense of the Contractor, such insurance as the Owner may deem proper at the Contractor's expense and may deduct the cost of such insurance from any monies which may be due or become due the Contractor under this Agreement.
- 47.1.4 The Contractor shall either: (1) require each of his subcontractors to procure and maintain during the life of his subcontract, subcontractors' comprehensive General Liability, Automobile Liability and Property Damage Liability Insurance of the type and in the same amounts as specified in this subparagraph, or (2) insure the activity of his subcontractors in his own policy.
- 47.1.5 Co-Insurance: The Contractor herein agrees to name the Owner as an insured party on all liability insurance policies provided for by this Article 47, INSURANCE.
- 47.1.6 No insurance shall be cancelled or otherwise voided during the Contract period, without at least 10 days prior written notice to the Owner, nor shall any insurance be invalidated should the insured waive any or all right of recovery against any party.

- 47.1.7 Liability insurance may be arranged by Comprehensive General Liability and Comprehensive Automobile Liability policies for the full limits required; or by a combination of underlying Comprehensive Liability policies for lesser limits with the remaining limits provided by an Excess or Umbrella Liability policy.
- 47.1.8 The Owner shall purchase and maintain such boiler and machinery insurance as may be required by the Contract Documents or by law. This insurance shall include the interest of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Work.
- 47.1.9 Any loss insured under Article 47 is to be adjusted with the Owner and made payable to the Owner as trustee for the insured, as their interests may appear, subject to the requirements of any applicable mortgage clause. The Contractor shall pay each subcontractor a just share of any insurance monies received by the Contractor, and by appropriate share of any insurance monies received by the Contractor, and by appropriate agreement, written where legally required for validity, shall require each subcontractor to make payments to his subcontractors in similar manner.
- 47.1.10 If the Contractor requests in writing that insurance for risks other than those described in this Article or other special hazards be included in the Owner's property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.
- 47.1.11 The Owner as trustee shall have power to adjust and settle any loss with the insurers.
- 47.1.12 If the Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion thereof, such occupancy or use shall not commence prior to a time mutually agreed to by the Owner and Contractor and to which the insurance company or companies providing the property insurance have consented by endorsement to the policy or policies. This insurance shall not be cancelled or lapsed on account of such partial occupancy or use. Consent of the Contractor and of the insurance company or companies to such occupancy or use shall not be unreasonably withheld.
- 47.2 Workmen's Compensation and Employer's Liability Insurance:
- 47.2.1 The Contractor shall provide coverage and amounts as required by the Workmen's Compensation Act of the State of Colorado.
- The Contractor shall provide Employer's Liability Insurance in an amount not less than \$100,000 for each occurrence.
- 47.2.3 The Contractor shall require any subcontractor to provide Workmen's Compensation and Employer's Liability Insurance in the same amounts for all of the subcontractor's employees to be engaged in work under this Agreement.
- 47.3 General Liability
- 47.3.1 General Liability Insurance shall be on a Comprehensive General Liability form and shall provide coverage for the following: Premises and Operations, Owners and Contractors Protective, Elevators, Independent Contractors, Products and Completed Operations, Contractual, Personal Injury, and Broad Form Property Damage; "XCU" exclusions must be deleted.

- 47.3.2 Minimum requirements for Comprehensive General Liability are: bodily injury, \$1,000,000.00 each person, \$2,000,000.00 each occurrence; property damage, \$1,000,000.00 each occurrence.
- 47.4 Automobile Liability
- 47.4.1 Comprehensive Automobile Liability Insurance shall include coverage for all owned motor vehicles and hired and non-owned motor vehicles.
- 47.4.2 Minimum requirements for Comprehensive Automobile Insurance are: bodily injury, \$1,000,000.00 each person, \$2,000,000.00 each occurrence; property damage, \$1,000,000.00 each occurrence.
- 47.5 Property Insurance:
- 47.5.1 The Owner may require the Contractor to purchase and maintain "Builder's Risk" Property Insurance for all work at the site to the full insurable value thereof. The Owner and the Project Manager shall be named as co-insured.

# ARTICLE 48 UNCOVERING AND CORRECTION OF WORK

During construction, whenever materials requiring inspection in place by the Project Manager and the Owner to be permanently covered up, it shall be Contractor's responsibility to notify the Project Manager at least 24 hours in advance of commencement of such covering operation. In the event of failure by Contractor to give such notification, Contractor shall, at his own expense, uncover such portions of work as required by the Project Manager or the Owner, and reinstall such covering after satisfactory inspection and correction of any and all deficiencies.

# ARTICLE 49 EQUAL OPPORTUNITY

49.1 The Contractor agrees to comply with the letter and spirit of the Colorado Antidiscrimination Act of 1957, as amended, and other applicable laws respecting discrimination and
unfair employment practices (24-34-402, CRS 1973, as amended). The Contractor shall be
responsible for any discriminatory or unfair employment practices of his subcontractors.

Neither the Contractor nor any subcontractor will discriminate against any employee or applicant for
employment because of race, creed, color, national origin, sex, religion, ancestry, mental or physical
handicap, or age. Contractor shall take affirmative action to insure that applicants are employed, and
that employees are treated during employment without regard to their race, creed, color, national
origin, sex, religion, ancestry, mental or physical handicap, or age. 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. Contractor agrees to post in conspicuous places, available to
employees and applicants for employment, notices setting forth the policies of non-discrimination.

49.2 Contractor and all subcontractors shall, in all solicitations or advertisement for employees placed by them or on their behalf, state that qualified applicants will receive consideration for employment without regard to race, creed, color, national origin, sex, religion, ancestry, mental or physical handicap, or age.

# ARTICLE 50 CLAIMS

- The Contractor shall not assert any claim arising out of any act or omission by any officer, agent or employee of the Owner in the execution or performance of this Contract against such officer, agent or employee in his or her individual or official capacities.
- The Contractor shall require each Separate Contract Design Professional or Contractor to agree in his Contract not to make any claim against the Owner, its officers, agents or employees, by reason of such Contract with the contractor.
- Nothing in this Contract shall be construed to give any person other than the Owner and the Contractor any legal or equitable right, remedy or claim under this Contract; and it shall be held to be for the sole and exclusive benefit of the Owner and the Contractor.

# ARTICLE 51 NOTICES

51.1 Except as otherwise provided herein, any notice, approval, acceptance, request, bill, demand or statement hereunder from either party to the other shall be in writing and shall be deemed to have been given when either delivered personally or deposited in a U.S. mailbox in a postage-prepaid envelope, addressed to the other party via certified mail. Notices to the Owner shall be addressed to the Project Manager by name. Either party may at any time change such address by delivering or mailing, as aforesaid, to the other party a notice stating the change and the changed address.

### ARTICLE 52 LEGAL INSERTIONS, ERRORS, INCONSISTENCIES, OR DISCREPANCIES IN CONTRACT

- It is the intent and understanding of the parties to this Contract that each and every provision of law required to be inserted in this Contract shall be and is inserted herein. Furthermore, it is hereby stipulated that every such provision is deemed to be inserted herein, and if through mistakes or otherwise, any such provision is not inserted in correct form, then this Contract shall upon application of either party, be amended by such insertion so as to comply strictly with the law and without prejudice to the right of either party.
- If this Contract contains any errors, inconsistencies, ambiguities, or discrepancies, including typographical errors, the Contractor shall request a clarification of same by writing to the Project Manager whose decision shall be binding upon the parties.

# ARTICLE 53 CAPTIONS OR HEAD NOTES

The captions or head notes on articles or sections of this Agreement, and marginal notes are intended for convenience and reference purposes only and in no way define, limit or describe the scope or intent hereof, or of this Agreement not in any way affect this Agreement.

# ARTICLE 54 EFFECTIVE AND BINDING

This Contract shall not become effective or binding upon the Owner unless it has been authorized and executed in accordance with the ordinances of the City of Greeley.

# ARTICLE 55 CONTRACTOR

- All personnel assigned to the Project by the Contractor shall be required to cooperate fully with personnel of the Owner and if in the sole discretion of the Owner the Contractor's personnel fails so to cooperate, the Contractor shall relieve them of their duties on the Project when required by the Owner.
- Within seven (7) consecutive calendar days after date of written notice to commence work, the Contractor shall designate in writing one person who, on his behalf, shall be responsible for coordinating all of the services to be rendered by the Contractor hereunder. Such designee shall be subject to the approval of the Owner. Any change to the approved designee shall be proposed in writing seven (7) days in advance and subject to Owner approval.
- 55.3 The Contractor shall engage, at his sole expense, all engineers, architects, cost estimators, lawyers, experts and Contractors as may be required for the proper performance of the Contract. The Contractor shall be responsible for the performance of the work of all architects, engineers, cost estimators, lawyers, experts and Contractors so engaged by him, including maintenance of schedules, correlation of their work and resolution of all difference between them. It is understood that all architects, engineers, cost estimators, lawyers, experts and Contractors are employees of the Contractor and not of the Owner, and the Contractor alone is responsible for their work.
- All drawings, tracings, specifications, digital media/electronic files and other material prepared and furnished under and for this Contract shall become the property of the Owner upon substantial completion and/or their acceptance by the Owner and/or upon termination of the services of the Contractor. Such documents shall be promptly delivered to the Owner upon demand and thereafter may be used by the Owner in whole or in part or in modified form, for those purposes it may deem advisable without further employment of, or payment of additional compensation to, the Contractor.
- The Contractor shall not, without the prior written approval of the Owner, specify for the project, or necessarily imply the required use of any article, product, material, fixture or form of construction, the use of which is covered by a pattent, or which is otherwise exclusively controlled by a particular firm or group of firms.

- 55.6 Should any claim be made or any action brought against the Owner relating to the design and satisfactory operation of the Project herein, the Contractor shall diligently render to the Owner without additional compensation any and all assistance which may be requested by the Owner.
- The Owner's Project Manager's decision shall be final and binding upon the Contractor as to all matters arising in connection with or relating to this Contract. The Project Manager shall determine the amount, quality, acceptability and fitness of the work being performed hereunder and shall determine all matters relative to the fulfillment of this Contract on the part of the Contractor and such determination shall be final and binding on the Contractor. Acceptance by the Owner of any document hereunder and all supporting documents shall not relieve the Contractor of sole responsibility for work performed under this contract, including, but not limited to, the final design of the Project, including the plans, specifications and all supporting documents, except as to any feature thereof which the Owner had specifically directed in writing to be included over the written objection of the Contractor. In case any question shall arise, the decision of the Owner's Project Manager, who is hereby accepted by the Contractor as the arbiter, shall be a condition precedent to the right of the Contractor to receive any money under this Contract.

# ARTICLE 56 APPEALS

- Except as otherwise provided in this Contract, any dispute concerning a question of fact arising under this Contract which is not disposed of by Agreement shall be decided by the Project Manager, who shall reduce his decision to writing and mail or otherwise furnish a copy thereof to the Contractor. The decision of the Project Manager shall be final and conclusive unless, within fifteen (15) days from the date of receipt of such copy, the Contractor mails or otherwise furnishes to the Project Manager a written notice of appeal.
- In the event a decision of the Project Manager is the subject of an appeal, such dispute may be settled by appropriate legal proceeding, or, if the parties mutually agree, through arbitration or administrative process. Pending any binding arbitrative or administrative decision, appeal, or judgment referred to in this section or the settlement of any dispute arising under this Contract, the Contractor shall proceed diligently with the performance of this Contract.
- Venue and jurisdiction of any suit, right, or cause of action arising under or in connection with this Contract shall lie exclusively in Weld County, Colorado.

# ARTICLE 57 PROHIBITED INTEREST

No member, officer or employee of the City of Greeley shall have any financial or pecuniary interest, direct or indirect, in this Contract or the proceeds thereof.

# ARTICLE 58 FINDINGS CONFIDENTIAL

Any reports, information, data, etc., available to or prepared or assembled by Contractor under this Contract shall not be made available to any individual or organization by Contractor without consent in writing from the Owner subject to applicable law.

# ARTICLE 59 GENERAL PROVISIONS

- 59.1 Services and work performed by Contractor under this Contract shall conform to reasonable and normal professional standards known and accepted within the community.
- No reports, graphics or other material produced directly or indirectly for the Owner under this Contract shall be the subject of an application for copyright or trademark by or on behalf of Contractor.
- The laws of the State of Colorado and applicable Federal, state and local laws, regulations and guidelines shall govern hereunder.
- The headings of the articles, clauses, and paragraphs of this Contract are inserted for reference purposes only and are not restrictive as to content.
- This Contract and any subsequent amendment shall be deemed an original having identical legal effect, and all of which together constitute one and the same instrument.
- Nothing contained herein shall be deemed to give any third party any claim or right of action against the Owner which does not otherwise exist without regard to this Contract.
- 59.7 Where a number of days is specified in this Contract it shall mean calendar days unless otherwise specified.
- This Contract shall not be assigned, in whole or in part, without the written consent of the Project Manager and Contractor.
- 59.9 The Owner certifies the following;
- A. An amount of money equal to or greater than the Contract amount has been appropriated and budgeted for the Project which this Contract concerns.
- B. No Change Order which requires additional compensable work to be performed by the Contractor will be issued by the Owner unless an amount of money has been appropriated and budgeted sufficient to compensate the Contractor for such additional compensable work unless such work is covered under the remedy-granting provisions of this Contract.
- C. As used in this paragraph, "remedy granting provision" shall mean any clause of this Contract which permits additional compensation in the event of a specific contingency or event occurs. This term shall include, but not be limited to, change clauses, differing site conditions clauses, variation in quantities clauses, and termination for convenience clauses.

# ARTICLE 60 CONTRACTOR ACCEPTANCE

- The acceptance by the Contractor, his successors or assigns of any payment made on the final acceptance of the Project under this Contract or of any final payment due on termination of this Contract, shall constitute a full and complete release of the Owner from any and all claims, demands and causes of action whatsoever which the Contractor, his successors or assigns have or may have against the Owner under the provisions of this Contract.
- No action shall be maintained by the Contractor, its successors or assigns, against the Owner on any claims based upon or arising out of this Contract or out of anything done in connection with this Contract unless such action shall be commenced within 180 days after the date of filing of the voucher for final payment hereunder in the office of the Finance Director, or within 180 days of the termination of this Contract.

# ARTICLE 61 SUCCESSORS AND ASSIGNS

The Contractor binds itself, its partners, successors, assigns and legal representatives to the other party to this Contract and to the partners, successors, assigns and legal representatives of such other party with respect of all covenants of this Agreement. The Contractor shall not transfer, assign, or subcontract any interest in this Agreement.

### ARTICLE 62 SEVERABILITY CLAUSE

If any provision of this Agreement is subsequently declared by legislative or judicial authority to be unlawful, unenforceable, or not in accordance with applicable laws, statutes, and regulations of the United States of America and the State of Colorado, all other provisions of this Agreement shall remain in full force and effect.

### **ARTICLE 63**

63.1 This Agreement represents the entire and integrated Agreement between the Owner and the Contractor and supersedes all prior negotiations, representations or agreements, either written or oral. This Agreement may be amended only by written instrument signed by both Owner and Contractor.

### **ARTICLE 64**

In accordance with C.R.S. §8-17-101, all parties contracting with the City of Greeley on public works projects shall employ Colorado labor to perform the work to the extent of not less than eighty percent (80%) of each type or class of labor in the several classifications of skilled and common labor employed on this project.

### **ARTICLE 65**

The Contract Documents may be executed in two or more counterparts, each of which shall be deemed an original but all of which together shall constitute one and the same document. The Contract Documents, including all component parts set forth above, may be executed and delivered by electronic signature by any of the parties and all parties consent to the use of electronic signatures.



### SECTION 520 SUBCONTRACTORS/MATERIALS SUPPLIERS AND RELATED DATA

Firm Name:	City Contractors License #					
	Primary Contractor					
PROJECT:	Address:					
For each Subcontractor and/or Ma (use additional sheets as necessa	aterials Suppliers to be utilized, please provide the following info ary):	rmation				
Phone Number:	Fax Number:					
Proposed work and percentage of	total work to be assigned					
	Percentage:	9				
	City Contractors License #					
Address:Phone Number:	Fax Number:					
Proposed work and percentage of	total work to be assigned					
	Percentage:	%				
	City Contractors License #					
Address:	Fax Number:					
	total work to be assigned					
	Percentage:	%				
	City Contractors License #					
Address:	Fax Number:					
	total work to be assigned					
	Percentage:	%				
	City Contractors License #					
Address:	Tay Ni wakaw					
	Fax Number:					
Proposed work and percentage of	total work to be assignedPercentage:	 %				
	Percentage:	70				

If the Primary Contractor adds any Subcontractors or Materials Suppliers during the duration of the project, the Primary Contractor will supply the City with an updated form before the Subcontractor or Materials Supplier will be allowed to work on the project.



September 2019

Prepared by:



### TABLE OF CONTENTS of REVISED or ADDED SPECIFICATION SECTIONS

Section	
Number	Section Name
	Measurement and Payment
00 62 00	Special Provisions
03 30 00	Cast-In-Place Concrete (Grasscrete)
32 15 40	Crushed Stone Paving
32 15 43	Stabilizer for Stabilized Aggregate Pathway: Pedestrian Access
32 80 00	Irrigation System
32 92 21	Turf Conversion Soil Prep and Seeding
32 97 00	Landscape Maintenance

### APPENDIX A

Ground Engineering: Bittersweet Park Soil Profile and Classification, Greeley, CO dated March 5, 2019

September 2019 TABLE OF CONTENTS

### MEASUREMENT AND PAYMENT

The work performed under this Agreement shall be paid for on both a Unit Price basis and Lump Sum basis for individual line items at the rates for the respective items on the Bid Schedule. The quantities provided on the Bid Schedule are only estimates of the actual quantities of the work to be performed and are only included for purposes of making the award and establishing a basis for estimating the probable cost of the work. The actual amounts of work completed and materials furnished for unit price bid items may differ from the estimated quantities. The basis of payment for work and materials bid as a unit price will be the actual amount of approved work done and materials furnished. Any quantity overages shall be first approved by the City prior to this work being completed.

Payment shall be made only for those items included in the Bid Schedule. All costs incurred shall comply with the provisions of these Specifications and shall be included in the unit price bid for the associated items in the Bid Schedule. Except as may be otherwise stipulated, no material, labor or equipment will be furnished by the OWNER. The quantity of work which will be considered for payment is the actual number of units completed in accordance with all relative Specifications. This basis of measurement and payment for each proposal item will be described below. The following provides a general listing of contract bid items along with a brief summary of the work and materials included, but not limited to, in the unit price or lump sum price for each bid item. Refer to the Specifications and Drawings for additional information.

### **PAY ITEMS**

### 1. Mobilization

Specification - Conforms to MUTCD Standards; Greeley Streets Construction Specification.

- A. No unit measurement for payment will be made for any of the work, materials, and equipment required for mobilization and field overhead. This work consists of the mobilization of personnel, equipment and supplies at the project site in preparation for work on the project. This item shall include the establishment of the CONTRACTOR'S offices, buildings and other necessary facilities, and all other costs incurred or labor and operations which must be performed prior to beginning the other items under the Contract. This item shall also include temporary fencing around project work and driving areas, and any other fencing/security items as deemed necessary by the CONTRACTOR. This item also includes obtaining permits and CONTRACTOR testing, including but not limited to the required Stormwater Discharge due to Construction Activities Permit and the Construction Dewatering Permit from the Colorado Department of Public Health and Environment. This item may also include provision of required bonds, insurance, and preparation of the project schedule. The removal of the CONTRACTOR's equipment, supplies, excess materials, and cleanup of the site are also included in this item.
- B. Payment per contract General Conditions.

# **2.** Construction Surveying and Staking (Including As-Built Survey of Irrigation) *Specification* - Conforms to MUTCD Standards; Greeley Streets Construction Specification, Sections 32 80 00 (Irrigation Systems).

- A. No unit measurement shall be made for this item. Work includes providing all equipment, labor, and materials required to provide Construction Surveying for construction of all work items for the project including: Staking of horizontal and vertical alignments of concrete and crusher fines trails and any overlot grading; subgrade elevations; off-sets; temporary control points; and re-establishment of land monuments, all appurtenant features of the work. Each payment shall be made based on the percentage of all work completed.
- B. The lump sum price bid shall include all of the CONTRACTOR's costs of whatsoever nature to perform the Construction Surveying as required for the construction of the Project in accordance with the DRAWINGS and SPECIFICATIONS. Pay based on percent of work completed.

### 3. Traffic Control (pedestrian)

Specification - Conforms to MUTCD Standards; Greeley Streets Construction Specification 01010 - Greeley Regulations for Street Construction, Section G Traffic Control; Greeley Streets Construction Specification 02618 – Pavement Marking Standards.

- 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 of the CONTRACTOR's costs. This BID item includes, but is not limited to: Preparing, implementing, adjusting as necessary, and maintaining the CONTRACTOR's approved Traffic Control Plan; Updating and submitting traffic control plans, as necessary, according to city, county, and other applicable regulations; Preparing, implementing, maintaining, and adjusting, as necessary, pedestrian controls; Providing all other related and necessary labor, equipment, pavement markings, and materials to complete the WORK.
- B. Payment per contract General Conditions

### 4. Erosion and Sediment Control

Specification - Conforms to Greeley Stormwater Criteria - Section 13.0 - Construction Site Erosion and Sediment Control; Technical Specifications - 02370 Erosion and Sediment Control

A. The measurement of this item will be on a lump sum basis. Work includes all equipment, labor, and materials required for the installation and maintenance of erosion and sediment control BMP's in accordance with the DRAWINGS and SPECIFICATIONS, or as otherwise directed by the PROJECT REPRESENTATIVE. Erosion and sediment control measures include (but are not limited to): establishing, removing, and restoring to its original condition stabilized staging areas within City right-of-way; furnishing, installing, restoration to its original condition and removal of all fencing and signage; furnish and installation and removal of vehicle tracking control; storage devices; street sweeping; installation and removal of silt fence, inlet protection; rock socks; sediment control logs; stockpile management; temporary diversion measures; concrete washout areas; and any additional erosion and sediment control BMP's as required by the CITY, permitting and preparation of all documents for required permits; inspection and reporting; and general maintenance of

erosion control BMP's throughout construction and in accordance with the DRAWINGS and SPECIFICATIONS.

B. Payment per contract General Conditions.

### 5. Unclassified excavation (export) from trail installation

Specification - Conforms to CDOT Section 203 Excavation and Embankment; Greeley Construction Specification; Technical Specifications: 312000 – Earth Moving, 312316 – Excavating and Backfilling

This work consists of excavation, hauling, disposal, placement, and compaction of all material encountered within the limits of the work, including excavation for ditches and channels, necessary for the construction of the roadway in accordance with the Contract.

- A. Items paid for by volume be the quantities designated in the Contract. Exceptions will be made when field changes are ordered or when it is determined that there are discrepancies in the Contract in an amount of at least plus or minus two percent of the plan quantity.
- B. The accepted quantities will be paid for at the contract unit price for each of the pay items that appear in the bid schedule. Payment for Unclassified Excavation (Export) shall be full compensation for all work necessary to complete the item including construction of embankments, reworking of existing materials to satisfy benching requirements, unclassified excavation, borrow, compaction, compaction of bases of cuts and fills, all work in available materials pits, and disposal of excess excavated material.

### 6. Grasscrete Pavement or approved equal

Specification – Conforms to 03 30 00 (Concrete Paving)

This work includes furnishing and installing all Grasscrete pavement system including subgrade preparation, staking and all related materials, equipment, and labor required or as directed by the Project Manager.

The unit of measurement for payment will be square feet. Measurement for payment will be by field measurement of the surface area of Grasscrete installed in accordance with the plans and specifications and as approved by the Project Manager. It shall be paid for at the Contract Unit Price.

### 7. Concrete Pavement - 4" thick

Specification – Conforms to City of Greeley Standards for Concrete Paving

- A. The measurement for payment for this item will be made of the actual number of square feet of concrete flatwork placed and accepted at the locations shown on the drawings and in accordance with the specifications.
- B. The unit price bid for the shall include: furnishing and installation of materials, formwork, subgrade preparation, testing of subgrade and materials, fibrous reinforcing, additives, dowels, finishing, joints, protective coatings, curing, sweeping, washing, cleanup and other items necessary to complete the work as shown on the drawings and in accordance with the specifications.

#### 8. Crusher Fines Pavement - 6" thick - unstabilized

Specification – Conforms to 32 15 40 (Crusher Fines Paving)

- A. The measurement for payment for this item will be made of the actual number of square feet of crusher fines pavement placed and accepted at the locations shown on the drawings and in accordance with the specifications.
- B. The unit price bid for the shall include: furnishing and installation of materials, formwork, subgrade preparation, testing of subgrade and materials, crusher fines material, cleanup and other items necessary to complete the work as shown on the drawings and in accordance with the specifications.

# 9. Crusher Fines Pavement - 6" thick - stabilized

Specification – Conforms to 32 15 40 (Crusher Fines Paving), 32 15 43 (Stabilizer)

- A. The measurement for payment for this item will be made of the actual number of square feet of stabilized crusher fines pavement placed and accepted at the locations shown on the drawings and in accordance with the specifications.
- B. The unit price bid for the shall include: furnishing and installation of materials, formwork, subgrade preparation, testing of subgrade and materials, crusher fines material, stabilizer additives, curing, cleanup and other items necessary to complete the work as shown on the drawings and in accordance with the specifications.

# 10. Import and Placement of Fill Material in Low Spot (near parking lot)

Specification - Conforms to CDOT Section 203 Excavation and Embankment; Greeley Construction Specification; Technical Specifications: 312000 – Earth Moving, 312316 – Excavating and Backfilling

- A. This work consists of hauling, placement, and compaction of all material encountered within the limits of the work as determined and coordinated with City of Greeley Project Manager.
- B. Items paid for by volume be the quantities designated in the Contract. Exceptions will be made when field changes are ordered or when it is determined that there are discrepancies in the Contract in an amount of at least plus or minus two percent of the plan quantity.

# 11. Irrigation

Specification – Conforms to Spec Sections 32 80 00 (Irrigation Systems), 32 91 13 (Soil Prep), 32 92 20 (Native Grass Seeding)

- A. Measurement: Payment for this item shall be paid for at the Contract Lump Sum Price based upon the percentage of this work item completed in accordance with the plans and specifications and as approved by the Owner's Representative.
- B. Payment: This work is for furnishing, transporting and installing all pipe and materials; excavating, backfilling and compacting; installing new pipe, heads, valves, couplings, elbows, fittings and water meters if required; testing and maintenance until City of Greeley staff has signed off; repairing or replacing existing irrigation systems to their original condition and function; controller connections, providing all other related and necessary

labor, equipment, materials, coordinating with local water authority, permitting, and any tap fees to complete the work.

# 12. Turf Conversion Method 1 (Tilling)

*Specification* – Special Conditions Conforms to Spec Sections 32 80 00 (Irrigation Systems), 02921 (Turf Conversion Soil Prep and Seeding).

- A. Measurement: Measurement for payment will be made of the actual number of square feet of turf converted and native grass seed installed and accepted at the project location where shown on the drawings and in accordance with the plans and specifications and as approved by the Owner's Representative. It shall be paid for at the Contract Unit Price.
- B. Payment: The payment shall be total compensation for all labor, equipment, materials, maintenance, and all incidentals necessary to apply 2 rounds of broad spectrum herbicide, mow, rake and remove debris, fertilize specific areas with 4-1-1, 1#N/1000/sf for fescue and wheatgrass areas and with Biosol, 7-2-1, 20#/1000/sf, till to a minimum 6" depth, disk, remove rocks, clods and debris, grade and drill seed in two directions, in accordance with the Drawings and Specifications, including all costs associated with the disposing of materials where the City directs. Soil Conditioners are incidental to each turf conversion method. Payment includes the Contractor developing SWMP drawings as necessary for conversion method.

## 13. Turf Conversion Method 2 (Aerating)

Specification – Special Conditions Conforms to Spec Sections 32 80 00 (Irrigation Systems), 02921 (Turf Conversion Soil Prep and Seeding)

- A. Measurement: Measurement for payment will be made of the actual number of square feet of turf converted and native grass seed installed and accepted at the project location where shown on the drawings and in accordance with the plans and specifications and as approved by the Owner's Representative. It shall be paid for at the Contract Unit Price.
- B. Payment: The payment shall be total compensation for all labor, equipment, materials, maintenance, and all incidentals necessary to apply 2 rounds of broad spectrum herbicide, mow, rake and remove debris, , aerate minimum of 4 passes at different directions, fine grading, remove rocks, clods and debris, drill seed in two directions, drag with drag mat and fertilize specific areas with 4-1-1, 1#N/1000/sf for fescue and wheatgrass areas and with Biosol, 7-2-1, 20#/1000/sf in accordance with the Drawings and Specifications, including all costs associated with the disposing of materials where the City directs. Soil Conditioners are incidental to each turf conversion method. Payment includes the Contractor developing SWMP drawings as necessary for conversion method.

# 14. Hydromulch and Tackify Seeded Areas

Specification – 02921 (Turf Conversion Soil Prep and Seeding)

A. Measurement: Measurement for payment will be made of the actual number of square feet hydromulched and tackified, installed and accepted at the project location where shown on the drawings and in accordance with the plans and specifications and as approved by the Owner's

Representative. It shall be paid for at the Contract Unit Price.

B. Payment: The payment shall be total compensation for all labor, equipment, materials, maintenance, and all incidentals necessary to apply 2000 lbs/acre of wood cellulose fiber and 100 lbs/acre of tackifier to seeded areas

# SECTION 00 62 00 SPECIAL PROVISIONS FOR CITY OF GREELEY Bittersweet Park Turf Conversion Project September 2019

# PROJECT DESCRIPTION

This project involves the upgrading and installation of a new irrigation system, the conversion of turf to native grasses throughout the park for the purpose of saving water and the addition of new concrete and crusher fines trails.

The project generally includes the following work:

# Removals

- Removal of irrigation system that conflicts with new to be installed irrigation, abandoning the remainder in place. List of removals include: valve boxes, irrigation heads, and quick couplers.
   Items to be abandoned include laterals and mainline pipe.
- Earthwork and export of material associated with the installation of concrete trails and crusher fines trails

# Turf Conversion Method 1 - Tilling

- Irrigate conversion areas well, grow existing turf to vigorous health.
- Apply broad-spectrum herbicide
- Wait 10-14 days
- Apply broad-spectrum herbicide
- Wait 10-14 days
- Evaluate if additional application needed
- Mow conversion area as short as possible, raking and removing all debris
- Flag pertinent objects to avoid damage, ie: valve boxes, utilities, etc.
- Apply fertilizer 4-1-1, 1 lb/1000 sf N (fescue and wheatgrass areas) and Biosol, 20lbs/1000 sf (native grass areas)
- Till conversion area 6" depth minimum
- Remove rocks, clods, and debris
- Recompact seedbed using irrigation
- Drill seed with mycorrhizae
- Irrigate

## *Turf Conversion Method 2 – Aerating*

- Irrigate conversion areas well, grow existing turf to vigorous health.
- Apply broad-spectrum herbicide
- Wait 10-14 days
- Apply broad-spectrum herbicide
- Wait 10-14 days
- Evaluate if additional application needed
- Mow conversion area as short as possible, raking and removing all debris
- Flag pertinent objects to avoid damage, ie: valve boxes, utilities, etc.
- Aerate using tine core aerator that pulls 2-3 inch plugs, three passes at different angles for turfgrass conversion.
- Aerate five to six times in different directions for grassland conversions.
- Drill or slit seed conversion area with appropriate grassland drill or slit seeder seed in two directions. Add mycorrhizae in with seed.
- Drag entire areas with drag mat

- Apply fertilizer 4-1-1, 1 lb/1000 sf N (fescue and wheatgrass areas) and Biosol, 20lbs/1000 sf (native grass areas)
- Irrigate

#### Park Improvements

- Concrete trail paving
- Crusher fines paving
- Grasscrete paving
- Native grass seed
- Irrigation

#### General

- Construction and erosion control measures, and;
- Traffic control and pedestrian control on local streets.

#### **CONSTRUCTION PLANS**

The construction plans for this project are dated April 2019 as prepared by Matrix Design Group, 1601 Blake Street, Suite 200, Denver, CO 80202 include the proposed landscape and irrigation improvements shown on sheet numbers 1-28 which are a part of these contract documents.

# CONSTRUCTION SPECIFICATIONS

This project is subject to the following specifications:

Abbreviated as:

Drawings and Special Provisions
 City of Greeley Design Criteria and Construction
 DCCS

· Specifications

Volume I - "Streets" January 2008
 Volume II - "Storm Drainage" June 2008
 Volume III - "Water / Sewer" February 2008
 Water

#### PRIORITY OF DOCUMENTS

In case of conflict, documents shall have the following priorities:

For Water, Sewer, and Streets:

- 1. Special Provisions
- 2. Plans
- 3. General Conditions
- 4. City of Greelev SDCS
- 5. CDOT Specifications and Standards

# **CONTRACTOR QUALIFICATIONS**

# **General Requirements**

The selected **CONTRACTOR** will be required to submit information relative to their safety program, references and financial standing, and their ability to meet the City goals and other listed criteria prior to being awarded the contract. The CITY reserves the right to award the contract to the next qualified contractor if all requested information is not provided as follows:

#### **Format**

Deliver four (4) copies of all submittals to the Owner's Representative within 10 working days from the date of Notice to Proceed. Provide information in a 3-ring binder with table of contents and index sheet. Provide sections that are indexed for different components and labeled with the specification section number and the name of the component. Submittals must be made for all the components on the material list. Indicate which items are being supplied on the catalog cut sheets when multiple items are shown on one sheet. Submittal package must be complete prior to being reviewed by the Owner's Representative. Incomplete submittals will be returned without review.

## Criteria

# **Safety**

- 1. Provide a summary description of the contractor's corporate safety program.
- 2. Submit your complete, written safety program for review. The successful CONTRACTOR safety program will become a part of the Contract. (Does not count against 5-page limit.) The safety program will include, at a minimum:
  - a. A statement of Purpose or Safety Policy
  - b. General Safety Guidelines
  - c. In addition, the CONTRACTOR will provide a copy of their Substance Abuse Policy
- 3. Contractor Responsibilities, if the Contractor is found in violation of any of these items, the City may terminate the contract:
  - a. Contractor shall have Environmental Health and Safety programs in place. Contractors are solely responsible for ensuring that such programs comply with federal, state, and local regulations.
  - b. The Contractor shall ensure proper environmental health and safety precautions are followed in accordance with the Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA) Code of Federal Regulations (CFR), and any other applicable regulatory agency.
  - c. The Contractor shall ensure individuals working at the site are trained and are aware of potential hazards. Contractors shall also ensure that these individuals are provided with proper safety equipment to prevent accidental injury in accordance with OSHA 1910 and OSHA 1926.

## References

- 1. Please submit three references for projects completed within the last three years.
- 2. The City of Greeley reserves the right to contact references without prior notice. A poor or "no comment" reference may result in denial of award.

#### **Financial**

- 1. Indicate if the firm has been refused any surety, bond or liability insurance in the last 10 years. List the bonding company information used for these projects.
- 2. Indicate if the firm is currently or has been on a municipal government's debar list and/or suspended list within the last 10 years.

# PRE-CONSTRUCTION CONFERENCE

After Contract Notice of Award, the CONTRACTOR shall attend a pre-construction conference with the City prior to commencement of construction. The CONTRACTOR shall have submitted digitally the following information prior to the meeting or it shall be available at the meeting:

- · Materials Sources
- Erosion and Sediment Control Plans
- · List of major subcontractors-including but not limited to: traffic control and flatwork
- Bar graph construction schedule in accordance with General Conditions Article 21.1
- · Substitutions, if necessary

· Long lead time items, if necessary.

#### **PERMITS**

Conform to Greeley Streets Standards - Section 01010 Summary of Work. Fees for City permits will be waived (Fees for City's CONTRACTOR License application will not be waived).

The CONTRACTOR shall obtain all required Colorado Discharge System Permits. Storm Water Discharge Associated with Construction Activities from State of Colorado, Department of Public Health & Environment, Water Quality Division for temporary storm water runoff and dewatering from the site. Contactor shall also submit a Stormwater Management Plan (SWMP) to the City Stormwater Management Division for review and approval. Provide a copy of permit(s) to the City prior to construction.

#### CONTRACTOR USE OF SITE

The CONTRACTOR shall, at all times, so conduct his work as to insure the least possible inconvenience to the general public and adjacent property owners to the project site, and to ensure safety of persons and property. Fire hydrants on or adjacent to the Work shall be kept accessible to firefighting equipment at all times. Temporary provisions shall be made by the CONTRACTOR to insure the use of access roads / driveways to adjacent properties. Full closure of any road is not allowable unless special approval is granted by the City. The CONTRACTOR shall submit for approval a Traffic Control Plan conforms to MUTCD Standards, Greeley Streets Construction Specification 01010, and Greeley Regulations for Street Construction, Section G Traffic Control prior to initiating construction. Any temporary pavement markings shall follow Greeley Streets Construction Specification 02618. The contractor shall give residents a minimum of 48 hours notification of potential utility disruptions.

# **WORKING HOURS**

The CONTRACTOR shall restrict working hours to between 7:00 am and 6:00 pm on normal City of Greeley business days unless prior approval has been obtained from the City. Costs incurred by the City to inspect, test, or oversee work performed outside these hours will be deducted from progress payments to the CONTRACTOR through the project's final change order. Hourly rates per individual are as follows: PROJECT MANAGER - \$95; Construction Inspector - \$75; Technician - \$60; and Surveyor - \$50.

# PROJECT WORK SCHEDULE

The CONTRACTOR is responsible for submitting an updated schedule to the City with each pay request or at the request of the PROJECT MANAGER for the duration of the project. Failure to do so will delay payment.

#### SCALE TICKETS

The CONTRACTOR shall provide certified scale tickets for each truckload of material to be paid by unit weight that is delivered to and incorporated in the project. The CONTRACTOR shall submit tickets to the designated City PROJECT REPRESENTATIVE at the time material is delivered to the site.

# PROTECTION OF EXISTING UTILITIES / UTILITY COORDINATION

Protection of existing utilities and coordination with utility companies shall be in accordance with Streets Section 01010. No additional payment will be made for this coordination.

CONTRACTOR is responsible for field verifying the location of utilities within the project limits and immediately notifying the City of Greeley of any potential discrepancies or conflicts between the work and the existing utility.

The City has not allowed for any damage costs to the adjacent utilities. CONTRACTOR to call 811 for utility locates and will coordinate with City staff for identification of private utilities. CONTRACTOR shall take any and all precautionary measures to protect utilities.

CONTRACTOR shall be prepared to assist various utility entities with the preservation or relocation of their utility.

Water and Sewer utilities, including services, shall be located by potholing per Water and Sewer Standards. The CONTRACTOR shall be responsible for this locating. CONTRACTOR shall minimize residential service disruptions to the greatest practical extent, and notify the City inspector 48-hours in advance of any planned service shutdown. The contractor shall require all necessary permits, locate utilities, excavate all materials of whatever character required to expose the utilities, survey the location of the utilities, and backfill the excavation to existing grade lines with the excavated or other approved materials. The contractor shall use extreme caution during this work. All damage to existing utility lines or adjacent facilities shall be repaired promptly at the CONTRACTOR'S expense.

#### **MATERIALS TESTING**

MATERIALS, ACCEPTANCE AND QUALITY CONTROL TESTING

Bills of lading for materials of importance, as determined by the PROJECT MANAGER shall be submitted to the PROJECT REPRESENTATIVE as the material is received.

Failure to submit the bill of lading may result in refusal of payment for appropriate bid item. The City will provide project acceptance and material testing to the extent the City deems necessary for project acceptance. The CONTRACTOR shall coordinate with City's PROJECT REPRESENTATIVE as to when the work is ready for acceptance testing. The CONTRACTOR shall assist City in obtaining samples for testing. Uncover and recover at no cost to the City any work buried prior to acceptance tests and approvals to allow City to test.

The CONTRACTOR shall be responsible for costs associated with re-testing materials that failed acceptance tests. Testing for construction quality control such as establishing roller patterns, backfill moisture content, embankment compaction and the like is the responsibility of and shall be provided by the CONTRACTOR.

Do not use any materials or equipment represented by samples until tests, if required, have been made and the materials or equipment found to be acceptable. Any product which becomes unfit for use for any reason after being found acceptable shall not be incorporated into the work.

Tests shall be made by an accredited testing laboratory selected by the PROJECT REPRESENTATIVE. Except as otherwise provided, sampling and testing of all materials and the laboratory methods and testing equipment shall be in accordance with the latest standards and tentative methods of the American Society for Testing Materials (ASTM), and the American Association of Highway and Transportation Officials (AASHTO).

Where additional or specific information concerning testing methods, sample sizes, etc., is required, such information is included under the applicable sections of the Specifications. Any modification of, or elaboration on, these test procedures which may be included for specific materials under their respective sections in the Specifications shall take precedence over these procedures.

Written reports of tests and engineering data furnished by CONTRACTOR for PROJECT REPRESENTATIVE's review of materials and equipment proposed to be used in the work shall be submitted as specified for Shop Drawings.

The testing laboratory retained by the PROJECT REPRESENTATIVE will furnish three (3) copies of a written report of each test performed by laboratory personnel in the field or laboratory. Two (2) copies of each test report will be transmitted to the City's representative and one (1) copy to the CONTRACTOR within seven (7) days after each test is completed.

Refer to the City of Greeley's Design and Construction Standards for the Quality Control testing Schedule for this project.

#### SOILS INVESTIGATION / REPORT

Ground Engineering: Bittersweet Park Soil Profile and Classification, Greeley, CO dated March 5, 2019

# CITY OWNED LAND, EASEMENTS AND RIGHT OF WAY

All construction shall be confined to the areas identified on the plans and located within City of Greeley Park land, easements or right-of-way. Any unauthorized disturbance occurring outside City owned land, easements or right-of-way limits shall be restored to its original condition (or better) at the CONTRACTOR'S expense.

# **CONSTRUCTION STAKING**

The CONTRACTOR will provide all construction staking for the project. All surveying and staking shall be performed under the supervision of a Colorado licensed surveyor. The CONTRACTOR will also provide an as-built survey upon completion of the project. Items requiring staking include: seeding area boundaries, trails centerline and/or offset and irrigation layout.

## CONSTRUCTION MATERIALS SUBMITTALS

CONTRACTOR shall submit manufacturers' information and materials specifications, testing results, and certifications that the materials proposed for this project meet the specification requirements outlined in the Standard Specifications and these Supplemental Specifications. The CONTRACTOR shall submit to the City manufacturers' information and certification that all materials conform to materials specifications for the following items before confirmation of orders:

- Irrigation materials list; sleeving, pipe, fittings, mainline components, sprinkler, drip irrigation
  components, control system components, shop drawings and all other components shown on the
  drawings and installation details or described herein. Components such as pipe sealant, wire,
  wire connectors, ID tags, etc. pipe, heads, valves, boxes, quick couplers, controllers, wire,
  sensors, etc.
- 2. Concrete Mix Design trails
- 3. Crusher fines and stabilization material
- 4. Soil conditioners
- 5. Landscape materials seed mixes, substitutions

# **EXCESS MATERIAL**

The CONTRACTOR shall legally dispose of all material removed from the project which is deemed unusable by the PROJECT REPRESENTATIVE. The CONTRACTOR shall legally dispose of, off the project site, all designated excess material at no additional cost to the City.

During the installation of the Work, excavated earthen material is to be stockpiled onsite or to a site approved by the PROJECT REPRESENTATIVE. Clean earthen material remaining after the installation of the Work shall be disposed of at a location chosen by the contractor and approved by the City.

No stockpiled material shall limit access to driveways or alleys at any time during construction. Disruption to local parking shall also be minimized to the maximum extent practicable.

#### TEMPORARY PATCHING

Temporary Patching shall be the CONTRACTOR's responsibility, Refer to Specification Sections 17 MGPEC & 02576 DCCS.

#### SURFACE AND GROUND WATER CONTROL

For all excavation, the CONTRACTOR shall provide suitable equipment and labor to remove water, and they shall keep the excavation dewatered so that construction can be carried on under dewatered conditions where required by the Drawings and Specifications. Water control shall be accomplished such that no damage is done to adjacent infrastructure or structures. The CONTRACTOR is responsible for investigating and familiarizing himself with all site conditions that may affect the work including surface water, level of groundwater and the time of year the work is to be done. All excavations made as part of dewatering operations shall be backfilled with the same type material as was removed and compacted to 85% of Maximum Standard Proctor Density (ASTM D698) except where replacement by other materials and/or methods are required.

The CONTRACTOR shall conduct his operation in such a manner that storm or other waters may proceed uninterrupted along their existing drainage courses. By submitting qualifications, the CONTRACTOR acknowledges that he has investigated the risk arising from such waters and has prepared his unit prices accordingly and assumes all of said risk. At no time during construction shall the CONTRACTOR affect existing surface or subsurface drainage patterns of adjacent property. Any damage to adjacent property resulting from the CONTRACTOR's alteration of surface or subsurface drainage patterns shall be repaired by the CONTRACTOR at no additional cost to the OWNER.

CONTRACTOR shall remove all temporary water control facilities when they are no longer needed or at the completion of the project.

Pumps and generators used for dewatering and water control shall be quiet equipment enclosed in sound deadening devices.

The CONTRACTOR shall coordinate, evaluate, design, construct, and maintain temporary water conveyance systems. A water control plan shall be submitted to the City for approval prior to construction. These systems shall not worsen flooding, alter major flow paths, or worsen flow characteristics during construction. The CONTRACTOR is responsible to ensure that any such worsening of flooding does not occur. The CONTRACTOR is solely responsible for determining the methods and adequacy of water control measures.

The CONTRACTOR shall be responsible for planning for and implementing a water control program. The contractor shall submit a copy of the water control plan to the CITY and the ENGINEER for review prior to construction.

The CONTRACTOR will be responsible for diverting the quantity of surface flow around the construction area so that the excavations will remain free of surface water for the time it takes to install these materials, and the time required for curing of any concrete or grout. The CONTRACTOR is

September 2019

cautioned that the minimum quantity of water to be diverted is for erosion control and construction purposes and not for general protection of the construction-site. It shall be the CONTRACTOR's responsibility to determine the quantity of water which shall be diverted to protect his work from damage caused by stormwater.

The CONTRACTOR shall, at all times, maintain a flow path for all surface flow. Temporary structures such as berms, sandbags, pipeline diversions, etc., may be permitted for the control of channel flow, as long as such measures are not a major obstruction to flows and do not worsen flooding, or alter historic flow routes.

CONTRACTOR is responsible for all clean up and/or repairs within the construction site as a result of any storm event during construction.

#### SEDIMENT AND EROSION CONTROL

The area of disturbance will exceed 1 acre for the turf conversion, therefore, a Storm Water Management Plan (SWMP) document is required. The CONTRACTOR shall submit this for review and approval at the Pre-Construction Meeting. No additional payment for the SWMP document will be permitted. Cost of plan is considered incidental to the turf conversion method used.

The CONTRACTOR shall be aware of the need for a State of Colorado stormwater construction discharge permit. The construction discharge permit allows for the management of stormwater resulting from rain events. Dewatering of groundwater from excavations shall be permitted separately. This permit must be obtained prior to commencing any soil disturbing work.

The CONTRACTOR shall coordinate with City representative for approval of protection of stockpiles of excavated material and bedding material, particularly where located on asphalt surfaces.

The CONTRACTOR shall note within the SWMP, mobile Concrete Washout bins will be used exclusively. No conventional washout pits will be allowed. One mobile Concrete Washout bin will be required on-site at all times.

The CONTRACTOR shall provide a contingency plan for sanitary sewer spills during construction.

The CONTRACTOR shall provide a contingency plan for flooding during project construction.

# CURBS, GUTTERS, SIDEWALKS, AND CURB RAMPS

Proposed curbs, gutters, sidewalks, and curb ramps shall meet City of Greeley and the Americans with Disabilities Act standards. A minimum of 6" of Flow-fill backfill shall be placed below all curb and gutter to be removed and replaced. Flow-fill backfill shall cure for a minimum of 24 hours prior to installation of curb and gutter.

Contractor shall anticipate field time to coordinate final grades and layout for curb, gutter, sidewalk, and curb ramp items with the PROJECT REPRESENTATIVE. This work will not be paid for separately, but included in the CONTRACTOR's bid costs for these items.

CONTRACTOR shall note that design flowline slopes are based on a minimum 0.5% flowline slope towards new inlets. In all cases, the flowline grades may be reduced to 0.4%, or greater.

#### **LANDSCAPING**

The CONTRACTOR shall anticipate seeding and irrigation with the work items. Landscaping shall be coordinated with the PROJECT REPRESENTATIVE and adjacent property owners. In general, landscape replacement shall match, or exceed, the quality of pre-construction site conditions.

If tree roots (within 50' of the trunk of any tree) will be cut or damaged, CONTRACTOR must contact Greeley Forestry Shiloh Hatcher at 970-339-2436 prior to such work. Access routes to the work area over the root zones of mature trees will be prohibited without providing proper compaction mitigation measures. Any necessary excavation, as approved by Greeley Forestry staff, will potentially require cutting of large roots (>2" diameter) with a saw versus tearing/shredding with equipment.

CONTRACTOR shall document the condition and type of landscaping in all areas to be disturbed prior to commencing work, either through video or photographs, to ensure that post project conditions meet or exceed pre-project conditions.

#### **WARRANTY**

Irrigation and landscape shall have a one-year warranty from Final Acceptance.

# ADDITIONAL INSURANCE REQUIREMENTS

CONTRACTOR'S Liability Insurance: CONTRACTOR's Liability Insurance shall also include Matrix Design Group, Inc., and Ground Engineering as additional insured per City of Greeley GENERAL CONDITIONS.

Indemnification: In addition to those specified in City of Greely GENERAL CONDITIONS, Matrix Design Group, Inc., and Ground Engineering shall also be indemnified and held harmless.

#### **FENCING**

Fencing will be used for open ditch protection. If the PROJECT MANAGER deems it necessary additional fencing may be employed to protect the construction site from the public during major construction activity.

END OF SECTION



#### **GRASSCRETE®**

# Grasscrete Molded Pulp Concealed System for Emergency or Periodic Access Applications Guideline Specification

# **SECTION 033000**

#### CAST-IN-PLACE CONCRETE

#### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Work specified in this section includes all labor, materials, equipment and services necessary to complete the Grasscrete Molded Pulp Concealed System, including single use formers, concrete reinforcement, sub-base materials and curing compound.
- B. Related Sections include the following:
  - 1. Division 1 Section "Product Requirements" for submittals and substitutions.
  - 2. Division 3 Section "Cast-in Place Concrete" for concrete slabs.

# 1.3 DEFINITIONS

# 1.4 SUBMITTALS

# A. Product Requirements:

1. Provide submittal information within 35 calendar days after the contractor has received the owner's notice to proceed.

# B. Product Data:

1. Submit special Sustainable Paving Systems, LLC specifications, test data and other data required for each type of manufactured material and product indicated.

- 2. Submit special Sustainable Paving Systems, LLC Technical Bulletins listing manufacturer's name, product name, descriptive data, curing time and application requirements.
- 3. Submit special Sustainable Paving Systems, LLC Material Safety Data Sheet (MSDS) and other safety requirements.

#### C. Material Certificates:

- D. Field quality-control test and inspection reports.
  - 1. Documentation by the concrete contractor or General Contractor of the sub-grade compaction results prior to concrete placement.

# 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: The contractor for this work shall be an applicator approved by Sustainable Paving Systems, LLC (916) 235-9088.
  - 1. Provide a Sustainable Paving Systems Grasscrete "Approved Installer Acknowledgement and Release" form stating that installer is familiar with proper procedures/installation requirements required by the manufacturer.
  - 2. Use an adequate number of skilled workmen who are thoroughly trained and experienced in the necessary craft.
- B. Manufacturer Qualifications: A firm experienced in the support and training of installation contractors to construct cast-in-place void structured concrete products designed for vehicular use.
  - 1. Sustainable Paving Systems, LLC (916) 235-9088 no equal

# C. Source Limitations:

1. Obtain each type or class of cementitious material of the same brand from same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer, obtain Grasscrete Formers from one source.

# D. Mock-ups:

- 1. On or suitable offsite mockups are required to demonstrate finished appearance and standard of workmanship.
  - a. Mock-up shall include entire system, including sub-base, and reinforcement with voids opened and ready for grass fill.
  - b. Notify Architect seven days in advance of dates and time when mock-ups will be constructed.

- c. Obtain from Architect approval of mock-ups before starting construction.
- d. If the Architect determines that the mock-ups do not meet requirements, General Contractor will demolish and remove them from the site and arrange to assemble more until approved.
- e. Maintain mock-ups during construction in an undisturbed condition as a standard for judging the completed work.

# 1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturers labels indicating brand name and directions for storage, mixing with other components and application.
- B. Store materials to comply with manufacturers written instructions to prevent deterioration from moisture or other detrimental effects.
- C. Dispense special concrete finish material from factory numbered and sealed containers. Maintain record of container numbers.

## 1.7 PROJECT CONDITIONS

#### A. Environmental Limitations:

- 1. Comply with American Concrete Institute written instructions for ambient temperature and other conditions affecting exterior concrete construction.
- 2. Concrete must be cured a minimum of 14 days or as directed by the manufacturer before vehicular trafficking of Grasscrete can begin.

# 1.8 PERFORMANCE REQUIREMENTS

- A. The product is required to bear daily vehicular traffic weighing a minimum of 65,000 pounds traveling at speeds greater than 20 miles per hour.
- B. The products must meet AASHTO HS20-44 with the impact increment equal to 30% as set forth by the American Association of State Highway and Transportation Officials.
- C. The product is required to be continuously reinforced with integral rebar spacing chairs set at 8" on center.
- D. The product is required to be manufactured from cast in place concrete with an average thickness of 5 ½".

#### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce products, the following requirements apply to product selection:
  - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturer listed. For other manufacturers to be considered, submit according to the specifications in "Product Requirements."

#### 2.2 MATERIALS

B.

- A. Grasscrete Molded Pulp Formers: Vacuum formed bio-degradable tools designed to construct void structured concrete with an average thickness of 5 ½".

  www.sustainablepavingsystems.com
  - Dayton Superior Cure & Seal 1315 EF: Water-based polymer curing compound designed to bond to fresh concrete and holds in the mix water to achieve improved concrete properties

www.daytonsuperior.com

and complies with < 100 g/l VOC content requirements.

- C. Propex Novomesh 950 Fibers: blended fibers packaged in 5-pound, water-soluble bags for ready mix plant or jobsite addition to the ready mix truck.

  www.fibermesh.com
- D. No deletions, substitutions or alternates to the above product types will be accepted.

#### PART 3 - EXECUTION

# 3.1 EXAMINATION

- A. Sub-grade for vehicle traffic shall be in accordance with local concrete street specifications. For most applications, except for very heavy loads, native soil having a minimum "R" Value of 30 and a compaction of 95% will provide a suitable sub-grade. A minimum 2" bed of well graded granular stone (road base) will be required to provide an adequate sub-base under the Concealed System. Consult General Contractor, Structural Engineer, Architect and Concrete Contractor prior to installation of concrete slab to ensure complete understanding of substrate preparation, reinforcement, penetrations, mix design, placing and finishing requirements, water capacity, elevations, etc.
- B. The concrete shall have a minimum compressive strength of 4,000 psi in 28 days when placed at a 8" to 12" slump. Portland cement shall conform to ASTM C 150, Type I, II or V.

Aggregates shall conform to ASTM C 33 and be 1/2" minus. Mixing water shall be fresh, clean and potable. In freeze-thaw areas, air entrainment shall be provided. Water reducing admixtures and/or super-plasticizers are permitted and shall conform to ASTM C 494.

- C. The Grasscrete slab shall have a minimum thickness of 5 1/2". All perimeters of the Grasscrete slab should be restrained by a 4" minimum concrete border poured monolithically.
- D. The Grasscrete shall be reinforced 16" on center with #3 black steel bar in both directions seated on the integral former chair.

# 3.2 PREPARATION

- A. Examine sub-grade, with installer present, for conditions affecting performance of finish. Rectify conditions detrimental to timely and proper work. Do not proceed until unsatisfactory conditions are corrected.
- B. Verify that elevations and compaction meet Project Conditions above.
- C. Prior to concrete pour, verify that formers are free of construction damage and contaminants.

#### 3.3 INSTALLATION

#### A. Construction Process:

- 1. Sub-grade shall be leveled to a uniform plane 7 1/2" below the final grade of the Grasscrete slab with ½" to 1" maximum layer placed over the sub-base comprised of coarse washed sand (squeegee) for use as a setting bed for the Grasscrete formers.
- 2. Grasscrete formers shall be placed on the sub-grade. In sloped situations the use of steel spikes or rebar lengths hammered through the formers into the sub-base may be necessary to hold the formers in place during the concrete placement process.
- 3. The reinforcement is placed 16" on center in an alternating, stacking patter. This stacking of the steel will place it at the most desirable height with minimal exposure to former material. Alternately approved rebar chairs can be used to elevate the steel slightly off the Grasscrete formers.
- 4. Five pounds of fibers are added to the ready mix truck in conjunction with the high range water reducers (if required to meet mix design specifications).
- 5. Concrete shall be placed and leveled to the top of the Grasscrete formers. The concrete surface shall have a very coarse squeegee or rake finish.
- 6. Grasscrete formers shall have the void tops removed after the concrete has hardened sufficiently with the majority of the residual paper pulp left in the voids being acceptable.
- 7. The open voids will be filled with a sand soil mix possibly with amendments such as dry granule, water soluble Polyacrylamide. A 1" layer of soil seeded with grass by others is spread over the entire concrete surface. Final soil selection and grass type to

be determined by the landscape architect of record. Two applications of sand/soil mix in the voids prior to topdressing are required. Use water to consolidate the soil prior to seeding. Grass types dependant upon region with drought tolerant native species preferred. Blue Grama, Red Fescue, Buffalo Grass are examples of grass types used for this application.

# 3.4 PROTECTION

A. General: Protect finished work from traffic until fully cured in accordance with manufacturer's recommendations.

END OF SECTION 033000



Sustainable Paving Systems, LLC 8789 Auburn Folsom Rd. #108 Granite Bay, California 95746

Tel: (916) 235-9088 Fax: (916) 914-2433

Web site: www.sustainablepavingsystems.com

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#### **SECTION 32 15 40**

# **CRUSHED STONE PAVING**

# 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 demolition, earthwork, grading, furnishing, and placement of crushed stone paving.
  - Furnish and place crushed stone paving, bonded with fine aggregate, constructed on a
    prepared underlying base course in accordance with these specifications and in conformity
    with the dimensions, typical cross section, and the lines and grades shown on the Contract
    Drawings. The locations where crushed stone paving will be used are shown on the Contract
    Drawings.

#### B. Related Sections:

- 1. Division 01 Section "Layout of Work and Surveys".
- 2. Division 01 Section "Contractor Quality Control".
- 3. Division 01 Section "Erosion and Sedimentation Control".
- 4. Division 31 Section "Earth Moving".

# 1.3 REFERENCES

- A. ASTM C117 Test Method for Materials Finer than No. 200 (75-um) Sieve in Mineral Aggregates by Washing.
- B. ASTM C136 Method for Sieve Analysis of Fine and Coarse Aggregates.
- C. ASTM D4318 Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

# 1.4 SUBMITTALS

- A. Material Analysis: Contractor shall provide copies of the following test data required by ASTM:
  - 1. ASTM C136 Sieve Analysis.
  - 2. ASTM C127 Specific Gravity and Absorption.
  - 3. ASTM C131 L.A. Abrasion.
- B. Samples: Provide a one (1) gallon sample of material for approval.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance 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, plant materials or within critical root zones.
- 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. Rejection of material.

- 1. Evidence of inadequate protection or improper handling or storage shall be cause for rejection.
- 2. Any product or material exhibiting signs of damage due to nonconformity to specifications or due to delivery, storage or handling shall be rejected by the Project Manager. Contractor shall be responsible for hauling off-site and disposing of according to general conditions and codes of the governing jurisdiction.

#### 1.6 PROJECT CONDITIONS

- A. Environmental requirements: Work shall occur only when weather and soil conditions permit in accordance with locally accepted practice.
- B. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with proposed crushed stone paving areas by field measurements before proceeding with work.
- C. Interruption of Existing Services or Utilities: Do not interrupt services or utilities to facilities occupied by Owner or others.

# D. Existing Conditions:

- 1. Utilities: Determine location of existing and proposed underground utilities. Perform work in a manner to avoid damage. Hand excavate, as required.
- 2. Excavation: Maintain grade stakes set by others until removal is mutually agreed upon by parties concerned.
- E. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained.

# 1.7 MAINTENANCE SERVICE

- A. General: Maintain Work in accordance with Division 01.
  - 1. Maintenance Period: Begin maintenance immediately after Work is completed. Maintain areas until the end of the Warranty period.

#### 1.8 WARRANTY

A. See Division 01 Section "Warranty".

# PART 2 - RODUCTS

# 2.1 CRUSHED STONE PAVING

A. Type: Crushed granite stone or gravel. Shall be unused material free of shale, lay, friable materials, organics and debris.

1. Size Range: 3/8 inch maximum

Sieve Size	Percent Passing		
2 inch	100		
3/8 inch	100		
No. 4	85		
No. 8	63		
No. 16	50		
No. 30	39		
No. 50	29		
No. 100	18		

2. Color: Uniform grey

#### 2.2 SOIL STABILIZER

A. Soil stabilizer or binder: See Section 32 15 43 Stabilizer

#### **PART 3 - EXECUTION**

# 3.1 EXAMINATION

- A. Examine areas where the Work of this Section will be performed for compliance with requirements and conditions affecting installation and performance.
  - 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 final grades are completed in accordance with the drawings.
- B. Proceed with installation only after unsatisfactory conditions have been corrected and approved by Project Manager.

# 3.2 QUALITY CONTROL

- A. Mock-up: Provide field constructed sample installation of crushed stone paving, and prepared subgrade.
  - 1. Mock-up to be five feet (5') x ten feet (10') and located where directed by Project Manager. Mock-up shall include proposed edge and banding, and surface stabilization if specified.
  - 2. Project Manager shall review mock up within forty-eight (48) hours of notification by the contractor.
  - 3. Make necessary adjustments as directed by Project Manager.
  - 4. Obtain approval from Project Manager before proceeding with the Work.
  - 5. Retain and protect mock-up during construction as a standard for judging completed crushed stone paving work. Do not remove or destroy mock-up until work is completed.

- 6. Accepted and properly maintained sample installations may remain in completed work if approved in writing by Project Manager.
- 7. All work shall match accepted field mock-up.

#### 3.3 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, turf areas, existing landscape areas, and trees from damage.
- B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of
- C. Install edging of type and in locations shown on drawings. Obtain acceptance of layout by Project Manager before excavating or installing. Make minor adjustments as required.

# 3.4 PLACEMENT OF CRUSHED STONE PAVING

- A. Cut earthwork to width of trail/area to receive crusher fines paving to approximate depth section as specified on the Contract Drawings. Remove, haul and dispose of excess material off site, or use on-site with approval of Project Manager.
- B. Complete excavation required in sub-grade before fine grading and final compaction of sub-grade is performed. Extend sub-grade compaction one foot (1') beyond proposed edge of crushed stone paving or as indicated on drawings.
  - 1. Where earth moving is required the sub-grade shall be compacted to ninety five percent (95%) standard proctor within two percent (2%) of the optimum moisture.
  - 2. Keep areas being graded or compacted shaped and drained during construction. Ruts greater than or equal to 1 inch deep in sub-grade shall be graded out and reshaped as required, and re-compacted before crushed stone paving placement.
  - 3. If the trail is part of a cross slope it should drain in the direction of the slope no greater than two percent (2%). Ensure that no low spots exist so that ponding does not occur.
- C. Prior to placement of Crushed Stone Paving material, the sub-grade shall be proof rolled. Where soft spots are detected, scarify subgrade beneath Crushed Stone Paving trail to a minimum of sixinch (6") depth. Moisture treat and compact to a minimum ninety five percent (95%) proctor density as determined by ASTM D698 or AASHTO T-99. Take moisture density tests every two hundred fifty (250) lineal feet of trail or proof roll. Treat and compact sub-grade, leaving it 5-inches below final grade for placement of Crushed Stone Paving. Compact material and retest by proof rolling to achieve approval of Project Manager.
- Install crushed stone paving only after excavation and construction work which might injure it have been completed, and after edging has been completely installed on the compacted sub-grade.
   Install crushed stone paving, over compacted base course in areas indicated on plan.
- E. Spread crushed stone evenly to fifty percent (50%) of specified depth. Avoid segregation of aggregate and contamination with lower courses or sub-grade.
- F. Compact to ninety five percent (95%) of maximum density as determined by ASTM D1557.
  - 1. Maintain surface course moisture content within plus/minus three percent (± 3%) of optimum. Add water to quarry fines paving as required to achieve optimum moisture content and a uniform, compacted surface conforming to the finish grades indicated.
  - 2. Compact areas inaccessible to rolling by mechanical tamping.

- G. Protect crushed stone paving from soil or other contaminates during and following installation.
- H. Spread and compact additional crushed stone paving to achieve the required minimum compacted thickness. Compact per 3.3.F above.

## 3.5 PLACEMENT OF STABILIZED CRUSHED STONE PAVING

- A. Complete items 3.3.A through H above using specified crusher fines material with pre-incorporated specified binder at specified application rates.
- B. Do not allow traffic on stabilized crushed stone paving for two days.

# 3.6 MAINTENANCE AND REPAIRS:

# A. Crusher Fines Paving:

1. Areas that do not compact, become eroded or are degraded in visual quality and/or performance as determined by the Project Manager are to be removed and/or repaired. Obtain approval of repair methods from Project Manager prior to affecting repairs.

## B. Stabilized Crusher Fines Paving:

- 1. To repair, excavate damaged area leaving a minimum one-inch depth of existing stabilized crushed stone paving. Apply stabilized crusher fines to existing surface as described above. Compact per 3.3.F above.
- 2. Do not allow traffic on repaired stabilized crushed stone paving for two days or until paving has fully cured.

# 3.7 CLEANUP AND PROTECTION

- A. All areas shall be clean at the end of each workday.
- B. The contractor shall maintain protection during installation, curing, and maintenance periods.
  - 1. Erect temporary fencing or barricades and warning signs as required protecting newly installed Crushed Stone Paving areas from traffic, other trades, and trespassers. Maintain fencing and barricades throughout initial maintenance period and remove with approval of Project Manager.
- C. Project completion: All debris, soil, trash, and excavated and/or stripped material resulting from Crushed Stone Paving operations and unsuitable for or in excess of requirements for completing work of this Section shall be disposed of off-site.
- D. Maintain protection during installation and maintenance periods. See Division 1. Treat, repair or replace damaged work as required.

# 3.8 QUALITY ASSURANCE

A. Refer to Division 1 Section "Quality Assurance".

#### **END OF SECTION 32 15 40**



Stabilizer Solutions, Inc. 33 South 28<sup>th</sup> Street Phoenix, AZ 85034 USA toll free 800.336.2468 p 602.225.5900 f 602.225.5902 www.StabilizerSolutions.com info@stabilizersolutions.com

#### **SECTION 32 15 43**

#### STABILIZER® FOR STABILIZED AGGREGATE PATHWAY: PEDESTRIAN ACCESS

#### **PART 1 - GENERAL**

#### 1.1 SUMMARY

- A. This Section includes material and labor requirements for construction with decomposed granite or crushed 3/8" or 1/4" minus aggregate pathway with Stabilizer® binder additive for the following items:
- 1. Stabilized Aggregate pathway and patios
- B. Related Sections:
- 1. Section 31 00 00 Earthwork
- 2. Section 32 11 00 Stabilizer® for Stabilized Aggregate Pavement: Firelanes, Driveways and Parking Lots.

# 1.2 PERFORMANCE REQUIREMENTS

A. Perform gradation of decomposed granite material or 3/8" or 1/4" minus crushed aggregate in accordance with ASTM C 136 – Method for Sieve Analysis for Fine and Course Aggregates.

#### 1.3 SUBMITTALS

- A. Products Data: For each product specified. Submit a 5 lb. sample and sieve analysis for grading of decomposed granite or crushed 3/8" or 1/4" minus aggregate to be sent to Stabilizer Solutions, Inc. prior to any construction (allow 2 week turn around). Must be approved by Landscape Architect and Owner.
- B. Shop Drawings: Show details of installation, including plans and sections.
- C. LEED Submittals:
- 1. Credit MR 4 Recycled Content: Attach product data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.
- 2. Credit MR 5 Regional Materials: Attach product data for regional materials indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include statement indicating cost for each regional material and the fraction by weight that is considered regional.
- 3. Credit MR 6 Rapidly Renewable Materials: Attach product data and certification letter indicating percentages by weight of rapidly renewable materials for each product. Include statement indicating costs for each product having rapidly renewable material.
- D. Maintenance Instructions: Submit copy(ies) of manufacturer's written maintenance instructions in accordance with 01 73 23 Operation and Maintenance Data.

# 1.4 PROJECT/SITE CONDITIONS

- A. Field Measurements: Each bidder is required to visit the site of the Work to verify the existing conditions. No adjustments will be made to the Contract Sum for variations in the existing conditions.
- 1. Where surfacing is indicated to fit with other construction, verify dimensions of other construction by field measurements before proceeding with the work.
- B. Environmental Limitations: Do not install Stabilized Aggregate pathway during rainy conditions or below 40 degrees Fahrenheit and falling.

#### 1.5 **QUALITY ASSURANCE**

- A. Installer Qualifications: Installer to provide evidence to indicate successful experience in providing Stabilized Aggregate surface or ability to follow installation instructions.
- B. Mock-ups: Install 4 ft. wide x 10 ft. long mock-up of decomposed granite or 3/8" or 1/4"minus crushed aggregate surfacing with Stabilizer® additive at location specified by owner's representative.
- C. Compaction testing to be provided by contractor, one test per 2,000 square feet of base course.
- D. Manufacturer's technical representative shall visit the site at the start of an installation to ensure the installer understands the correct installation methods to use.

#### 1.6 WARRANTY

- A. General Warranty: The special 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. Special Warranty: Submit a written warranty executed by the installer agreeing to repair or replace components of Stabilized Aggregate that fail in materials or workmanship within the specified warranty period. Stabilizer Solutions, Inc. does not warranty "Stabilizer®" purchased from a non-approved Stabilizer Solutions, Inc. licensee. Failures include, but are not limited to, the following:
- 1. Premature wear and tear, provided the material is maintained in accordance with manufacturer's written maintenance instructions.
- 2. Failure of system to meet performance requirements.
- C. Warranty Period: Contractor shall provide warranty for performance of product. Contractor shall warranty installation of product for the time of one year from completion.
- D. Contractor shall provide, for a period of sixty days, unconditional maintenance and repairs as required.

#### **PART 2 - PRODUCTS**

#### 2.1 MANUFACTURERS

A. Stabilizer® for Stabilized Aggregate surfaces provided by the following manufacturer:

September 2019 Page 2 of 5

1. Stabilizer Solutions, Inc. 33 South 28<sup>th</sup> St., Phoenix, AZ 85034; phone (602) 225-5900, (800) 336-2468; fax (602) 225-5902; website stabilizersolutions.com; email <u>info@stabilizersolutions.com</u>

# 2.2 MATERIALS

- A. Decomposed Granite or 3/8" or 1/4" crushed aggregate screenings
- 1. Sand and crushed stone shall consist of inert materials that are hard and durable, with stone free from surface coatings and deleterious materials. Gradation requirements shall be as follows:
- 2. Crushed Stone Sieve Analysis Percentage of Weight Passing a Square Mesh Sieve AASHTO T11-82 and T2782

1/4" MINIIS	AGGREGATE	GRADATION
1/4  VIIINUA	AURINIAIA	(IIXAI)AII()IX

U.S. Sieve No.	Percent Passing by Weight
# 3/8"	100
# 4	90 – 100
#8	75 – 80
# 16	55 – 65
# 30	40 - 50
# 50	25 – 35
# 100	15 – 20
# 200 to	10 – 15

- 3. Acceptable local supplier list to be provided by Architect
- B. Stabilizer® Binder
- 1. Patented, non-toxic, organic binder that is a colorless and odorless concentrated powder that binds decomposed granite or crushed 3/8" or 1/4" minus aggregate.
- 2. Product to have 64% pre-consumer recycled content.
- 3. Product shall have 25 years experience at same formulation.

#### 2.3 EXCESS MATERIALS

A. Provide owner's authorized rep. with the following excess materials for use in future Stabilized Aggregate repair: 40 to 50 lb. Bags of the Stabilized Aggregate blended with proper amount of Stabilizer®.

# **PART 3 - EXECUTION**

#### 3.1 PREPARATION

A. Base shall be 3" compacted layer of your state's DOT recommended crushed granular road base. Make any corrections necessary to base furnished and installed to bring gravel to the elevations shown on the drawing.

- B. Pre-soak base material with water and compact to 95% determined by Test Method ASTM D 1557 prior to installing Stabilized Aggregate. Compaction testing to be provided by project owner, one test per 2,000 square feet of base.
- C. Although porous, it is recommended to have proper drainage available to ensure no standing water on surface or adjacent to Stabilized Aggregate, including downspouts when placed under roof overhang and surface drains.
- D. Before proceeding with installation, notify Owner's Representative in writing of unsuitable site/base conditions.

# 3.2 BLENDING STABILIZER

A. Stabilizer® shall be thoroughly pre-mixed with aggregate at the rate of 15-lbs of Stabilizer® per 1-ton of aggregate. Verify with manufacturer correct Stabilizer® rate for your project and climate. Drop spreading of Stabilizer® over pre-placed aggregate or mixing by rototilling is not acceptable. Stabilizer shall be mechanically pre-mixed per manufacturer's recommendations using an approved mechanical blending unit to adequately blend Stabilizer® with aggregate (Bucket blending is not an approved blending apparatus). Always blend Stabilizer® and aggregate DRY.

#### 3.3 PLACEMENT

A. After pre-blending, place Stabilized Aggregate directly on prepared sub-grade. Level to desired grade and cross section. Depth of pathways shall be 3" for heavy foot traffic and light vehicles. DO NOT place on filter fabric. Contact Stabilizer Solutions, Inc. for installation on slopes greater than 8%.

# 3.4 WATERING

- A. Water heavily for full-depth moisture penetration of profile. Water <u>activates</u> Stabilizer®. Apply 25 to 45-gallons of water per 1-ton to achieve saturation. Randomly test for depth using a probing device, which reaches full depth.
- B. Contractor shall wait a minimum of 6-72 hours or until such time that the Stabilized Aggregate is able to accept compaction from a 1 to 5 ton roller without separation, plowing or any other physical compromise of the aggregate.
- C. If surface aggregate dries significantly quicker than subsurface material, lightly mist surface before compaction.

#### 3.5 COMPACTION

- A. Compact Stabilized Aggregate to 85% relative compaction by equipment such as; a 2 to 5-ton double drum roller making 3 to 4 passes. Do not begin compaction for 6 hours after placement and up to 72 hours. DO NOT use a vibratory plate compactor or vibration feature on roller, as vibration separates large aggregate particles. If pumping or pancaking of surface occurs, surface is still too wet to roll.
- B. Take care in compacting surface when adjacent to planting and irrigation systems, use 8" or 10" hand tamp. Installation of Stabilized Aggregate more than 3" thick shall be installed in lifts. If 4" thick compacted (2) 2" lifts. If 5" thick compacted (2) 2.5" lifts. If Stabilized Aggregate is pre-moistened before installation entire 4" or 5" lift may be installed.

September 2019 Page 4 of 5

C. Lightly spray surface area following compaction. Do not disturb aggregate surface with spray action.

# 3.6 INSPECTION

A. Finished surface shall be smooth, uniform and solid with no evidence of chipping or cracking. Cured and compacted pathway shall be firm throughout profile with no spongy areas. Loose material shall not be present on surface after installation, but may appear after use and according to environmental conditions. Pathway shall remain stable underneath loose granite on top with a "natural" look. Any significant irregularities in path surface shall be repaired to the uniformity of entire installation.

# 3.7 PROTECTION

- A. Contractor shall furnish and install construction fence around new surface to prevent public access. Fencing shall be maintained in place for a minimum of 12 72 hours after completion of installation, or as directed by the Owner' Representative. Drying period may take longer due to weather conditions.
- B. Contractor shall notify Owner's Representative that landscape irrigation shall be restricted near Stabilized Aggregate surface until drying period is complete. Standing water on surface and adjacent to path shall be restricted at all times.

#### 3.8 MAINTENANCE

- A. Remove debris, such as paper, grass clippings, or organic material by mechanically blowing or hand raking as needed. When plowing snow, use rubber baffle on plow blade or wheels on plow to lift blade 1/4" off the surface.
- B. During first year, minor amounts of loose aggregate may appear on surface (1/16 to 1/4"). If material exceeds a 1/4", redistribute over entire surface. Water to 1" depth and compact with power roller of no less than 1000-lbs. Repeat as needed. If cracking occurs, sweep fines into cracks, water thoroughly and hand tamp with an 8" 10" hand tamp.

#### 3.9 REPAIRS

- A. Excavate damaged area to the depth of the Stabilized Aggregate and square off sidewalls.
- B. If area is dry, moisten damaged portion lightly.
- C. Pre-blend the dry required amount of Stabilizer® with the proper amount of aggregate in a concrete mixer.
- D. Add water to the pre-blended Stabilized Aggregate. Thoroughly moisten mix with 25 to 45 gallons per 1-ton of pre-blended material or to approximately 10% moisture content.
- E. Apply moistened pre-blended Stabilized Aggregate to excavated area to finish grade.
- F. Compact with an 8" to 10" hand tamp or 250 to 300 pound roller. Keep traffic off areas for 12 to 48 hours after repair has been completed.

END OF SECTION

# IRRIGATION SPECIFICATIONS

# TABLE OF CONTENTS

# SECTION 32 80 00 - IRRIGATION

<u>PART 1 GENE</u>	RAL	
1.01	SCOPE	2
1.02	WORK NOT INCLUDED	2
1.03	SUBMITTALS	2
1.04	RULES AND REGULATIONS	3
1.05	QUALITY ASSURANCE	3
1.06	TESTING	3
1.07	CONSTRUCTION REVIEW	5
1.08	COORDINATION AND SCHEDULING	5
1.09	GUARANTEE/WARRANTY AND REPLACEMENT	5
PART 2 MATE	ERIALS	
2.01	QUALITY	6
2.02	SUBSTITUTIONS	6
2.03	SLEEVING	6
2.04	PIPE AND FITTINGS	6
2.05	MAINLINE COMPONENTS	7
2.06	SPRINKLER IRRIGATION COMPONENTS	8
2.07	DRIP IRRIGATION COMPONENTS	8
2.08	CONTROL SYSTEM COMPONENTS	8
2.09	OTHER COMPONENTS	9
PART 3 EXEC	<u>UTION</u>	
3.01	INSPECTIONS AND REVIEWS	10
3.02	LAYOUT OF WORK	10
3.03	EXCAVATION, TRENCHING, AND BACKFILLING	10
3.04	SLEEVING AND BORING	11
3.05	ASSEMBLING PIPE AND FITTINGS	11
3.06	INSTALLATION OF MAINLINE COMPONENTS	12
3.07	INSTALLATION OF SPRINKLER IRRIGATION COMPONENTS	12
3.08	INSTALLATION OF DRIP IRRIGATION COMPONENTS	13
3.09	INSTALLATION OF CONTROL SYSTEM COMPONENTS	13
3.10	INSTALLATION OF OTHER COMPONENTS	14
3.11	PROJECT RECORD (AS-BUILT) DRAWINGS	14
3.12	WINTERIZATION AND SPRING START-UP	15
3.13	MAINTENANCE	15
3.14	CLEANUP	16
PART A SHIPPI	EMENTAL BASELINE SPECIFICATIONS	16

September 2019

#### **DIVISION 2-SITE WORK**

SECTION 32 80 00 - IRRIGATION

PART 1: GENERAL

#### 1.01 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. Items of work specifically included are:

- I. Procurement of all applicable licenses, permits, and fees.
- II. Coordination of Utility Locates ("Utility Notification Center").
- III. Connection of electrical power supply to the irrigation control system.
- IV. Sleeving for irrigation pipe and wire.
- V. Preparation of Record Drawings.
- VI. Spring start-up and winterization.
- VII. Maintenance period.

# 1.02 WORK NOT INCLUDED:

Items of work specifically excluded or covered under other sections are:

- I. Provision of electrical power supply to the irrigation control system.
- II. Provision for water to the site (water meter).

# 1.03 SUBMITTALS:

- II. Deliver four (4) copies of all submittals to the Owner's Representative within 10 working days from the date of Notice to Proceed. Provide information in a 3-ring binder with table of contents and index sheet. Provide sections that are indexed for different components and labeled with the specification section number and the name of the component. Submittals must be made for all the components on the material list. Indicate which items are being supplied on the catalog cut sheets when multiple items are shown on one sheet. Submittal package must be complete prior to being reviewed by the Owner's Representative. Incomplete submittals will be returned without review.
- III. Materials List: Include sleeving, pipe, fittings, mainline components, sprinkler, drip irrigation components, control system components, shop drawings and all other components shown on the drawings and installation details or described herein. Components such as pipe sealant, wire, wire connectors, ID tags, etc. must be included. Quantities of materials need not be included.
- IV. Manufacturers' Data: Submit manufacturers' catalog cuts, specifications, and operating

instructions for equipment shown on the materials list.

- V. 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.
- VI. The following items are required to receive Baseline's installation verification and warranty verification: Baseline's Controller and Communications. Prior to final acceptance of the project, the contractor shall be responsible for contacting and coordinating installation verification for any and all of the aforementioned products required by and installed on this project. Prior to starting work on this project, the contractor shall contact the Central Control Distributer, Denver Brass and Copper Greeley Store, and conduct an on-site meeting with a representative of Denver Brass and Copper and a City representative to coordinate all required verification services in a timely manner, to include Radio Site Survey and equipment needs. The contractor shall provide documentation of this meeting to the City of Greeley. Prior to final acceptance of the work, the contractor shall provide proof of installation verification of all required equipment by Denver Brass and Copper to the City of Greeley.

#### 1.04 **RULES AND REGULATIONS:**

- 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.
- II. 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.
- III. 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.

#### 1.05 **QUALITY ASSURANCE:**

- Engage an experienced Installer who has completed irrigation work similar in material, design, I. and extent to that indicated for this project and with a record of successful irrigation installations.
- II. Installer's Field Supervision: Field supervision shall be on site, full time during installation. Field supervisor shall have at least 5 years-experience in 2 wire installation.

#### 1.06 **TESTING:**

- I. Notify the Owner's Representative three days in advance of testing.
- II. 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 at least 24 hours before testing.
- II. Subsections of mainline pipe may be tested independently, subject to the review of the Owner's Representative.
- III. Furnish clean, clear water, pumps, labor, fittings, and equipment necessary to conduct tests or retests. Pressure gauge resolution must be suitable for recording losses less than 5 psi.

IV. All costs, including travel expenses for site visits by the Project Manager, for any reinspection that may be required due to non-compliance with the Construction Documents shall be the sole responsibility of the Contractor.

#### V. Hydrostatic Pressure Test (Solvent Weld Mainline Pipe):

- Subject mainline pipe to a hydrostatic pressure equal to 140 PSI for two hours. Test with mainline components installed.
- B. Backfill to prevent pipe from moving under pressure. Expose couplings and fittings.
- C. Expose all remote control valves their riser pipe and service tee fittings.
- Purge air from mainline pipe before test. Attach pressure gauge to mainline pipe in test D. section.
- E. Observe pressure loss on pressure gauge. If pressure loss is greater than 5 PSI, identify reason for pressure loss. Replace defective pipe, fitting, joint, valve, or appurtenance. Repeat test until pressure loss is equal to or less than 5 PSI.
- F. Visually inspect irrigation pipe for leakage and replace defective pipe, fittings, joint, valve, or appurtenance. Repeat test until pipe passes test.
- G. Cement or caulking to seal leaks is prohibited.

# VI. Volumetric Leakage Test:

- Backfill to prevent pipe from moving under pressure. Expose couplings and fittings. A.
- B. Purge air from pipeline before test.
- Subject mainline pipe to 140 PSI for two hours. Maintain constant pressure. C.
- Provide all necessary pumps, bypass piping, storage tanks, meters, 3-inch test gauge, supply piping, and fittings in order to properly perform testing.
- E. Testing pump must provide a continuous 140-PSI to the mainline. Allowable deviation in test pressure is 5-PSI during test period. Restore test pressure to 140-PSI at end of test.
- F. Water added to mainline pipe must be measured volumetrically to nearest 0.10 gallons.
- G. Use the following table to determine maximum allowable volume lost during test: Leakage Allowable (Gallons per (100 Joints) / Hour)

	Test Pressure (PSI)								
Pipe Size (INCHES)	60	70	80	90	100	110	120	130	140
2 1/2"	0.39	0.42	0.45	0.48	0.51	0.53	0.56	0.58	0.61
3"	0.48	0.51	0.55	0.58	0.62	0.65	0.68	0.70	0.73
4"	0.62	0.66	0.71	0.75	0.80	0.84	0.87	0.91	0.94
6"	0.90	0.97	1.04	1.11	1.18	1.23	1.29	1.34	1.40
8"	1.17	1.26	1.41	1.44	1.53	1.60	1.68	1.74	1.82

#### VII. Operational Test:

- Activate each remote control valve in sequence from controller. The Owner's Representative will visually observe operation, water application patterns, and leakage.
- B. Replace defective remote control valve, solenoid, wiring, or appurtenance to correct operational deficiencies.
- C. Replace, adjust, or move water emission devices to correct operational or coverage deficiencies.
- Replace defective pipe, fitting, joint, valve, sprinkler, or appurtenance to correct leakage D. problems. Cement or caulking to seal leaks is prohibited.

September 2019 IRRIGATION SYSTEM 32 80 00 - 4

E. Repeat test(s) until each lateral passes all tests. Repeat tests, replace components, and correct deficiencies at no additional cost to the Owner.

# VIII. Control System Acceptance Test:

- Upon completion of construction, City of Greeley Parks Department Representatives will administer a System Acceptance Test.
- Following construction completion and a Review by the Project Manager, an evaluation B. period will begin. After 30 days of continuous service without major system problems, the system will be accepted and the guarantee/warranty period will begin. If at any time during the 30-day evaluation period, a major system problem occurs, the source of the problem will be determined and corrected and the 30-day evaluation period will start again. Equipment will not be accepted until such time as the System Acceptance Test is passed.
- C. If successful completion of the System Acceptance Test is not attained within 90 days following commencement of the evaluation period, the Project Manager has the option to request replacement of equipment, terminate the order, or portions thereof, or continue with the System Acceptance Test. These options will remain in effect until such time as a successful completion of the System Acceptance Test.
- D. Final payment will be made after successful completion of the System Acceptance Test.

# IX. Control System Grounding:

- Test for proper grounding of control system per manufacturer's recommendations. Test results must meet or exceed manufacturer's guidelines for acceptance.
- Replace defective wire, grounding rod, or appurtenances. Repeat the test until the B. manufacturer's guidelines are met.
- C. Test for proper grounding of 2-wire cable per manufacturer's recommendations. Test results must meet or exceed manufacturer's guidelines for acceptance. Will be verified by manufactures representative for acceptance.

#### CONSTRUCTION REVIEW: 1.07

The purpose of on-site reviews by the Owner's Representative is to periodically observe the work in progress, the Contractor's interpretation of the construction documents, and to address questions with regard to the installation.

- I. Scheduled reviews such as those for irrigation system layout or testing must be scheduled with the Project Manager as required by these specifications.
- II. Impromptu reviews may occur at any time during the project.
- III. A review will occur at the completion of the irrigation system installation and Project Record Drawing submittal.

#### COORDINATION AND SCHEDULING: 1.08

The irrigation construction schedule is to be provided at the Pre-Construction meeting depicting I. the dates the various stages of the project will start and when they will be completed.

#### 1.09 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.

I. 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 days of notification from the Owner's Representative.

- II. Contract documents govern replacements identically as with new work. Make replacements at no additional cost to the contract price.
- III. Guarantee/warranty applies to originally installed materials and equipment and replacements made during the guarantee/warranty period.

#### **PART 2: MATERIALS**

# 2.01 QUALITY:

Use materials that are new and without flaws or defects of any type, and which are the best of their class and kind.

#### 2.02 SUBSTITUTIONS:

- I. Alternative equipment must be approved by the Engineer prior to bidding. The Contractor is responsible for making any changes to the design to accommodate alternative equipment.
- II. Pipe sizes referenced in the construction documents are minimum sizes and may be increased at the option of the Contractor.

#### 2.03 SLEEVING:

- I. Install a separate sleeve beneath paved areas to route each run of irrigation pipe or wiring bundle.
- II. Sleeving material beneath pedestrian pavements shall be PVC Class 200 pipe with solvent welded joints.
- III. Sleeving beneath drives and streets shall be PVC Class 200 pipe with solvent welded joints.
- IV. Sleeving diameter: equal to twice that of the pipe or wiring bundle.
- V. All sleeving located under concrete, pavement or other hard surfacing shall be notched on both sides to mark the sleeve location.

# 2.04 PIPE AND FITTINGS:

- I. Mainline Pipe and Fittings:
  - A. Use rigid, un-plasticized polyvinyl chloride (PVC) 1120, 1220 National Sanitation Foundation (NSF) approved pipe, extruded from material meeting the requirements of Cell Classification 12454-A or 12454-B, ASTM Standard D1784, with an integral belled end suitable for solvent welding.
  - B. Use Class 200, SDR-21, rated at 200 PSI, conforming to the dimensions and tolerances established by ASTM Standard D2241. Use PVC pipe rated at higher pressures than Class 200 in the case of small nominal diameters that are not manufactured in Class 200.
  - C. 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, Type 1, PVC solvent weld fittings conforming to ASTM Standards D2466 and D1784. Use primer approved by the pipe manufacturer. Solvent cement to conform to ASTM Standard D2564.

# II. Lateral Pipe and Fittings:

- A. Use rigid, un-plasticized polyvinyl chloride (PVC) 1120, 1220 National Sanitation Foundation (NSF) approved pipe, extruded from material meeting the requirements of Cell Classification 12454-A or 12454-B. ASTM Standard D1784, with an integral belled end suitable for solvent welding.
- B. Use Class 200, SDR-21, rated at 200 PSI, conforming to the dimensions and tolerances established by ASTM Standard D2241.
- C. Use solvent weld pipe for lateral pipe. Use Schedule 40, Type 1, PVC solvent weld fittings conforming to ASTM Standards D2466 and D1784 for PVC pipe. Use primer approved by the pipe manufacturer. Solvent cement to conform to ASTM Standard D2564, of a type approved by the pipe manufacturer.

# III. Specialized Pipe and Fittings:

- A. Low Density Polyethylene Hose:
  - 1. Use pipe specifically intended for use as a flexible swing joint.

Inside diameter: 0.490 +0.010 inch.

Wall thickness: 0.100+0.010 inch.

Color: Black.

- 2. Use spiral barbed fittings supplied by the same manufacturer as the hose.
- B. Assemblies calling for flanged connections shall utilize stainless steel studs and nuts and rubber gaskets.
- C. Assemblies calling for threaded pipe connections shall utilize PVC Schedule 80 and 40 threaded fittings and Spears pre-manufactured swing-joint assemblies. Use PVC Schedule 80 nipples.
- D. Joint sealant: Use non-hardening, nontoxic pipe thread sealant formulated for use on threaded connections and approved by the pipe fitting and valve manufacturers. Where directed by valve manufacturers, use thread tape for threaded connections at valves instead of thread paste.
- E. Copper Pipe: Use Type "K" rigid pipe conforming to ASTM Standard B88. Use wrought copper of cast bronze fittings, soldered, flared mechanical, or treaded joint per installation details or local code. Use a 95-percent tin and 5-percent antimony solder.
- F. Pressure Supply Lines (downstream of backflow prevention units) HDPE, DR11.

# IV. Joint Restraint Harness:

- A. Use a joint restraint harnesses wherever joints are not positively restrained by flanged fittings, threaded fittings, and/or thrust blocks.
- B. Use a joint restraint harness with transition fittings between metal and PVC pipe, where weak trench banks do not allow the use of thrust blocks, or where extra support is required to retain a fitting or joint.
- C. Use bolts, nuts, retaining clamps, all-thread, or other joint restraint harness materials that are zinc plated or galvanized.
- D. Use on pipe greater than or equal to 3-inch diameter or any diameter rubber gasket pipe.

# 2.05 MAINLINE COMPONENTS:

- I. Flow Sensor Assembly: As presented in the installation details.
- II. Isolation Gate Valve Assembly: As presented in the installation details. Acceptable manufacturers are American AVK, Clow, Kennedy, Mueller, Matco, Nibco, or Waterous.

- III. Quick Coupling Valve Assembly: As presented in the installation details.
- IV. Air Vacuum Relief Valve Assembly: as presented in the details. Provide a continuous action combination air vacuum relief valve with an operating pressure rating of 150 PSI. Acceptable manufactures are Bermad, Crispin, Fresno, or Waterman.

#### 2.06 SPRINKLER IRRIGATION COMPONENTS:

- I. Remote Control Valve (RCV) Assembly for Sprinkler Laterals: as presented in the installation details. Use wire connectors and waterproofing sealant to join control wires to solenoid valves. Use standard Christy I.D. tags with hot-stamped black letters on a yellow background. Install a separate valve box over a 3-inch depth of 3/4-inch gravel for each assembly. Provide PRS-Dial pressure regulators for all spray nozzles when inlet pressure exceeds 15 psi of desired outlet pressure. Install 2-wire decoder on each control valve.
- II. Sprinkler Assembly: As presented in the drawings and installation details.
- III. Sprinkler Pressure Test Kit: Provide Rain Bird PHG assembly, and Rain Bird Pitot Tube (part no. 41017), for use in pressure adjustment for spray and rotors sprinklers.

# 2.07 DRIP IRRIGATION COMPONENTS:

- I. Remote Control Valve (RCV) /assembly fir Drip Laterals.
  - A. As presented in drawing and installation details.

# II. Inline Drip Tubing:

- A. Tubing: Use UV resistant polyethylene drip tubing with integral pressure compensating drip emitters. Emitter spacing as noted in drawings and installation details. Use emitters that are pressure compensating from 8 to 70 PSI. Use tubing with O.D. of 0.660", and I.D. of 0.560". Use tubing stakes or landscape fabric staples to hold above-ground pipe in place.
- B. Blank Drip Tubing: Use UV resistant polyethylene blank tubing for supply and exhaust manifolds with flows less than five (5) GPM and start connections between manifolds and drip tubing. Use PVC insert line fittings compatible with inline drip tubing. Compression fittings will not be allowed. Use blank tubing from same manufacture as inline drip tubing.
- C. Flush Valve Assembly: As presented in drawings and installation details.

# 2.08 CONTROL SYSTEM COMPONENTS:

- I. Automatic Controller (2-Wire) Size and type shown on Drawings; mounted as detailed.
- II. Single Station Decoders (2-Wire) Size and type shown on Drawings; mounted as detailed.
  - A. Install decoders and wire per manufacture recommendations and requirements.
  - B. Grounding for all decoders and 2-wire cable, to be per manufactures recommendations and requirements. Minimum one grounding assembly per every 600' of wire and at all ends of the wire runs.
- III. Baseline Controller Assembly: All incidental parts which are not specified herein and are necessary to complete the system shall be furnished and installed as though such parts were shown on plans or specified. All systems shall be in satisfactory operation at the time of completion. Contractor is responsible to meet with designated City of Greeley Parks Division staff as well as Denver Brass and Copper Technical Services Staff to determine appropriate communication path from the below options BEFORE PACKAGE SYSTEM IS TO BE

<u>ORDERED</u>. Contractor is also required to provide designated City of Greeley Parks Division Staff with a final Denver Brass and Copper Package System final sales order for approval <u>BEFORE</u> ordering of system occurs. (refer to supplemental Baseline Specification section).

- IV. Lightning protection: Provide one 4" x 96" x 0.0625" ground plate, one 5/8"x10 foot copper clad UL listed grounding rod, 30 feet of #6 AWG bare copper grounding wire, and one CADWELD connector, and two 6-inch round valve boxes at each satellite controller group. Contractor responsible for adding to the grounding path until test measures 10 ohms or less.
- V. Wire markers: Pre-numbered or labeled with indelible nonfading ink, made of permanent, nonfading material.

### VI. Power Wire:

- A. Electric wire from the power source to satellite control unit shall be solid or stranded copper, Type UF single conductor cable or multi-conductor with ground cable, UL approved for direct underground burial. Power wires shall be black, white, and green in color. The Contractor is responsible for verifying that the power wire sizes are compatible and adequate for the control system being used.
- B. Splices: Use 3M 82-A series connectors.
- C. Conduit: PVC Schedule 40.
- D. Warning tape: Inert plastic film highly resistant to alkalis, acids, or other destructive chemical components likely to be encountered in soils. Three inches wide, colored yellow, and imprinted with "CAUTION: BURIED ELECTRIC LINE BELOW"

### VII. Control Wire:

# A. Low Voltage:

- 1. Electrical Control Wire UFUL approved No. 12/12 (2-wire Paige #170116RB or as per manufactures requirements) direct burial copper wire to operate system as designed.
- 2. If multiple controllers are utilized, refer to wire routing plan for individual wire runs and colors.
- 3. Control Wire connections and splices shall be made with 3M DBRy-6 direct bury splice.
- 4. Loop five (5) feet minimum of 2-wire cable into all valve boxes.
- 5. If multiple controllers are utilized, each controller shall have it's own 2-wire cable run, controllers cannot be connected with same 2-wire run.
- B. Warning tape: Insert plastic film highly resistant to alkalis, acids, or other destructive chemical components likely to be encountered in soils. Three inches wide, colored yellow, and imprinted with "CAUTION: BURIED ELECTRIC LINE BELOW."

# 2.09 OTHER COMPONENTS SUPPLIED BY CONTRACTOR:

- I. Tools and Spare Parts: Provide operating keys, servicing tools, spare parts and other items indicated in the General Notes of the drawings.
- II. Other Materials: Provide other materials or equipment shown on the drawings or installation details that are part of the irrigation system, even though such items may not have been referenced in these specifications.

### PART 3: EXECUTION

# 3.01 INSPECTIONS AND REVIEWS:

- I. Site Inspections:
  - A. Verify construction site conditions and note irregularities affecting work of this section. Report irregularities to the Owner's Representative prior to beginning work.
  - B. Beginning work of this section implies acceptance of existing conditions.
- II. Utility Locates ("Utility Notification Center of Colorado"):
  - A. Arrange for and coordinate with local authorities the location of all underground utilities.
  - B. 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 Owner's Representative one week in advance of review. Modifications will be identified by the Owner's Representative at this review.

# 3.02 LAYOUT OF WORK:

- I. Stake out the irrigation system. Items staked include: back flow device, sprinklers, mainline and lateral pipe, control valves, quick coupling valves, controller, and isolation valves.
- II. Install all mainline pipe and mainline components inside of project property lines.

# 3.03 EXCAVATION, TRENCHING, AND BACKFILLING:

- I. Excavate to permit the pipes to be laid at the intended elevations and to permit work space for installing connections and fittings.
- II. Minimum cover (distance from top of pipe or control wire to finish grade):
  - A. 24-inches over mainline pipe and over electrical conduit.
  - B. 28-inches over control wire.
  - C. 18-inches over lateral pipe to sprinklers.
- III. Maintain at least 15-feet clearance from the centerline of any tree.
- IV. PVC lateral pipes may be pulled into the soil utilizing a vibratory plow device specifically manufactured for pipe pulling. Minimum burial depths equal minimum cover listed above.
- V. Backfill only after lines have been reviewed and tested.
- VI. Excavated material is generally satisfactory for backfill. Backfill shall be free from rubbish, vegetable matter, and stones larger than 2-inches in maximum dimension. Remove material not suitable for backfill. Backfill placed next to pipe shall be free of sharp objects that may damage the pipe.
- VII. Backfill unsleeved pipe in either of the following manners:
  - A. 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.
  - B. 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.

VIII. 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. Use of water for compaction around sleeves, "puddling", will not be permitted.

- IX. Dress backfilled areas to original grade. Incorporate excess backfill into existing site grades.
- X. Where utilities conflict with irrigation trenching and pipe work, contact the Owner's Representative for trench depth adjustments.

# 3.04 SLEEVING AND BORING:

- I. Install sleeving at a depth that permits the encased pipe or wiring to remain at the specified burial depth.
- II. Extend sleeve ends six inches beyond the edge of the paved surface. Cover pipe ends and mark with stakes.
- III. Bore for sleeves under obstructions that cannot be removed. Employ equipment and methods designed for horizontal boring. Hand excavating under sidewalks and hardscapes will not be allowed.

# 3.05 ASSEMBLING PIPE AND FITTINGS:

### I. General:

- A. Keep pipe free from dirt and pipe scale Cut pipe ends square and debur. Clean pipe ends.
- B. Keep ends of assembled pipe capped. Remove caps only when necessary to continue assembly.
- C. Trenches may be curved to change direction or avoid obstructions within the limits of the curvature of the pipe. Minimum radius of curvature and offset per 20-foot length of pipe by pipe size are shown in the following table. All curvature results from the bending of the pipe lengths. No deflection will be allowed at a pipe joint.

# II. Mainline Pipe and Fittings:

- A. Use only strap-type friction wrenches for threaded plastic pipe.
- B. PVC Rubber-Gasket Pipe:
  - 1. Use pipe lubricant. Join pipe in the manner recommended by manufacturer and in accordance with accepted industry practices.
  - 2. Ductile iron fittings shall not be struck with a metallic tool. Cushion blows with a wood block or similar shock absorber.

# C. PVC Solvent Weld Pipe:

- 1. Use primer and solvent cement. Join pipe in a manner recommended by the manufacturer and in accordance with accepted industry practices.
- 2. Cure for 30 minutes before handling and 24 hours before allowing water in pipe.
- 3. Snake pipe from side to side within the trench.
- D. Fittings: The use of cross type fittings is not permitted. Do not strike ductile iron fittings with metallic tools. Cushion blows with wood block or similar shock absorber

# III. Lateral Pipe and Fittings:

- A. Use only strap-type friction wrenches for threaded plastic pipe.
- B. PVC Solvent Weld Pipe:
  - Use primer and solvent cement. Join pipe in the manner recommended by the manufacturer and in accordance with accepted industry practices.
  - 2. Cure for 30 minutes before handling and 24 hours before allowing water in the pipe.
  - 3. Snake pipe from side to side within the trench.

C. Fittings: The use of cross type fittings is not permitted.

# IV. Specialized Pipe and Fittings:

- A. Low Density Polyethylene Hose: Install per manufacturer's recommendations.
- B. Flanged connections: Install stainless steel studs and nuts and rubber gaskets per manufacturer's recommendations.
- C. PVC Threaded Connections:
  - 1. Use only factory-formed threads. Field-cut threads are not permitted.
  - 2. Use only non-hardening, nontoxic thread sealant.
  - 3. When connection is plastic-to-metal, the plastic component shall have male threads and the metal component shall have female threads.
- D. Make metal-to-metal, threaded connections with non-hardening, nontoxic pipe sealant applied to the male threads only.
- E. Copper Pipe:
  - 1. Use flux and solder. Join pipe in manner recommended by manufacturer and in accordance with local codes and accepted industry practices.
  - 2. Solder so that continuous bead shows around the joint circumference.

# 3.06 INSTALLATION OF MAINLINE COMPONENTS:

- I. Master Valve Assembly: Install where indicated on the drawings.
- II. Flow Sensor Assembly: Install where indicated on the drawings according to manufacuture's installation guidelines.
- III. Isolation Gate Valve Assembly:
  - A. Install where indicated on the drawings.
  - B. Locate at least 12-inches from and align with adjacent walls or edges of paved areas.
- IV. Quick Coupling Valve Assembly: Install where indicated on the drawings.

# 3.07 INSTALLATION OF SPRINKLER IRRIGATION COMPONENTS:

- I. Remote Control Valve (RCV) Assembly for Sprinkler Laterals:
  - A. Flush mainline before installation of RCV assembly.
  - B. Install where indicated on the drawings. Connect control wires to remote control valve wires using 3M DBY-6 or DBR-6 waterproof connectors. Install connectors per the manufacturer's recommendations.
  - C. Install only one RCV to a valve box. Locate valve box at least 12-inches from and align with nearby walls or edges of paved areas. Group RCV assemblies together where practical. Arrange grouped valve boxes in rectangular patterns. Allow at least 12-inches between valve boxes.
  - D. Attach ID tag with controller station number to control wiring.
  - E. Install 2-wire decoder, per manufacture standards and recommendations.
  - F. Brand valve box lid with appropriate station number for each remote control valve. Branding device must create letters a minimum of 3-inches in height and 0.2-inches deep in lid.

# II. Sprinkler Assembly:

- A. Flush lateral pipe before installing sprinkler assembly.
- B. Install per the installation details at locations shown on the drawings.
- C. Locate rotary sprinklers 6-inches from adjacent walls, fences, or edges of paved areas.
- D. Locate spray sprinklers 3-inches from adjacent walls, fences, or edges of paved areas.

- E. Install sprinklers perpendicular to the finish grade.
- F. Supply appropriate nozzle or adjust arc of coverage of each sprinkler for best performance.
- G. Adjust the radius of throw of each sprinkler for best performance.

# III. Sprinkler Pressure Test Kit (if applicable):

- Use a Pitot tube and pressure gauge at the worst-case rotor sprinkler assembly, from the respective remote control valve. Adjust PRS-Dial at each rotor remote control valve, to provide the design operating pressure at the worst-case rotor sprinkler head. Typically the worst-case sprinkler is the sprinkler furthest from the remote control valve. Complete pressure adjustment for every rotor remote control valve.
- Using pressure gauge and necessary fittings, place pressure gauge on worst-case spray B. sprinkler, from the respective remote control valve. Adjust PRS-Dial at each spray remote control valve to provide an operating pressure of 30 PSI at the worst-case spray sprinkler head. Typically the worst-case sprinkler is the sprinkler furthest from the remote control valve. Complete pressure adjustment for each spray remote control valve.
- C. Turn over Pitot tube and pressure gauge to the City of Greeley at completion of construction.

### INSTALLATION OF DRIP IRRIGATION COMPONENTS: 3.08

- Remote Control Valve (RCV) Assembly for Drip Laterals:
  - Flush mainline pipe before installing RCV assembly.
  - Locate as shown on drawings. Connect control wires to remote control valve wires using B. wire connectors and waterproof sealant. Provide 3M DBRY-6 or DBR-6 connectors and sealant per manufacturer's recommendations.
  - C. Install only one RCV per valve box. Locate at least 12-inches from and align with nearby walls or edges of paved areas. Group RCV assemblies together where practical. Align grouped valve boxes in uniform patterns. Allow at least 12-inches between valve boxes. Brand controller letter and station number on valve box lid in 2-inch high letters.
  - D. Arrange grouped valve boxes in rectangular patterns.
- II. Inline Drip Tubing: Install inline drip tubing components in strict accordance with tubing manufacturer's details, guidelines, and recommendations.
- III. Flush Valve Assembly: Provide at end of each dripper line grid as show and directed on drawings and installation details. Install at least 12-inches from and align with adjacent walls or edges of paved areas. Brand "FV" on valve box lid in 2-inch high letters.

### INSTALLATION OF CONTROL SYSTEM COMPONENTS: 3.09

- I. Satellite Controller Assemblies:
  - A. The location of the Controller Assemblies as depicted on the drawings is approximate; the Project Manager will determine the exact site location during sprinkler layout review.
  - B. Assemble controller assembly, sensors, and appurtenance controller enclosure per authorized manufacturer representative recommendation and shop drawings. Provide pre-fabrication and testing of controller assembly by authorized Baseline distributor representative prior to installation in field. Provide installation observation and wire connections in field by manufacturer's personnel or trained distributor personnel.
  - C. Provide combination switch/GFCI outlet in accordance with local codes inside satellite controller assembly enclosure.
  - D. Provide electrical service connection for Controller Assemblies under direction and observation of manufactures' personnel or trained distributor personnel. Utilize existing electrical source. Provide primary surge protection arrestors on incoming power lines in

- accordance with control system manufacturer recommendations.
- E. Lightning protection: Drive grounding rod into soil its full length. Space rod and grounding plate according to manufactures installation guidelines regarding spacing from controller in order to achieve 10 ohms or less upon testing. Connect #6 AWG copper grounding wire to rod from plate using CADWELD connection. Install 6-inch round valve box over each CADWELD connection and grounding plate connection. Connection of grounding wire to the satellite must be per satellite manufacturer or distributor's recommendations.
- F. 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.
- G. Connect control wires to the corresponding controller terminal.

# II. Power Wire:

- A. Install with a minimum number of field splices. If a power wire must be spliced, make splice with recommended connector, installed per manufacturer's recommendations. Locate all splices in a separate 12-inch standard valve box. Coil 2 feet of wire in valve box.
- B. All power wire shall be laid in trenches. The use of a vibratory plow is not permitted.
- C. Green wire shall be used as the ground wire from power source to all satellites.
- D. Carefully backfill around power wire to avoid damage to wire insulation or wire connectors.
- E. Unless noted on plans, install wire parallel with mainline pipe. Install wire a minimum of 2-inches below top of PVC mainline pipe.
- F. Encase wire not installed with PVC mainline pipe in electrical conduit with a continuous run of warning tape placed in the backfill, 6-inches above the wiring.

### III. 2- Wire cable:

- A. Install with mainline pipe wrapping with tape spaced at 10-foot intervals.
- B. Provide a 5 feet excess length of 2-wire cable 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. Do not tie wiring loop. Coil 5 feet length of 2-wire cable within each remote control valve box. If a 2-wire cable must be spliced, make splice with wire connectors and waterproof sealant, installed per the manufacturer's instructions. Locate splice in a valve box that contains an irrigation valve assembly, or in a separate 12-inch standard valve box. Use same procedure for connection to valves as for in-line splices.
- C. Unless noted on plans, install wire parallel with and below PVC mainline pipe.
- D. Protect wire not installed with PVC mainline pipe with a continuous run of warning tape placed in the backfill six inches above the wiring.

# 3.10 INSTALLATION OF OTHER COMPONENTS:

- I. Tools and Spare Parts: Prior to the Review at completion of construction, supply to the Owner operating keys, servicing tools, spare parts, and any other items indicated in the General Notes on the drawings.
- II. Other Materials: Install other materials or equipment shown on the drawings or installation details that are part of the irrigation system, even though such items may not have been referenced in these specifications.

# 3.11 PROJECT RECORD DRAWINGS:

I. The Contractor is responsible for documenting changes to the design. Maintain on-site and separate from documents used for construction, one complete set of contract documents as Project

September 2019 IRRIGATION SYSTEM 32 80 00 - 14

Documents. Keep documents current. Do not permanently cover work until as-built information is recorded.

- II. Record pipe and wiring network alterations. Record work that 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.
- III. Prior to construction completion, obtain from the Owner's Representative an AutoCAD data file for this project. Using CAD, duplicate information contained on the project drawings maintained on site. Label each sheet "Record Drawing". Data delivered should conform to the current coordinate system used by the City of Greeley

which is HARN NAD83 State Plane US Survey Feet Northern Colorado projection. Vertical values should be captured in NAVD 88. Reference control point data can be obtained via the City of Greeley's web site within the GIS page or by contacting the GIS division at 970-350-9300.

- IV. Turn over the "Record Drawings" to the Owner's Representative. Completion of the Record Drawings will be a prerequisite for the Review at the completion of the irrigation system installation. The following items will need to be included:
  - A. Connection to pump assembly.
  - B. Routing of sprinkler pressure mainlines
  - C. Sprinkler control valves, decoders (valve number & decoder number)
  - D. Quick coupling valves.
  - E. Manual drains and stop and waste valves.
  - F. End of line flush valves
  - G. Control wire routing if not with pressure mainline.
  - H. Gate valves.
  - I. 2-Wirel wire, cable splices
  - J. 2 wire grounding locations
  - K. Soil moisture sensor locations (valve number its connected to)
  - L. Water meters, if any
  - M. Locations of all sleeving including size, quantity and depth of sleeve
  - N. Flow sensors
  - O. Pressure regulating valves

### 3.12 WINTERIZATION AND SPRING START-UP:

I. Winterize the irrigation system in the fall after the installation, and start-up the irrigation system the following spring. Repair any damage caused in improper winterization at no additional cost to the Owner. Coordinate the winterization and start-up with the landscape maintenance personnel.

### MAINTENANCE: 3.13

- Upon completion of construction and Review by the Owner's Representative, maintain irrigation I. 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.
- II. 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 after the landscape maintenance operation.

# 3.14 CLEANUP:

I. Upon completion of work, remove from the site all machinery, tools, excess materials, and rubbish.

### PART 4

# CITY OF GREELEY IRRIGATION CONTROLLER SPECIFICATION

# **Baseline Specification**

All irrigation controllers and online web management platform will be as manufactured by Baseline Control Systems. Controllers will be Base Station 3200 painted steel wall mounts and/or stainless-steel pedestals.

# **BaseManager Online Management System**

Real-time internet connectivity that works on any web enabled device. With the ability to run any number of controllers across two controller platforms, using one interface.

Map-based user interface utilizing Bing maps with interactive map icons, giving the user the ability to turn zones on and off with user defined runtime, learn flow on a single station, chart zone activity, view what programs the zone is in and its associated runtime, test electrical circuit providing an AC voltage at the solenoid, amp draw, voltage drop reading along the two-wire path, and custom notes. Ability to geo locate zones, master valves, moisture sensors, flow meters, hydrometers, event switches, temperature sensors, and custom markers on map interface through mobile access. Interactive map icons must be color coded with 11 different colors displaying current status of that device. Colors for zone icon activity status and program status must transcend the entire control platform from controller face plate, to mobile phone access, internet and or self-hosted management platform. System can be configured to send alerts and messages via text message and email.

All sensor status and activity must be available in all access points from controller, to mobile phone, and web platform access. System must be able to interface with a rain switch in a manner that allows for user defined start, stop and pause conditions. Weather Access and weather-based schedules programmed on a by zone basis in watering schedule, with the ability to combine timed runtimes, weather-based runtimes and soil moisture-based runtimes in the same program. Allowing for a combination of weather-based or soil moisture activated runtimes on the same zones, depending on specific needs.

Allow the ability to customize zone names, sensor names, and program names and populate those customized descriptions throughout the entire platform from controller face plate, to mobile phone access, internet and or self-hosted management platform.

Requires the ability to manage controller access between users, giving users access to specific controllers, while other users have access to the same controllers or different controllers.

Basemanager must be available as a cloud-based service provided by Baseline Systems, as a subscription-based access platform or a self-hosted server or virtual machine server-based platform.

Minimum security protocol requirements: AES256-bit encryption along with the TLS1.2 protocol.

# **Baseline Communication Methods**

All controllers must have the capability of utilizing all of the following methods of communication. Cellular (minimum of 4G), Ethernet, 900Mhz Ethernet Radio, Wi-Fi, and Two-Wire as a true two-way communication path. Must have the ability to connect to the online central without the use of a cellular modem device. Also, must be able to utilize 900Mhz Ethernet radio to connect multiple controllers to the internet through a single controller Ethernet and/or Cellular access point. Controller supports up to 8 available addresses for TCP/IP-based connections. These addresses are used to connect the following performance components: Flow station, SubStation, and Munro Pump Station.

# **Baseline Controller and Two-Wire Specification**

Wall mount controllers will be in powder coated steel or 304 grade stainless steel cabinets. Pedestal mount controllers will be in 304 grade stainless steel flip top pedestals mounts. Wall mount controller dimensions are: 15.5" x 12.38" x 6.4", 16-gauge powder coated steel or stainless steel. Pedestal mount enclosure dimensions are: 17.38" x 36.25" x 12.63" 16-gauge stainless steel. Controller display will meet the following minimum requirements: Built in full color display with High contrast 3.5-inch TFT LCD screen, resolution is 320x240 at 65,536 colors, screen brightness of 200 lumens for easy viewing in direct sunlight. Controllers must have a built in Ethernet port and be capable of running two-wire and conventional wire out of the same controller. With a zone count of up to 200 stations per controller in any combination of conventional and decoder stations, not exceeding the 200 stations. Controllers must utilize true two-way communication on the two-wire path. Controller is capable of operating non-irrigation zones with ease. Controller allows for operation of 15 concurrent zones and a up to 99 concurrent zones through the use of SubStations. Allows for the ability to back up and restore all programming and historical data with any USB flash drive. Controller will store all program and history information in its non-volatile memory. Controller will allow for the establishment of 3 levels of 4-digit PIN password protection: operator, programmer, and administrator.

Programming Features are as follows: All controllers must provide up to 99 automatic programs, with 8 programmable start times, allowing 1-15 concurrent zone to operate in each program, as long as it does not exceed the hydraulic and electrical limitations of the system. Controller will be able to utilize weather-based schedules, moisture sensor-based schedules and traditional runtime-based schedules and will allow for all three of these methods to be utilized in the same program. Other programming features must include: Water source prioritization, program prioritization, and intelligent water rationing. The controller allows a program to be started by the following options: Start time, moisture percent, temperature value, event switch contacts open or closed, pressure sensor readings.

Each controller must be able to read and manage up to 8 master valves and 8 flow sensors and utilize pressure readings to stabilize flow. Every controller will have the ability to monitor up to 25 soil moisture sensors. Pressure sensors can be used to create start, stop or pause conditions based on a user defined pressure reading. Controller will search for and identify all devices connected to the two-wire path and lists them according to device type and serial number.

Messaging and Alerts: Provides real-time soil moisture measurements and watering feedback to the user, alerts and alarms are self-diagnosed and displayed on the screen. Displays on-screen historical-run-time chart that includes time watered for the last 6 days of program, and a historical water use chart showing actual water used for the last 6 days by flow meter. Displays a 6-day scalable soil moisture history graph with integrated run-time bar chart. Displays high flow alerts, low flow alerts, pause messages and conditions, rain delays, wire faults, and other operating conditions.

Decoders will have built in diagnostic LED indicator lights that tell you at a glance the device is working. Two-wire must utilize true two-way communication on the two-wire path. Requires smart two-way communication allowing you to assign any decoder to a zone or function from the controller after the decoder has been installed in the field. Multi-station decoders can be assigned any station number in any order.

Available devices for two-wire include but are not limited to the following: Single station decoder, two station decoder, four station decoder, master valve decoder, dc latching decoder, event decoder, pump start switching

decoder, flow decoder, pause decoder and coach's button, and pressure sensor decoder. Controller must be able to identify every two-wire device connected to the two-wire path and must be able to list them in the controller. Controller is capable of re-addressing any station decoder to a new station number while leaving it installed in the field, by re-assigning the devices serial number to a new station number.

All decoders will be fully sealed, submersion-proof, and approved for direct bury, and will carry a standard 5-year warranty out of the box.

Acceptable wire and wire connectors for two-wire path: Paige P7072D or Regency 14/2 and 12/2 Maxi Wire, connectors will be DBR/Y-6. Other wire and wire connectors may be approved as an equal but must be submitted to owner prior to installation, and owner makes all final decisions on all specifications.

# Controller and Two-Wire Path Grounding and Surge Protection Specification

All installations should conform to manufacturer's instructions and must meet or exceed the American Society of Irrigation Consultants (ASIC) Earth Grounding Electronic Equipment in Irrigation Systems–Guidelines (htp://www.asic.org).

Grounding Electrodes In all cases where it does not conflict with appropriate grounding grid design for the site in question, grounding electrodes (such as rods or plates) referred to in this specification must conform to the following standards.

# Grounding Rods:

- All grounding rods must be bare copper of 5/8" diameter or greater and a minimum of 8' length or longer.
- Grounding rods must be located at a minimum distance to assure that the two-wire path is outside of the electrode sphere of influence for the grounding rod. For an 8' grounding rod, this means that the grounding rod must be connected at least 8' away from the two-wire path, at a right angle to the two-wire path. See the BL-LA01 Surge Arrestor Installation Guide for details on connecting the grounding rod to the device or surge arrestor.
- Install all grounding rods in a 10-inch round valve box to facilitate the use of a clamp-on ground resistance tester. If you use a smaller box, you will not be able to clamp the tester around the ground rod or the conductor.
- Drive grounding rods into the ground to a minimum of 8' in a vertical or oblique position. The angle of the rod relative to the vertical must be no more than 45°.

### **Grounding Plates:**

- All grounding plates must be a minimum of 5 square feet, as outlined in ASIC Earth Grounding Electronic Equipment in Irrigation Systems–Guidelines.
- Grounding plates must be located a distance equal to the diagonal measurement (the distance from one corner of the grounding plate to the opposite corner) of the grounding plate from the two-wire path. The longest side of the grounding plate must run parallel to the two-wire path.
- Install grounding plates in a horizontal position a minimum of 30" below ground level and below the frost line. Position the plate flat at the bottom of the trench.

Consult the ASIC Earth Grounding Electronic Equipment in Irrigation Systems–Guidelines for correct minimum recommended distances for different grounding rod or grounding plate sizes and grounding grid designs.

# Connections to Grounding Rods & Plates:

All connections to grounding rods/plates must conform to ASIC Earth Grounding Electronic Equipment in Irrigation Systems–Guidelines and must consist of either a CADWELD type or screw clamp type of connection. CADWELD or equivalent connections are preferred. All clamps must be suitable for direct burial or exothermic weld. The resistance reading on this connection should be less than 1 milliohm.

Any wire extensions required to connect from a grounding rod to a surge arrestor or enclosure ground lug must be 6-gauge bare copper wire and must not have any sharp bends, coils, or kinks. Wire extensions connected to surge arrestors must use a split bolt connector, CADWELD connector, or screw clamp connector where the bare copper

ground wire meets the green grounding wire from the surge arrestor.

Never use solder to make connections in the grounding system because it will melt during a lightning discharge.

# **Grounding Options:**

While the best option for grounding irrigation equipment is a direct physical connection to the earth, there are times when this is impossible or impractical. The following options are available for special cases. All other requirements in Baseline's Grounding Specifications apply.

- Controller Enclosure: When direct physical connection to the earth is not possible, the irrigation controller's enclosure ground can be connected to the building ground. However, DO NOT connect the two-wire surge arrestor ground to the building ground. The ground on an electrical receptacle (outlet) is not allowed and is not sufficient.
- Irrigation System on a Green Roof or Green Wall: When grounding the irrigation system on a green roof or green wall, the irrigation controller's enclosure ground can be connected to the building ground, and it is acceptable to connect the green wire from each surge arrestor to the building system ground.

# Two-wire Grounding with Surge Arrestors:

The surge arrestor is a critical part of the surge protection scheme for the two-wire path. Surge arrestors attach directly to the two-wire path and help dissipate electricity generated by nearby lightning strikes and other electromagnetic events. While two-wire components have optical isolators and other surge arresting features, the surge arrestor provides an extra measure of protection.

IMPORTANT: Surge arrestors are required for proper operation and for warranty coverage.

# Installation of Surge Arrestors:

- Connects directly to the red and black wires
- Attaches to grounding rod via the green wire
- Install in a valve box
- Surge arrestors must be connected to bare copper ground wires using split bolt connectors, CADWELD
  connectors, or screw clamp connectors suitable for direct burial (no wire nuts of any kind are supported for
  grounding wires).

# Two-Wire Grounding Installation:

Two-wire supports a large number and variety of wiring configurations. As more wires are connected to a piece of electronic equipment, more lightning energy enters the equipment, and a more substantial grounding grid must be used. Consult the Baseline Two-Wire Specification for more details. The two-wire must have properly installed surge arrestors as outlined in the Baseline Surge Arrestor Install Guide and elsewhere in this document. Surge arrestors must be installed as outlined below:

- The first surge arrestor on the two-wire path must be within 25' of the controller. This grounding point must be separate from the irrigation controller's enclosure grounding point.
- Place a surge arrestor every 600' on the two-wire path. Each surge arrestor protects a 300-foot radius of the two-wire path.
- In lightning prone regions, consider grounding every 300' rather than going out to the maximum distance.
- There must be a surge arrestor at the end of the two-wire that is the maximum distance from the controller or if looped at the point of maximum distance from the controller.
- Any branch of the two-wire that exceeds 50' must have a surge arrestor at the end.
- On an uninterrupted run of more than 600', it is acceptable to have a surge arrestor at each end. Note: On any wire run with no splices, do not cut the wire to install a surge arrestor, just place one at the end.

# Controllers in Steel Wall Mount Enclosures:

The following applies to all controllers, controller extensions, add on components, in steel wall mount enclosures. If the controller is on or within an existing building, the unit must be grounded as outlined below: The ground lug, located in the interior in the lower right region of the enclosure, must be connected directly to the building ground using a bare copper wire of 6 AWG or larger, as outlined in article 250 of the National Electric Code (NEC), so that

a single point of connection with the building ground is achieved. If the controller is mounted at a remote location more than 25' away from the building or grounded AC power source, the unit must be grounded as outlined below: A bare copper grounding wire of 6 AWG or larger must be connected from the ground lug to an appropriate grounding rod as outlined in the previous sections of this document.

### Controllers in Stainless Steel Enclosures:

If the controller is within 25' of an existing building, and is connected to the AC power system within that building, the unit must be grounded as outlined below: The ground lug, located in the interior on the back panel in the lower-left corner under the AC power box in the pedestal enclosure, must be connected directly to the building ground using a bare copper wire of 6 AWG or larger, as outlined in article 250 of the National Electric Code (NEC), so that a single point of connection with the building ground is achieved. If the controller is mounted at a remote location more than 25' away from a building or grounded AC power source, the unit must be grounded as outlined below: A bare copper grounding wire of 6 AWG or larger must be connected from the ground lug to an appropriate grounding rod as outlined in the previous sections, and in conformance with the ASIC Earth Grounding Electronic Equipment in Irrigation Systems—Guidelines.

IMPORTANT: All clamps used to connect the 6 AWG wire to the grounding electrode must be suitable for direct burial or exothermic weld.

# **Baseline Extended Ten Warranty**

All Baseline manufacturer specifications must be adhered to including all grounding specifications for the controller and or the two-wire path. Once the controller has been installed the contractor is required to have DBC Technical Service perform the Baseline/DBC Extended Warranty testing. All equipment must meet or exceed the testing standards set forth by Baseline Systems. Controllers must be grounded to 10 ohms or less. After you have installed your grounding system on the two-wire path, Baseline requires that you measure the ground resistance in order to prove that each grounding point meets Baseline's specifications. Resistance readings of 5 to 10 ohms are desirable, and a reading of no more than 25 ohms is required. DBC Technical Service will measure the ground resistance and will perform all other necessary testing, inspections and will submit all paperwork to Baseline for approval.

The Baseline Extended Ten Year Warranty Testing should be specified as follows:

DBC BASELINE EXTENDED WARRANTY CERTIFICATION DBC TO PERFORMGROUNDING OHMS TEST AT CONTROLLERS AND ALONG TWO-WIRE PATH CROUNDING RODS. CONTROLLERS MUST BE GROUNDEDTO 10 OHMS OR LESS, AND TWO-WIRE GROUNDING RODS (5-10 OHMS DESIRABLE) MUST BE 25 OHMS OR LESS. INCLUDES ALL FIELDINSPECTIONS AND SUBMISSION TO BASELINE FOR APPROVAL.

Important: Consult Baseline's Two-Wire Technical Specification and the Surge Arrestor & Grounding Specification for details on surge protection installation. Failure to install surge protection hardware to specification will void surge protection coverage under this warranty.

THIS WARRANTY IS LIMITED SOLELY TO BASELINE EQUIPMENT, AND DOES NOT WARRANT AGAINST DAMAGE CAUSED BY LIGHTNING OR OTHER POWER SURGES TO NON-BASELINE EQUIPMENT, WIRING, LANDSCAPE, OR FACILITIES. THIS WARRANTY DOES NOT COVER ANY EFFECTS TO LANDSCAPE OR PROPERTY DUE TO BASELINE EQUIPMENT'S OPERATION OR FAILURE TO OPERATE FOLLOWING A SURGE OR LIGHTNING STRIKE, NOR DOES IT COVER LABOR COSTS ASSOCIATED WITH TROUBLESHOOTING OR REPAIRS.

**END OF SECTION** 

### **DIVISION 2-SITE WORK**

SECTION 32 92 21 - TURF CONVERSION SOIL PREP AND SEEDING

### PART 1 - GENERAL

### 1.01 SUMMARY:

- I. Section Includes:
  - A. Turf Conversion Method 1 Tilling
  - B. Turf Conversion Method 2 Aerating
  - C. Fine grading and preparing areas to be seeded.
  - D. Furnishing and applying soil amendments.
  - E. Furnishing and applying fertilizer, herbicides.
  - F. Furnishing and seeding new areas.

### 1.02 DEFINITIONS

I. Fertilizer: Any material of natural or synthetic origin (other than liming materials) that is applied to soils or to plant tissues (usually leaves) to supply one or more plant nutrients essential to the growth of plants.

Finish Grade: Elevation of finished surface of planting soil.

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, defoliant, or desiccant.

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.

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.

Soil Amendment: Any material added to a soil to improve its physical properties, such as water retention, permeability, water infiltration, drainage, aeration and structure. The goal is to provide a better environment for roots.

Soil Conditioner: Any product which is added to soil to improve the soils physical qualities. Soil conditioner is considered a subset of soil amendments.

Subgrade: Surface or elevation of subsoil remaining after excavation is complete or top surface of a fill or backfill before planting soil is placed.

Subsoil: All soil beneath the topsoil layer of the soil profile and typified by the lack of organic matter and soil organisms.

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.

Turf Conversion Method 1 – Tilling: Irrigate conversion areas well, grow existing turf to vigorous health, Apply broad-spectrum herbicide, Wait 10-14 days, Apply broad-spectrum herbicide, Wait 10-14 days, Evaluate if additional application needed, Mow conversion area as short as possible, raking and removing all debris, Flag pertinent objects to avoid damage, ie: valve boxes, utilities, etc., Apply fertilizer – 4-1-1, 1 lb/1000 sf N (fescue and wheatgrass areas) and Biosol Forte (fertilizer/conditioner), 1200 lbs/ac (native grass areas), Till conversion area – 6" depth minimum, Remove rocks, clods, and debris, Recompact seedbed using irrigation, Drill seed with mycorrhizae, Irrigate

Turf Conversion Method 2 – Aerating: Irrigate conversion areas well, grow existing turf to vigorous health, Apply broad-spectrum herbicide, Wait 10-14 days, Apply broad-spectrum herbicide, Wait 10-14 days, Evaluate if additional application needed, Mow conversion area as short as possible, raking and removing all debris, Flag pertinent objects to avoid damage, ie: valve boxes, utilities, etc., Aerate using tine core aerator that pulls 2-3 inch plugs, three passes at different angles for turfgrass conversion, Aerate five to six times in different directions for grassland conversions, Drill or slit seed conversion area with appropriate grassland drill or slit seeder – seed in two directions. Add mycorrhizae in with seed, Drag entire areas with drag mat, Apply fertilizer – 4-1-1, 1 lb/1000 sf N (fescue and wheatgrass areas) and Biosol, 20lbs/1000 sf (native grass areas), Irrigate

Undesirable Plant Species including State designated Noxious Weeds as per the Colorado Noxious Weed Act (C.R.S. 35-5.5-101-119).

### 1.03 SUBMITTALS:

- I. Quality Control Submittals:
  - A. Certificates: State, Federal and other inspection certificates shall be submitted to the City prior to acceptance of material.
  - B. Native Grass Seed Mixes: Certification of grass seed from seed vendor including the composition of each grass-seed mixture, stating the botanical and common name, percentage by weight of each species and variety, percentage of purity, germination, and weed seed. Include the year of production and date of packaging. Seed packaging and identification tags are to be submitted to the owner at completion of seeding.
  - C. Wildflower Seed Mix: From seed vendor for each flower species 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. Contractor shall provide all seed tags from bags to the Project Manager. No payment for native seeding shall be made until tags are provided.
  - D. Imported Soil Amendment Test Report: Submit test analysis to City for acceptance prior to delivery of material.
  - E. Fertilizer: State, Federal and other certificates shall accompany invoices for materials showing sources of origin. Submit to City prior to acceptance of material.
  - F. Seeding Schedule: Submit in writing two copies of proposed schedule, indicating approximate dates for, site preparation, herbicide treatments, soil preparation and seeding. Schedule all work during specified seeding seasons.

### 1.03 DELIVERY, STORAGE AND HANDLING:

- I. General: Handle and transport in a safe manner in compliance with local state, and federal regulations. Comply with MSDS requirements.
- II. Fertilizer: Deliver inorganic or chemical fertilizer to site in original unopened containers bearing manufacturer's guaranteed chemical analysis, name, trade name, trademark, and conformance to state law, bearing name and warranty of producer.
- III. Soil Amendments: Do not stockpile. Distribute and till immediately upon arrival at site (same day).
- IV. Seed: Deliver seed in original sealed, labeled, and undamaged containers. All material shall be furnished in original manufactures shipping bags or containers and remain in these bags or containers until used. All materials shall be stored in a manner which will prevent them from coming into contact with precipitation, surface water, or other contaminating substances. All materials which have become wet, moldy or otherwise damaged in transit, or stored improperly shall not be used.

# V. Bulk Materials:

- A. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
- B. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water run-off, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
- C. Accompany each delivery of bulk fertilizers and soil conditions with appropriate certificates.

# 1.04 PROJECT/SITE CONDITIONS:

- I. General: Do not perform work when climate and existing site conditions will not provide satisfactory results.
- II. Site Information: The Contractor shall be held to have examined the site, to ascertain the state thereof and the conditions under which the work is to be done. Note: Drawings typically indicate the physical dimensions of the site, but do not show the extent of all obstructions and subsurface conditions.
- III. Existing Utilities: Protect from damage any sewer, water, gas, electric, phone, cable TV, irrigation or other pipe lines or conduits uncovered during the work until the matter has been reviewed by the City. If such lines are found to be abandoned and not in use, remove without extra cost. If such lines are found to be in use, carefully protect and carry on work around them. If City deems it advisable to move such lines, City will pay cost of moving.
- IV. Existing Site Features: Protect from damage as noted herein or on drawings.

# V. Vehicular Access:

- A. Vehicular accessibility on site shall be kept to a minimum. Repair damage to prepared ground and surfaces caused by vehicular movement during work under this Section to original condition at no additional cost to City. Repair, to original condition, vehicular damage to the surrounding area at no additional cost to the City.
- B. Only those vehicles identified with Company Name/Logo are allowed in the parks.

# VI. Environmental Requirements:

A. Install seed between spring and fall; March 15 - September 30.

- B. Do not install seed on saturated or frozen soil.
- C. Do not install seed until soil preparations have been approved by the City.
- D. Do not install seed until irrigation system is installed and tested.
- E. Proceed with planting only when existing and forecast weather conditions are suitable for work.

# **PART 2 - MATERIALS**

### I. Soil Amendments:

- A. Compost: One hundred percent (100%) humus rich organic matter. The compost shall be a well decomposed, stable, weed free organic matter derived from agricultural, food, or industrial residuals; biosolids (treated sewage sludge); yard trimmings, or source-separated or mixed solid waste. Product must be certified as fully composted at a permitted solid waste processing facility. Product to be registered with the Colorado Department of Agriculture and approved for use on Colorado Certified Organic Farms by the Division of Plant Industry of the State of Colorado. Product shall contain no solid particle greater than one-half inch (½") in length or diameter and be free from un-composted or non-stabilized wood bulking agents. Product shall contain no substances toxic to plants and shall be reasonably free (<1% by dry weight) of manmade foreign matter. The compost will possess no objectionable odors and shall not resemble the raw material from which it was derived.
- B. Provide analysis for the following:
  - 1. Organic Matter Content: 30 70% (dry basis)
  - 2. Soluble Salt Concentration (EC paste test): 5 dS (mmhols/cm) or less (as received)
  - 3. PH range: 5.5 to 8.0 (as received)
  - 4. Final carbon to nitrogen ratio: 20:1 or less.
  - 5. Nutrient Content (dry weight basis): N 1% or above, P 1% or above, K 0.5% or above.
  - 6. Bulk Density: 800 1,000 Ibs/yd<sup>3</sup>
  - 7. Moisture Content: 35% 55%
- C. Certification of Compost Testing: The Contractor shall furnish to the City a signed statement certifying that the compost furnished is from the lot that has been tested.

# II. Soil Conditioner:

- A. Organic slow release fertilizer (7-2-1), acceptable product: "Biosol Forte" or approved equal.
- B. Granular Humic Acid soil conditioner from a fresh water source, acceptable product: "Menefee Humate Soil Conditioner".

# III. Mycorrhizae Inoculant:

- A. Mycorrhizal Granular Inoculum. Acceptable product: "MycoApply Endo Granular".
- 1. Mycorrhizal Fungi: Dry, granular inoculant containing at least 5300 spores per lb (0.45 kg) of vesicular-arbuscular mycorrhizal fungi and 95 million spores per lb (0.45 kg) of ectomycorrhizal fungi, 33 percent hydrogel, and a maximum of 5.5 percent inert material.
- 2. Mycorryzal Inoculant: AM-120, as manufactured by Reforestation Technologies International, locally available from Pawnee Buttes Seed, Greeley, CO, (970) 356-7002.

# IV. Fertilizer:

- A. Depending on the turf conversion method determines when fertilizer should be applied.
  - 1. For Fescue and wheatgrass areas: Use 4-1-1, 1 lb Nitrogen (N) per one thousand (1,000) square feet.
  - 2. For all other native grass areas: Use Biosol (6-1-1), 20 lbs. per one-thousand (1,000) square feet.

# 2.02 SEED:

- I. Grass Seed: Fresh, clean, dry, new-crop seed conforming to all State and Federal regulations and complying with the Association of Official Seed Analysts', "Rules for Testing Seeds" for purity and germination tolerances.
  - A. Seed Mixture: Provide seed of grass species and varieties, proportions by weight, and minimum percentages of purity, germination. All materials furnished shall be free of prohibited noxious weeds and meet State and City standards for restricted noxious weeds.
  - B. Proportions and Mixing: All seed shall be mixed by a wholesale seed supplier in the proportions-necessary to obtain the application rate specified.
  - C. Labels: All seed and seed mixes shall be furnished in bags or containers clearly labeled to show the name and address of the supplier, the common, scientific and variety name(s) of the seed(s), the lot number, net weight, percent of weed seed content and the guaranteed percent of purity and germination.
  - D. Certification of Seed Testing: The Contractor shall furnish to the City a signed statement certifying that the seed furnished is from the lot that has been tested and comply with the Colorado Seed Law.
  - E. Wildflower seed mix "Native Prairie Wildflower Mix" premixed as provided by Pawnee Buttes Seed, Greeley, CO, (970) 356-7002.
    - Species include: Partridge Peas (Cassia fascicalata), Ox Eye Sunflower (Heliopsis helianthoides), Plains Coreopsis (Coreopsis tinctoria), Illinois Bundleflower (Desmanthus illinoensis), Black-eyed Susan (Rudbeckia hirta), Clasping Coneflower (Rudbeckia amplexicaulis), Kenab Purple Prairie Clover (Dalea purpurea 'Kaneb'), Blanket Flower (Gaillardia aristata), Annual Sunflower (Helianthus annuus), Lanced Leaved Coreopsis (Coreopsis lanceolata), Mexican Hat (Ratibida columnifera), Yellow Prairie Coneflower (Ratibida columnifera 'Yellow'), Evening Primrose (Oenothera caespitosa), Wild Bergamot (Monarda fistulosa), Canada Milkvetch (Astragulus candensis), Maximillian Sunflower (Helianthus maximiliani), Indian Blanket (Gaillardia pulchella), Western Yarrow (Achillea lanulosa), American Vetch (Vicia americana), Prairie Cinquefoil (Potentilla arguta)
- 2. Seed Mixes

SUNNY TURF MIX						
		% of mix by	PLS			
Scientific Name	Common Name	wt.	lbs/Acre	Seeds/lb	Seeds/SF	Season
Bouteloua dactyloides 'Sundancer'	Buffalograss, Sundancer	85	127.5	56,000	163.91	warm
Bouteloua gracilis 'Hachita'	Blue Grama, Hachita	15	22.5	825,000	426.14	warm
	,	100	150		590	
SALT TOLERANT MIX		100	200		330	
JALI TOLLIART WIX		% of mix by	PLS			
Scientific Name	Common Name	wt.	lbs/Acre	Seeds/lb	Seeds/SF	Season
Distichlis spicata	Inland Saltgrass	15	4.5	520,000	53.72	warm
Pascopyrum smithii 'Arriba'	Western Wheatgrass, Arriba	35	10.5	110,000	26.52	cool
Puccinellia distans 'Fults II'	Alkaligrass, Fults II	25	7.5	1,200,000	206.61	cool
Sporobolus airoides	Alkali Sacaton	25	7.5	1,750,000	301.31	warm
sporovous unoutes	Aikali Sacatoli	100		1,750,000		waiiii
NAVIJE A T.C.D.A.C.C. TUDE NAVV		100	30		588	
WHEATGRASS TURF MIX		0/ of main has	DLC			
Coloni Co None	Common Name	% of mix by	PLS	C d . /U.	C 1 - /CF	6
Scientific Name	Common Name	wt.	lbs/Acre	Seeds/lb	Seeds/SF	Season
Elymus lanceolatus ssp. psammophilus 'Sodar'	Streambank Wheatgrass, Sodar	18	54	156,000	193.39	cool
Elymus trachycaulua ssp. trachycaulus 'Pryor'	Slender Wheatgrass, Pryor	19	57	159,000	208.06	cool
Pascopyrum smithii 'Arriba'	Western Wheatgrass, Arriba	23	69	110,000	174.24	cool
Thinopyrum intermedium ssp. barbulatum 'Luna'	Pubescent Wheatgrass, Luna	40	120	100,000	275.48	cool
		100	300		851	
SHADE TOLERANT MIX						
		% of mix by	PLS			
Scientific Name	Common Name	wt.	lbs/Acre	Seeds/lb	Seeds/SF	Season
Elymus elymoides	Bottlebrush Squirreltail	20	7	192,000	30.85	cool
Festuca arizonica 'Redondo'	Arizona Fescue, Redondo	50	17.5	550,000	220.96	cool
Koeleria macrantha	Prairie Junegrass	10	3.5	2,315,000	186.01	cool
Poa secunda 'Hanford'	Sandberg Bluegrass, Hanford	20	7	1,047,000	168.25	cool
		100	35	,,	606	
NATIVE SHORTGRASS MIX		200				
TATIVE STICKTONASS WIIX		% of mix by	PLS			
Scientific Name	Common Name	wt.	lbs/Acre	Seeds/lb	Seeds/SF	Season
Bouteloua dactyloides 'Sundancer'	Buffalograss, Sundancer	20	6	825,000	113.64	
Bouteloua gracilis 'Hachita'	Blue Grama, Hachita	45	13.5	56,000	17.36	warm warm
Koeleria macrantha		-	3	-	159.44	
	Prairie Junegrass	10 25	7.5	2,315,000	18.94	cool
Pascopyrum smithii 'Arriba'	Western Wheatgrass, Arriba			110,000		cool
		100	30		309	
NATIVE MIDGRASS MIX		o, c	B1.0			
		% of mix by	PLS			_
Scientific Name	Common Name	wt.	lbs/Acre	Seeds/lb	Seeds/SF	Season
Bouteloua dactyloides 'Sundancer'	Buffalograss, Sundancer	14	4.2	825,000	79.55	warm
Bouteloua curtipendula 'Butte'	Sideoats Grama, Butte	22	6.6	191,000	28.94	warm
Bouteloua gracilis 'Hachita'	Blue Grama, Hachita	18	5.4	56,000	6.94	warm
Koeleria macrantha	Prairie Junegrass	8	2.4	2,315,000	127.55	cool
Pascopyrum smithii 'Arriba'	Western Wheatgrass, Arriba	25	7.5	110,000	18.94	cool
Schizachyrium scoparium 'Cimmaron'	Little Bluestem, Cimmaron	10	3	260,000	17.91	warm
Sporobolus cryptandrus	Sand Dropseed	3	0.9	5,298,000	109.46	warm
		100	30		389	

# 2.03 HERBICIDES:

I. Herbicide: EPA registered and approved, of type utilized by City of Greeley Parks Department.

- II. Applicators must possess both a Colorado Department of Agriculture license and City of Greeley pesticide applicator's license.
- III. The contractor making chemical applications must have a Qualified Supervisor on staff.

# 2.04 EROSION CONTROL NETTING, BLANKETS, MATS, FABRICS:

- I. Erosion control blankets, mats, of other commercial products for stabilizing disturbed areas may be required on certain projects. If so, the type, manufacturer, and installation method for these products will be agreed to prior to installation.
- II. Hydromulch: Wood cellulose fiber mulch shall consist of virgin wood fibers manufactured from clean whole wood chips. Fiber shall not be produced from recycled materials such as sawdust, paper, cardboard, or residue from pulp and paper plants. The wood cellulose fibers must maintain uniform suspension in water under agitation. Wood cellulose fiber shall conform to the following specifications:

Percent Moisture Content 10.0% +/- 3.0% Percent Organic Matter (Oven Dried Basis) 99.3% +/- 0.2% Percent Ash Content 0.7% +/- 0.2% pH 4.9 +/- 0.5 Water Holding Capacity 1200-1600 grams

Tackifier: A free-flowing noncorrosive powder produced either from the natural plant gum of *Plantago insularis* (Desert Indianwheat) or a pre-gelatinized 100 percent natural corn starch polymer.

Plantago insularis specifications:

pH 1% solution 6.5-8.0

Mucilage content 75% min (ASTM D 7047)

or

Pre-gelatinized 100 percent corn starch polymer

Organic Nitrogen as protein 5.5-7%

Ash Content 0.2% Fiber 4-5%

pH 1% solution 6.5-8.0

Size 100% thru 850 microns (20 mesh)

Settleable Solids <2%

# **PART 3 - EXECUTION**

# 3.01 EXAMINATION:

- I. General:
  - A. Verify that existing site conditions are as specified and indicated before beginning work under this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.
  - B. All work is to be performed by personnel thoroughly familiar with proper and accepted methods for soil preparation, herbicide applications, fertilizing, seeding, mulching, etc. All work is to be performed under the direct supervision of the Contractor's superintendent, who shall be thoroughly familiar with the provisions of these specifications.
- II. Damaged Earth: Inspect to verify that earth rendered unfit to receive planting due to concrete water, mortar, lime water or any other contaminant dumped on it has been removed and replaced with clean earth from a source approved by the Project Manager. All access roadways or compacted soil shall be ripped to loosen.

- III. Unsatisfactory Conditions: Report in writing to the City.
- IV. Acceptance: Beginning installation indicates acceptance of existing conditions by Contractor.

# 3.02 PREPARATION:

- I. Protection:
  - A. Locate structures, playground equipment, sewer, water, irrigation, gas, electric, phone, cable TV, other pipelines or conduits and equipment prior to commencing work.
  - B. Be responsible for proper repair to landscape, utilities, walls, soft surface paths, pavements and other site improvements damaged by operations under this section.

# II. Existing Vegetation:

- A. Contractor shall keep a log of all pesticide applications preformed throughout the duration of the project, detailing applications. Notes shall be submitted to Owner at the completion of project.
- B. Herbicides shall be applied using well maintained spraying equipment by individuals working for the Contractor who are appropriately licensed by the State or Federal agency having jurisdiction over such applications. It shall be the responsibility of the Contractor to be knowledgeable of any and all current laws and regulations pertaining to pesticide applications, and to advise the City immediately if any requests for applications made by the City are inappropriate as they pertain to these laws and regulations.
- C. Herbicides and other chemicals shall not be applied during periods when wind or other physical conditions cause the herbicides to be transported off site, or a distance of more than five (5') feet from the immediate area where they are being applied. It shall be the responsibility of the Contractor to notify the Project Manager immediately if any weather or other physical conditions exist which would make application inappropriate.
- D. All herbicides and other chemicals shall be applied at rates as determined by the Contractor and the Project Manager.
  - 1. Native areas:
    - a. New seeding areas: Existing vegetation, excluding trees and shrubs, in all areas designated to receive new native seed mixes, shall be sprayed with a contact non-selective post emergent herbicide (Roundup), a minimum of 10 days and a maximum of (3) weeks prior to the ripping/tilling process.
- 2. Reapply herbicide if necessary to insure complete kill of existing vegetation.
- E. Till existing turf into a depth of 8 inches minimum for the Tilling Turf Conversion method.
- III. Surface Grade: Remove existing grass, weeds, debris and rocks larger than one and one half-inches (1½") in all areas designated to receive seed. Verify that all rough grades have been established.
- IV. Runoff: Take measure and furnish equipment, materials, and labor necessary to control the flow, drainage and accumulation of water on and off the site, as intended by the grading plans.
- V. Erosion Control: Take measure and furnish all labor, materials, and equipment necessary to control and prevent soil erosion, blowing soil and accumulation of wind-deposited material on the site throughout duration of work.

# 3.03 INSTALLATION:

- I. SOIL/SEED BED PREPARATION:
  - A. General: All tilling operations shall be done in a direction which follows the natural contours of the land on slopes of 3:1 or less. Soils on slopes greater than three 3:1 will be prepared for planting in a manner specified by the City. Any irregularities in the ground surface resulting from soil preparation operations shall be corrected and sloped to drain as intended by the

September 2019

grading plans.

# B. Tilling:

- 1. Any required soil conditioners (e.g. organic soil conditioners, fertilizer, etc.) shall be uniformly spread on the surface of soil which is to be prepared as stated below and at the rates specified in section 3.03; II and 3.03; III, below.
- 2. Soil shall be tilled to a minimum of eight inches (8"), with agricultural sub-soiler in all areas to receive seed. This includes any areas compacted by construction traffic during the construction process, with four (4) passes in at least two (2) directions.
- 3. In areas where extremely stiff materials, or if debris is encountered during ripping, re-adjust equipment to avoid bringing up chunks of un-tillable material.
- 4. The soils shall be worked until it has become loose and friable and no clods greater than two inches (2") in diameter remain, unless directed otherwise by the Project Manager, prior to the addition of any soil amendments, seed, or mulch.
- 5. Remove stones larger than one and one-half inches (1½") in any dimension and sticks, roots, rubbish, and other extraneous matter.

### II. Soil Amendment:

A. Areas to receive Fescue and Wheatgrass Seed: Evenly distribute Class I Compost at 5cy/1000sf.

# III. Soil Conditioners:

- B. Areas to receive Native Seed: Evenly distribute Biosol Forte and Humate material in the native seed areas at the following rates:
- C. "Biosol Forte". Application rate used for bidding purposes: 1200 lbs/acre.
- D. "Menefee Humate Soil Conditioner". Application rate used for bidding purposes: 600 lbs/acre.
- E. "MycoApply Endo Granular". Application rate used for bidding purposes: 20 lbs/acre.
- F. Spreading the conditioners shall be accomplished with either a truck or trailer mounted spreader, capable of being adjusted to apply varying rates of material at a given speed.
- G. In areas inaccessible with a truck or trailer mounted spreader, the conditioners can be delivered and spread with a tractor and/or by hand.

### IV. Fertilizer:

- A. See 2.01; II above.
- B. Areas receiving organic soil conditioners:
  - 1. After applying soil conditioners and fertilizer, thoroughly till area to a depth of six inches (6") minimum by rototilling, harrowing, or disking until soil is well pulverized.
- C. Fill, compact and grade the site to within +/- 0.1' (1 3/16") of grades indicated and specified.

# V. Fine Grading in all areas to receive seed:

- A. Do fine grading for areas prior to seeding: Perform as required to maintain positive drainage, prevent ponding and direct run-off into catch basins, drainage structures, etc. and as required to provide smooth well-contoured surface prior to proceeding.
- B. Prior to Acceptance of Grades: Hand-rake to a smooth even surface with a loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions. Remove debris, clods, rocks, vegetable matter, and any other objects that may interfere with planting or maintenance operations. Limit fine grading to areas that can be planted in the immediate future.
- C. Establish finish grades to within one-half inch (½") of grades indicated.
- D. Noxious weeds or parts thereof shall not be present in the surface grade prior to seeding.
- E. Moisten prepared lawn areas before planting when soil is dry. Water thoroughly and allow the surface to dry before planting. Do not create muddy soil.
- F. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Leave
  September 2019 TURF CONVERSION SOIL PREP AND SEEDING

graded surface clean and free of trash and debris. Restore prepared areas if eroded or otherwise disturbed after fine grading and before planting.

### 3.04 SEEDING:

- I. The Contractor shall notify the Project Manager prior to any seeding work.
- II. The Project Manager will be on site during seeding operations and will collect representative samples of the seed used on the project for possible later testing for contract compliance.
- III. All prepared areas need to be firm, but not compacted, prior to seed application.

# IV. Native Areas:

- A. Seed the listed varieties in the areas designated on the drawings.
- B. All seed is to be drilled 0.25 inch to 0.50 inch into the soil at the specified PLS/acre rate listed in the Seed Mix Schedule, with a mechanical, power-drawn drill seeder. Rows shall be spaced not more than eight inches (8") apart.
- C. The contractor shall drill equal quantities in two directions at right angles of each other.
- D. Seeding rates need to be increased 50% on slopes 6:1 or greater.
- E. Seeding rates need to be increased 100% for areas that are seeded by hand broadcasting.
- F. Seeding native grasses into existing vegetation, or areas that have not been ripped and tilled to a minimum of 6 inches require the use of a seeder with:
  - 1. Double Disc openers with depth bands.
  - 2. Native Grass Seed Box with agitator and picker wheels.
  - 3. Press wheels.
  - 4. In hard ground areas, the Project Manager may require the use of a, no till Coulter unit.
- G. A cultipacker seeder (Brillion, Trillion type) is acceptable to use in well prepared (fine and firm) seed bed applications.
  - 1. The seeder should be equipped with seed boxes to handle the type of seed being planted.
  - 2. Native grass seed would need a seed box with an agitator and picker wheels.
  - 3. Seeding rates would need to be increased 50% with a cultipacker seeder since it is a broadcasting application.
- V. Broadcast Seeding: Some areas may be inaccessible to a drill. In these mutually agreeable areas, seed shall be uniformly broadcast at 2 times the specified rate. Seed is to be evenly distributed and sown in equal quantities, in two directions at right angles to each other. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Hand broadcasted seeded areas need to be raked in to provide a minimum of ½" cover and a maximum of ½" cover.
- VI. Watering Newly Seeded Areas.
  - A. Native areas:
    - 1. Native areas will have irrigation available, develop a schedule for establishment and long-term irrigation based on seed types and locations.
    - 2. Native areas without irrigation:
      - a. Spring Planting: Plan the planting operation to start as soon as the soil can be worked and prior to the spring rainy season.
      - b. Fall Planting: Place seed prior to the first hard frost in the fall, but after dormancy begins for the varieties being planted.
- VII. Companion Crops: Add the prescribed companion crop with the native seed mixes to be planted at the rate listed. If in doubt, coordinate with Project Manager.

VIII. Erosion Protection: Follow SWMP requirements as necessary.

- A. Slopes of 6:1 or less require no erosion protection.
- B. Protect seeded slopes exceeding 6:1 against erosion with jute or coir-fiber erosion-control mesh installed and stapled according to manufacturer's recommendations or hydromulch and tackifier.
  - 1. Hydromulch application rate 2000 lbs/acre
  - 2. Tackifier application rate 100 lbs/acre
    - a. Wood cellulose fiber mulch and tackifier shall be added to water to form a homogeneous slurry. The operator shall spray apply the slurry mixture uniformly over the designated seeded area.
- C. Protect seeded slopes exceeding 4:1 against erosion with erosion-control blankets installed and stapled according to manufacturer's recommendations.

# 3.05 NOTIFICATION AND INSPECTION:

- I. Inspection: Provide notice to Owner requesting inspection at least seven (7) days prior to anticipated date of completion.
- II. Deficiencies: If deficiencies exist, the City shall specify such deficiencies to the Contractor who shall make satisfactory adjustments and will again notify the City for final inspection.

# 3.06 CLEANING:

I. Cleaning: Remove and haul from the site all excess materials and debris generated during the construction process. Perform daily cleaning during installation of the work, and upon completion of the work. Clean paved and finished surfaces soiled as a result of work under this section. Clean out drainage inlet structures as required. Repair any and all damage.

# 3.07 PROTECTION:

I. General: Provide and install barriers as required and as directed by the City to protect the seeded areas against damage from pedestrian and vehicular traffic until well established and accepted by the City. Provide any additional erosion control measures which are necessary for the successful establishment of grass areas.

### END OF SECTION

# **SECTION 32 97 00**

# LANDSCAPE MAINTENANCE

# PART 1 - GENERAL

# 1.1 RELATED DOCUMENTS

A. 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. The Work of this Section includes furnishing of all supervision, labor, materials, equipment and transportation required to maintain the landscape areas called for under this contract for the time period specified. The work includes but is not limited to: weed control, re-seeding, re-sodding, mowing, weed control, watering of plant material and pruning, irrigation system repair and maintenance, fence installation and maintenance, maintenance of erosion control measures (BMP's) including storm water features and coordination with City staff.

# B. Related Sections:

- 1. Division 01 Section "Submittals".
- 2. Division 01 Section "Erosion and Sedimentation Control".
- 3. Division 32 Section "Irrigation System".

# 1.3 INSPECTION AND ACCEPTANCE

- A. Formal Inspections: The project will be inspected during the Maintenance and Guarantee Period at the following points:
  - 1. Substantial Completion Inspection
  - 2. Establishment Inspection
  - 3. Quarterly Inspections
  - 4. Final Inspection (just prior to the end of the Warranty and Maintenance Period)
- B. Additional inspections and observations to monitor maintenance and landscape conditions will be done throughout the Maintenance and Guarantee Period by the City of Greeley Parks, Recreation and Libraries (CPR) Project Manager.
- C. Substantial Completion Inspection: At the completion of operations under this contract, and prior to the beginning of the maintenance and guarantee period, the substantial completion inspection will be performed. At the time of this inspection, the Contractor shall have all planted and landscape areas complete and irrigation system operational. All fencing and protection shall be in place. All debris and litter shall be cleaned up and all walkways and curbs shall be cleaned of soil and debris left from installation operations. The inspection will not occur until these conditions are met. Also see Division 1 Section "Contract Closeout".
- D. Establishment Inspection: Shall occur approximately 30 days after Substantial Completion. The review will consist of a review of seeded areas. The inspection will be to review germination of seed areas and to check for signs of stress in the existing plant materials.
- E. Quarterly Inspections: Shall occur quarterly from the date of Substantial Completion. The review will consist of a review of all maintenance contract responsibilities. The Contractor

- shall keep a quarterly report to be turned in at inspections to review work done to date, including any subcontracting, frequency of schedule, notifications made, materials list, equipment list etc.
- F. Final Inspection and Acceptance: The Contractor must give 7 days prior notice to the City of Greeley CPR Project Manager requesting a Final Inspection in conformance of Division 1 requirements. During the inspection, the City of Greeley CPR Project Manager shall prepare a list of any defects discovered during such final inspection ("punch list") and submit the punch list to the Contractor. If in the opinion of the City of Greeley CPR Project Manager that all work has been completed or performed per the contract documents the City of Greeley CPR Project Manager will provide the Contractor with written notice of Final Acceptance. Final acceptance by the City of Greeley CPR Project Manager will not be given until all deficiencies are corrected.

### 1.4 SUBMITTALS

- A. See Division 01 Section "Submittals" for submittal requirements.
- B. Maintenance Reports: Submit detailed maintenance quarterly reports and schedules for the Maintenance and Guarantee Period for review and approval by the City of Greeley CPR Project Manager.
- C. Material List: Submit a detailed list of materials, to be used for seeding, fertilization, herbicides, pesticides that are to be used for seeding, weed control, plant health and mulching.
- D. Equipment List: Submit a detailed list of equipment and chemical controls to be used for weed control, seeding and mulching operations. Include brand and model number of all equipment to be used for soil preparation and seeding activities.
- E. Work Examples: Submit list of three projects completed in the last two years of similar complexity to this project with name and location of project, Project Manager's name and telephone number, name of project landscape architect and telephone number. Include certifications held by contractor and subcontractor employees who will oversee the work during the maintenance period.
- F. Limits of Work Area: All improvements and maintenance within the project work area are included unless otherwise indicated on the Drawings or directed by the City of Greeley CPR Project Manager. Areas outside defined areas, as illustrated on the Drawings, will be maintained by that property owner.
- G. Performance of Work: The Contractor's work force and equipment shall be accepted by City of Greeley CPR Project Manager prior to the commencement of the maintenance period. The Contractor shall submit to the City of Greeley CPR Project Manager an outline of the equipment and crew sizes to be utilized throughout the maintenance period. Maintenance work shall not be divided among several Contractors but shall be done by one entity. In the event that the City of Greeley CPR Project Manager finds any items identified as unacceptable, Contractor shall make the revisions noted by the City of Greeley CPR Project Manager at no cost to the City.

- H. Scheduling / Progress Reports:
  - 1. Scheduling: Prior to the beginning of the Maintenance and Warranty Period, Contractor shall submit for approval to the City of Greeley CPR Project Manager a detailed schedule identifying all activities which are to be performed. Examples of such commitments include the regular intervals for weed control, fertilization, herbicide applications and mowings and other operations and the month and week which are scheduled for other major activities such as reseeding and mulching. It is not the City of Greeley CPR Project Manager's intent to require the Contractor to meet each deadline on a specific day, but merely to identify the general time periods for such activities. The Contractor may modify the schedule due to weather conditions, providing that City of Greeley CPR Project Manager is notified in advance of any changes.
  - 2. Notification: Contractor shall be required to notify the City of Greeley CPR Project Manager a minimum forty-eight (48) hours in advance of all major work so the Project Manager or Consultant have the option of being present at the time of the work. Examples of such work are: clean cultivation, mowing, spraying, seeding, mulching or other activities relating to the repair of landscape items. In the event that proper notification is not given by the Contractor, the City of Greeley CPR Project Manager shall have the right to require the Contractor to reschedule any such work until such time that the City of Greeley CPR Project Manager is available. The above provision applies only to work which could be perceived as normal or regularly scheduled maintenance, emergency repairs do not apply.
  - 3. Progress Reports: The Contractor shall submit quarterly progress reports during the growing season and quarterly progress reports through the winter. The written progress reports shall be sent to the City of Greeley CPR Project Manager outlining work completed, damage incurred, and problems encountered. Progress reports shall contain digital photo documentation of work.
  - 4. Site Meetings: Contractor shall meet, on site, with the City of Greeley CPR Project Manager and Park District staff on a quarterly basis to review the project status.
  - 5. After Hours Contact: Contractor shall provide one afterhours contact and telephone number.
- I. Maintenance Coordination: Contractor shall coordinate maintenance operations and activities with City of Greeley CPR Project Manager. Failure to Perform: In the event that, in the City of Greeley CPR Project Manager's opinion, action has not been taken on the part of the Contractor to properly maintain the project, the City of Greeley CPR Project Manager may take whatever action that is deemed necessary to affect such repairs and any costs incurred will be deducted from the Contract amount.
- J. Licenses, Taxes, and Insurance:
  - 1. Licenses: Contractor agrees to obtain and pay for all licenses required by the City, State and Federal governments that are necessary for legally conducting business. Contractor shall maintain all licenses and permits required for maintenance activities (e.g. herbicide application).
  - 2. Taxes: Contractor shall pay all applicable taxes, including sales taxes on materials supplied.
  - 3. Insurance: Contractor shall maintain all insurance policies in accordance with the General Conditions of the contract through the entire term of the maintenance and guarantee period.
- K. Payment Schedule: Payments shall be made as indicated in Measurement and Payment section.

# PART 2 - PRODUCTS

# 2.1 Herbicides:

- A. For Native Grass areas: "Milestone", as manufactured by Dow AgroSciences.
- B. For cultivated landscape areas: As approved by City of Greeley CPR Project Manager.

# **PART 3 - EXECUTION**

# 3.1 NATIVE SEEDING AREAS

A. Watering: All watering shall be done in such a way as to encourage establishment, deep root growth and drought tolerance. See Article 3.5 "Irrigation & Water Management", below.

# B. Weed Control:

- 1. Weed Control Prior to Initial Installation per Division 32 Section "Soil Preparation".
- 2. Weed control shall be done for the duration of the Maintenance and Warranty Period and when weed density meets or exceeds 12 plants per square yard. Weed control shall be completed by one of the following methods:
  - a. Clean Cultivation: Prior to finish grading and final soil preparation work, all areas to be seeded shall be clean cultivated with approved equipment. Clean cultivate using a rod weeder or other approved equipment tilling the ground no more than 2-inches deep. Contractor shall coordinate timing of clean cultivations with the vegetative conditions on the site. Exact timing of cultivations shall be adjusted to control weed germination on the site. It is the responsibility of the Contractor to clean cultivate as necessary to prevent excessive growth of vegetation. Undesirable species shall not be allowed to seed on the site. Bindweed shall not be clean cultivated but removed by herbicide spot applications.
  - b. Mowing: Mowing of annual undesirable species shall be done as a weed control method. Undesirable species shall not be allowed to seed on the site. Existing grass stands to remain shall not be mowed until late fall or early spring to encourage seed drop.
  - c. Chemical Control: Apply approved herbicides as needed to control establishment of annual and perennial weeds. Spot applications may be required. Contractor is responsible for ensuring seed establishment and that seed is not adversely affected by herbicide applications. Contractor shall use herbicides for specific species as recommended by CSU Agricultural Extension Service or Project Manager.
  - d. Spot Application Chemical Control: Apply herbicide by hand applicator directly to invasive annual and perennial weeds. Allow a minimum two weeks between application and any seeding activities.

# C. Reseeding:

- 1. Evaluate native grass areas every 90 days during the Maintenance and Warranty Period as to success of germination and coverage. Use the following criteria:
  - a. Reseed all areas that meet the following conditions:
    - 1) Areas of bare or dead grass greater than 18- by 18-inches square.
    - 2) Areas of weed density greater than 10 plants per square foot.

- 3) Areas with general density of specified grasses less than 24 plants per square foot.
- 4) Native grass areas should exhibit 75% coverage of vigorous grass growth at the time of the Final Inspection.
- 2. Reseed unacceptable areas as defined above. Reseeding, soil preparation and mulching shall comply with Division 32 Sections "Native Grass Seeding" and "Soil Preparation". Seed mixes may be revised (% of species) to better suit site conditions. If requested by City of Greeley CPR Project Manager, mix shall be revised at no additional cost to the Contract. Where drill seeding is not feasible, hand broadcast seed and rake into the soil to achieve 1/4- to 1/2-inch coverage of soil. The seed application rate shall be doubled in all areas where it is mechanically broadcast and quadrupled in areas requiring hand broad casting. Hydroseeding is not allowed.
- 3. Timing of reseeding shall be as specified herein. Upon the City of Greeley CPR Project Manager's written approval, the Contractor may reseed at a later date mutually agreed upon.

# 3.2 IRRIGATION SYSTEM AND WATER MANAGEMENT

- A. Contractor shall check all irrigation systems for proper operation after each mowing, and any deficiencies or adjustments shall be repaired prior to the next watering cycle. Any damage to system caused by Contractor's operations shall be repaired without charge to City.
- B. Contractor is responsible for following all City of Greeley restrictions and establishment rules for new landscapes.
- C. Contractor shall be responsible for providing an Establishment Watering Schedule, Transition Watering Schedule and a Maintenance Watering Schedule to the Project Manager, Operation Supervisor and the local irrigation controller manufacturer Field Representative (when applicable).
  - 1. All irrigation schedules and zone controller charts shall ensure that there will be no ponding or runoff of water during any of the scheduled times.
  - 2. Prior to any plant material being installed all schedules shall be provided to the Project Manager and Operations Supervisor.
  - 3. The water schedule templates are available from Water Conservation and the Project Manager.
  - 4. Contractor shall make any modifications to the programming as requested by the City of Greeley CPR Project Manager.
  - 5. Initial Irrigation (Days 1-21):
    Plants shall be adequately watered for the first 21 days after installation or until seeds have germinated and emerged.
    - a. Exact timing of irrigation cycles will depend on weather conditions, soil conditions, and speed of emergence of grass seed.
    - b. Short, frequent irrigation cycles shall be used.
    - c. Split cycles or the 'cycle and soak' feature must be employed to reduce erosion or run off in seeded areas.
    - d. Do not exceed 3-inches of total water per week.
    - e. Coordinate with irrigation system schedule and programming with the City of Greeley CPR Project Manager, City staff, and local irrigation controller manufacturer Field Representative.

- f. Do not over-water native seeded areas in a manner which eliminates components of the seed mix.
- g. Contractor shall submit a meter reading before and after establishment to verify water use.
- 6. Transition Irrigation (Days 22-60):
  - a. Less frequent, but longer watering cycles will provide moisture at depths that will encourage seedlings to continue to develop.
  - b. Allow the surface soils to dry slightly between watering to encourage deeper rooting.
  - c. Watering shall be done utilizing historic evapotranspiration rates for the current watering month(s).
  - d. Do not over-water native seeded areas in a manner which eliminates components of the seed mix.
- 7. Maintenance Irrigation (Days 61 End of Maintenance Period):
  - a. It is the responsibility of the Contractor to coordinate with Project Manager, Operations Staff, and local irrigation controller manufacturer Field Representative the programming of irrigation controllers, to properly irrigate plant materials and turfgrass.
  - b. Do not over-water native seeded areas in a manner which eliminates components of the seed mix.
- D. All damage to irrigation system during the landscape and irrigation maintenance period shall be repaired by the Contractor with identical materials.
- E. Time of Irrigation: Watering shall be done during the approved City of Greeley CPR allowed water window. Coordinate times with the City of Greeley CPR Project Manager.
- F. Winterization of Irrigation System: Under the maintenance period, the Contractor shall be responsible for winterizing irrigation pumps, if applicable, and draining irrigation system for the full maintenance period.
  - 1. Remove water from system by use of compressed air.
  - 2. Remove water from drip lines by opening flushing plugs.
  - 3. Submit a meter reading after winterization of the system has occurred to City of Greeley CPR.
  - 4. Winterization shall occur no later than October 15th unless a variance has been granted from the City of Greeley CPR Project Manager Project Manager.
- G. Spring Start-Up: The Contractor shall be responsible for starting up the irrigation system in the spring (April 15).
  - 1. Fully activate the system including controller start-up, in order to demonstrate that it is in full working order.
    - a. Any repairs that are needed as a result of improper winterization shall be corrected by the Contractor at no additional cost to the City.
  - 2. Correct all deficiencies and make any adjustments to ensure proper system function.
  - 3. Submit a meter reading prior to spring start-up to the City of Greeley CPR Project Manager.

- H. It shall be the responsibility of the Contractor to ensure the satisfactory operation of the entire irrigation system and workmanship within the project area. The entire system, including materials, shall be maintained to be complete and remain operable in every detail by the Contractor throughout the maintenance period, and the Contractor agrees to make any adjustments or repair any defects occurring within the maintenance period within 7 calendar days of notification by the City of Greeley CPR Project Manager.
  - 1. Contractor shall replace any materials with manufacturer's defects at no additional cost to City.
  - 2. Replacement of any equipment shall match that installed and designed on the irrigation plans unless a variance is granted from City of Greeley CPR Project Manager.
  - 3. Problems resulting in leakage or water waste shall be repaired within 12 hours of notification.
  - 4. Contractor is responsible for emergency repairs and or shut downs.
    - a. If Contractor neglects to perform these duties within the specified time, the City may make such repairs at the Contractor's expense.
    - b. In the case of an emergency, where in the judgment of the City, delay would cause serious loss or damage, repairs or replacement may be made by verbal communication and without notice being sent to the Contractor, and the Contractor shall pay the cost thereof.
- I. Any settling of irrigation trenches/backfill material during the maintenance period shall be repaired by Contractor's at no additional cost to the City.
  - 1. Contract documents shall govern irrigation replacement during maintenance period the same as new work.
  - 2. Replacements are to be made at no additional cost to the City.

Any vandalism to the irrigation system prior to final acceptance shall be repaired and/or replaced at Contractor's expense. Extraordinary acts of vandalism shall be discussed with the City of Greeley CPR Project Manager to determine payment for repairs.

**END OF SECTION 32 97 00** 

# APPENDIX A SOIL PROFILE AND CLASSIFICATION REPORT



May 2, 2019

Subject: Bittersweet Park: Soil Profile and

Classification, Greeley, Colorado

Job No. 19-0009

Sarah Boyd **City of Greeley** 100 10<sup>th</sup> Street Greeley, Colorado 80631

Dear Sarah Boyd,

This letter presents the results of a subsurface exploration program performed by GROUND Engineering Consultants, Inc. (GROUND) to evaluate the soil profile and classification at several locations within Bittersweet Park located at the northwest corner of 35<sup>th</sup> Avenue and 16ht Street in Greeley, Colorado. Our study was conducted in general accordance with GROUND's Proposal No. 1903-0480, dated March 5<sup>th</sup>, 2019.

Field and office studies provided information regarding surface and subsurface conditions, including existing improvements, the general vertical distribution of earth materials. Material samples retrieved during the subsurface exploration were tested in our laboratory to assess the engineering characteristics of the site earth materials. Results of the field, office, and laboratory studies are presented below.

This report has been prepared to summarize the data obtained.

Site Conditions: The existing site supports the Bittersweet Park. It is characterized by large open grassy areas with various trees with around a pond. The topography across the site was varied with slopes generally descending from the perimeter down to the pond

It is our understanding that areas within the park do not currently drain properly. Bittersweet Park Soil Profile Greeley, Colorado Page 2 of 3

At the time of our exploration, the area near test hole 3 had retained surface water due to a recent snow storm, while surrounding areas were comparatively less moist at the surface.

**Subsurface Exploration:** The subsurface exploration for the project was conducted on March 18<sup>th</sup>, 2019. Three (3) test holes were drilled at the project site with a truck-mounted continuous flight power auger rig to evaluate the subsurface conditions as well as to retrieve soil samples for laboratory testing and analysis. The test holes were drilled to depths of approximately 3 to 4 feet below existing grades. A representative of GROUND directed the subsurface exploration, logged the test holes in the field, and prepared the soil and bedrock samples for transport to our laboratory.

The approximate location of the test holes are shown in Figure 1. A log of the exploratory test hole is presented in Figure 2. Explanatory notes and a legend are provided in Figure 3.

Laboratory Testing: Samples retrieved from our test holes were examined and visually classified in the laboratory by the project engineer. Laboratory testing of a soil sample obtained from the subject site included standard property tests, such as natural moisture contents, grain size analyses, and liquid and plastic limits. Laboratory tests were performed in general accordance with applicable ASTM protocols. Results of the laboratory testing program are summarized in Table 1.

**Subsurface Conditions:** The subsurface conditions encountered in the test holes generally consisted of approximately 2 to 3 inches of topsoil / sod over silty sand materials to the test hole termination depths of approximately 3 to 4 feet below existing grades. Please see attached logs on Figure 2 for individual soil profiles.

**Sand** was silty and fine to medium grained, with non to low plasticity, loose to dense, moist to very moist, and dark brown to light brown in color.

**Groundwater** was not encountered in the test holes to the depths explored at the time of drilling. The test holes were filled immediately upon completion for safety. Groundwater levels can be expected to fluctuate, however, in response to annual and longer-term cycles of precipitation, irrigation, surface drainage, nearby rivers and creeks, land use, and the development of transient, perched water conditions.

Bittersweet Park Soil Profile Greeley, Colorado Page 3 of 3

**Drainage Observations:** The materials that were encountered during our exploration consisted largely of silty sand materials. The sand fraction of these materials was very fine in size based on our laboratory testing. These materials, especially when tightly packed, typically will not drain water effectively compared to more coarsely grained sandy materials.

Based on our field observations, the subsurface soil profiles at the three exploration sites generally appear consistent. We did not observe any layers of material that would provide a greater moisture infiltration rate that would improve drainage of surface waters down through the soil.

Additionally the area near Test hole 3 appeared to be relatively flat. The existing grading generally does not promote effective drainage of surface water. An area drain was observed to the southwest of this test hole, but the flat surface grading was not effective in moving the water to this drain. The density of the materials encountered in test hole 3 was also notably higher than that of the other



test holes and is likely contributing to poor surface drainage.

We trust that this provided the additional information that you needed at this time. If you have any questions, please contact this office.

Sincerely,

**GROUND Engineering Consultants, Inc.** 

Kelsey Van Bemmel, P.E.

Reviewed by Joseph Zorack, P.E.





GOOGLE EARTH AERIAL IMAGE (DATE UNKNOWN)

Indicates test hole number and approximate location.



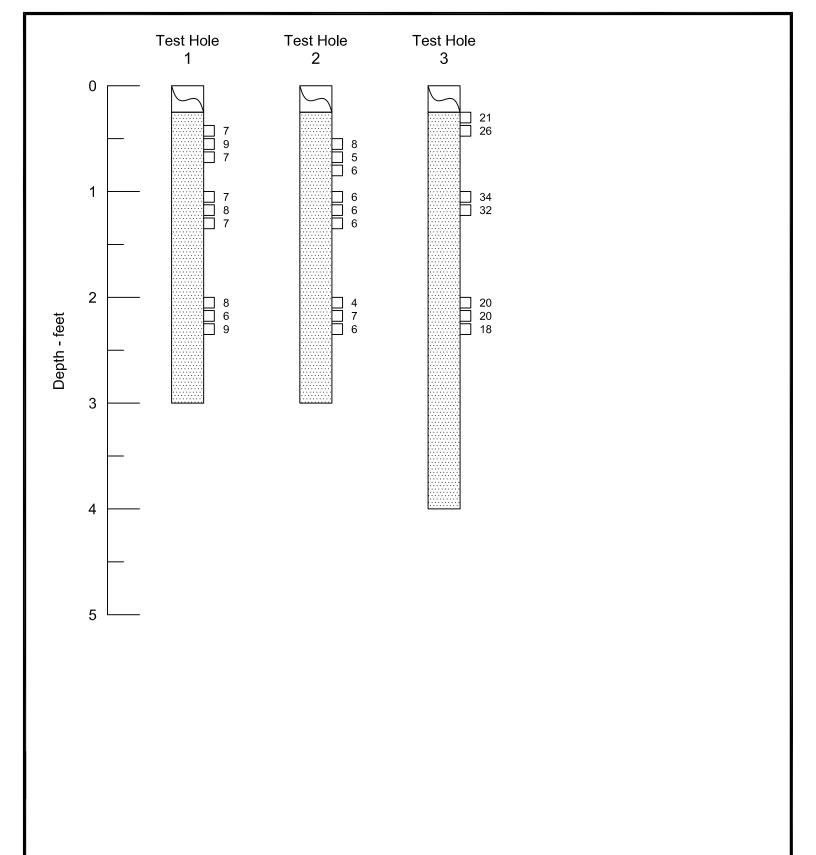
**ENGINEERING CONSULTANTS** 

LOCATION OF TEST HOLES

FIGURE: 1

CADFILE NAME: 0009SITE.DWG

JOB NO.: 19-0009



# GROUND

LOGS OF TEST HOLES

JOB NO.: 19-0009 FIGURE: 2

CADFILE NAME: 0009LOG1.DWG

LEGEND:	Topsoil
	Sand: The sand was silty and fine to medium grained, with non to low plasticity, loose to dense, moist to very moist, and dark brown to light brown in color.
I	
þ	CPT Measurments wre obtained with an S-200 Dynamic Cone Penetrometer. The Values measured roughly correlate to the Standard "N" Resistance Value (Standard Penetration Test). The "N" value is measured in blows per foot.

### NOTES:

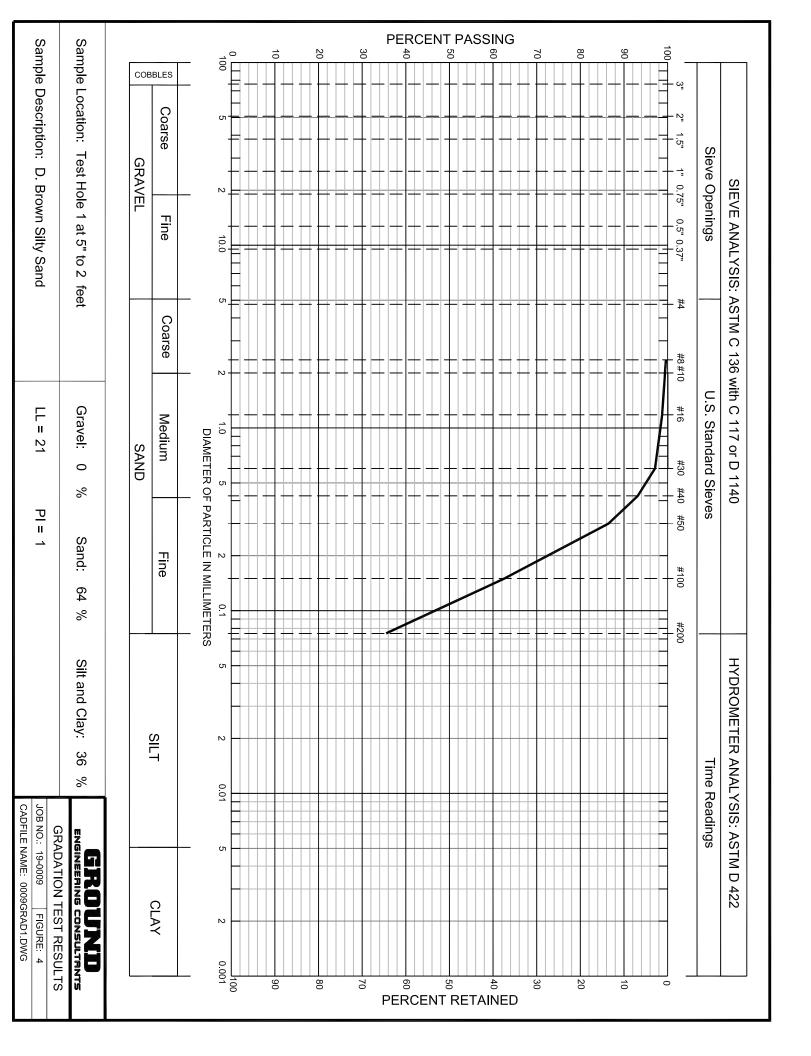
- 1) Test hole was drilled on 3/18/19 with 4-inch diameter continuous flight augers.
- 2) Location of the test hole was measured approximately by pacing from features shown on the site plan provided.
- 3) Elevation of the test hole was not measured and the log of the test hole is drawn to depth.
- 4) The test hole location and elevation should be considered accurate only to the degree implied by the method used.
- 5) The lines between materials shown on the test hole log represent the approximate boundaries between material types and the transitions may be gradual.
- 6) Groundwater was not encountered during drilling. Groundwater levels can fluctuate seasonally and in response to landscape irrigation.
- 7) The material descriptions on this legend are for general classification purposes only. See the full text of this report for descriptions of the site materials and related information.
- 8) The test hole was immediately backfilled upon completion of drilling, unless otherwise specified in this report.

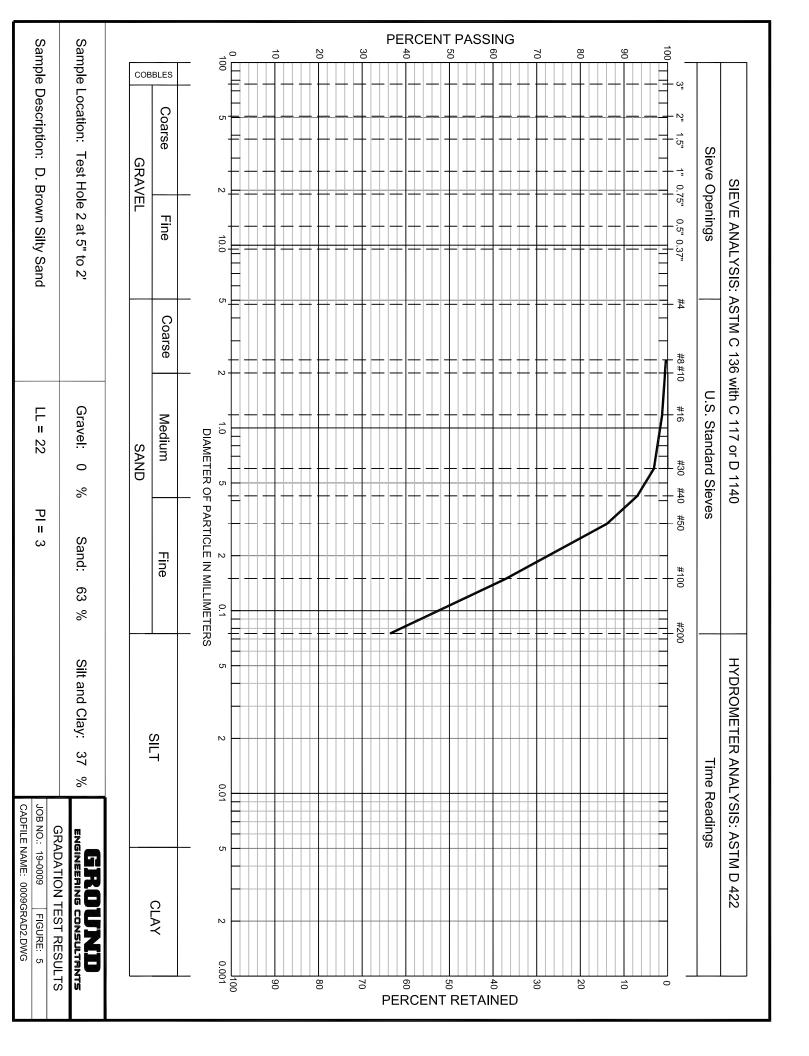


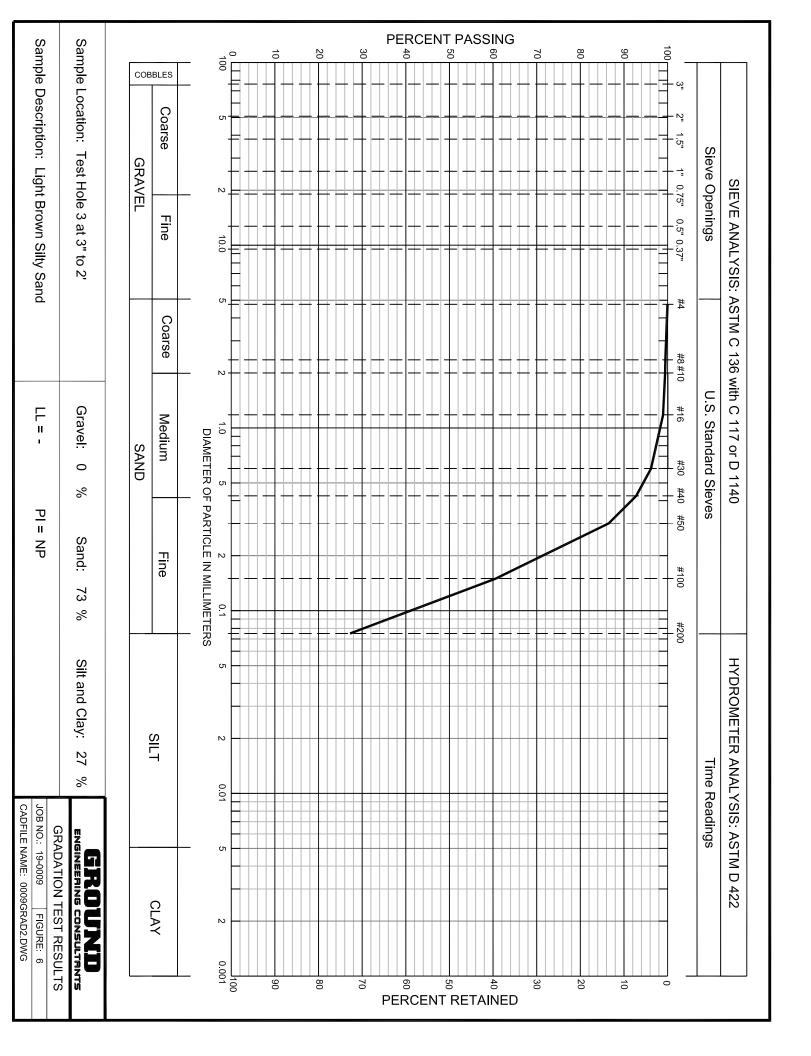
LEGEND AND NOTES

JOB NO.: 19-0009 FIGURE: 3

CADFILE NAME: 00009LEG.DWG









### **ENGINEERING**

# TABLE 1 SUMMARY OF LABORATORY TEST RESULTS

Sample	Location	Natural	Grad	ation	Percent	Atterbe	rg Limits	USCS	AASHTO	
Test Hole No.	Depth (feet)	Moisture Content (%)	Gravel (%)	<b>Sand</b> (%)	Passing No. 200 Sieve	Liquid Limit	Plasticity Index	Classifi- cation	Classifi- cation (GI)	Soil or Bedrock Type
1	5" to 2'	12.0	0	64	36	21	1	SM	A-4(0)	Silty Sand
2	5" to 2'	12.2	0	63	37	22	3	SM	A-4(0)	Silty Sand
3	5" to 2'	12.6	0	73	27	NV	NP	SM	A-2-4(0)	Silty Sandy

SD = Sample Disturbed, NV = Non-Viscous, NP = Non-Plastic

Job No. 19-0009



SYMBOL	MANUFACTURER	MODEL NO.	DESCRIPTION	DETAIL NO.
6000	RAIN BIRD	1806 SAM PRS WITH MPR SERIES	POPUP SPRAY HEAD	9
<b>♦</b> ■ <b>♦</b> ■	RAIN BIRD	NOZZLE  1806 SAM PRS WITH MPR SERIES NOZZLE (LOW GROW NATIVE)	POPUP SPRAY HEAD	9
D <sup>#2.0</sup> +4.0	RAIN BIRD	5006-PL-PC-SAM-SS-NP WITH #NOZ (X.01a -LOW ANGLE NOZZLES)	GEAR DRIVEN ROTOR	10
#8.0	RAIN BIRD	5006-PL-FC-SAM-NP-SS WITH #NOZ	GEAR DRIVEN ROTOR	
#6 #12 #12 #16	RAIN BIRD	6504-PC/FC-SS-NP WITH #NOZZLE	GEAR DRIVEN ROTOR	10
#2.0 #4.0	RAIN BIRD	5006-PL-PC-SAM-SS-NP WITH #NOZZLE (X.OLA -LOW ANGLE NOZZLES) (LOW GROW NATIVE)	GEAR DRIVEN ROTOR	10
#8.0	RAIN BIRD	5006-PL-FC-SAM-SS-NP WITH #NOZZLE (LOW GROW NATIVE)	GEAR DRIVEN ROTOR	10
● <sup>B</sup>	RAIN BIRD	RMS-M-B-C-1402, RMS-SOCK	ROOT WATERING BUBBLER	13
•	RAIN BIRD	PESB W/ BL-5201 DECODER	ELECTRIC CONTROL VALVE (1" - 2")	8 \$ 22
•	RAIN BIRD	300-BPES W/ BL-5201 DECODER	3" ELECTRIC CONTROL VALVE	17 & 22
▼ (A)	RAIN BIRD  BASELINE	BL-3200X BASELINE 2-WIRE WALL MOUNT CONTROLLER, WITH BL-CM4GX-VZ CELLULAR MODEM, (200 ST.) INCLUDES SITE VERIFICATION, GROUNDING CERTIFICATION AND CERTIFIED START-UP SERVICES (BY AN APPROVED CERTIFIED BASELINE DISTRIBUTOR)	QUICK COUPLING VALVE  ELECTRIC CONTROLLER	4 1 <b>\$</b> 2
<b>M</b>		LINE SIZE - 2½" AND SMALLER	GATE VALVE W/ SQ. NUTS	3
M		LINE SIZE - 3" AND LARGER	GATE VALVE W/ SQ. NUT	3
N/5	LEEMCO		MECHANICAL JOINT RESTRAINTS	6, SEE SHEETS
•	LEEMC <i>O</i>	SB"XX"C COUPLING WITH LH"XX"C TRANSITION RESTRAINTS & SS"XX" STIFFENERS - DR11 ("XX" REFERS TO PIPE SIZE)	TRANSITIONAL FITTING - HDPE TO PVC - LARGER THAN 2"	16
		CLASS 200 BE - 21/2" & SMALLER	PVC MAINLINE	5
		CLASS 200 RT - 3" & LARGER	PVC MAINLINE	5 \$ 6
		DR-11	HDPE MAINLINE	5, 6, 15 \$ 16
		CLASS 200 BE	PVC LATERAL	5
		CLASS 200 BE	PVC SLEEVING	6
		DR-9	HDPE SLEEVING	6 \$ 15
<u> </u>	RAIN BIRD	XCZ-100-COM W/ BL5201 DECODER	SUBSURFACE VALVE ASSEMBLY	11 \$ 22
	SPEARS  RAIN BIRD	COMPACT 2000 SERIES  XFCV-06-12 RINGS SPACED PER DETAIL	1" END OF LINE FLUSH VALVE SUBSURFACE DRIPLINE RING - TREE	12 14 <b>\$</b> 17
		CLASS 200 BE	ROOT WATERING PIPE - 1" MIN.	5, 13, 15-17
	MATERMAN	AV-150 -1.5"	AIR RELIEF VALVE	20
FS	DATA INDUSTRIAL	IR220B-INSERT 2" W/ BL-5308 SENSOR DECODER	FLOW SENSOR	21
<b>-</b>	BASELINE	BISENSOR	SOIL MOISTURE SENSOR (OWNER WILL LOCATE THE MOISTURE SENSORS, LOCATIONS ON PLANS ARE FOR BIDDING ONLY)	25, 26 \$ 27
N/5	BASELINE	BL-5201	VALVE DECODER	22
N/5	BASELINE	BL-5308	FLOW SENSOR DECODER	21
<b>©</b>	BASELINE	BL-LAO1	SURGE PROTECTION	23
N/5	RAIN BIRD	MAXI-CABLE (#12-2)	2-WIRE DECODER CABLE	21 - 24
	STATION NO. — [	19 2" SIZE OF CONTROL VALVE		

## IRRIGATION HAND TRENCHING NOTES

- CONTRACTOR WILL BE RESPONSIBLE TO SUBMIT "TREE PROTECTION PLAN" FOR APPROVAL BEFORE ANY CONSTRUCTION IS ALLOWED. REFER TO SPECIFICATIONS FOR PROTECTION FENCING REQUIREMENTS.
- 2. TREES SHOWN ON IRRIGATION PLANS ARE APPROXIMATE.
- 3. EXISTING TREES ALL TRENCHING WITHIN THE TREE PROTECTION AREA OF THE EXISTING TREES SHALL BE DONE BY HAND OR USE OF AIR SPADE. CONTRACTOR TO NOTIFY PM 72 HOURS PRIOR TO ANY DIGGING WITHIN TREE DRIP LINES. MARK OUT PROPOSED PIPING ROUTING AND COORDINATE WITH PM AND FORESTRY FOR APPROVAL OF PIPE ROUTING, PRIOR TO ANY INSTALLATION. SEE SPECIFICATIONS FOR EXISTING TREE PROTECTION PROCEDURES.
- 4. NO IRRIGATION LINES SHALL BE LOCATED WITHIN DRIP LINE OF THE EXISTING TREE, IF REQUIRED PER PLANS, PRIOR APPROVAL OF THE CITY FORESTER OR PROJECT PM.
- 5. ALL PIPING WITHIN THE TREE PROTECTION AREA OF EXISTING TREES SHALL BE HAND DUG OR USE OF AIR SPADE. ROOTS OVER 2" IN DIAMETER SHALL NOT BE CUT. PIPING SHALL BE TUNNELED UNDER THESE ROOTS. WHEN IN DOUBT, CONTACT GREELEY PARKS FORESTRY DIVISION AND DISTRICT SUPERINTENDENT AND PROJECT MANAGER FOR DECISIONS.

CHALK OR PAINT PROPOSED LATERAL PIPE ROUTING WITHIN DESIGNATED TREE MASSES AND OBTAIN APPROVAL FROM PROJECT MANAGER AND GREELEY DEPARTMENT OF FORESTRY AND DISTRICT REPRESENTATIVE PRIOR TO TRENCHING AND/OR PLOWING OF PIPING AND/OR EXCAVATING FOR HEAD INSTALLATION.

# IRRIGATION CONSTRUCTION NOTES

- 1. DRAWINGS AND BASE INFORMATION ALL BASE AND PLANTING INFORMATION HAVE BEEN PROVIDED BY MATRIX DESIGN GROUP. THE CONTRACTOR IS RESPONSIBLE TO NOTIFY HYDROSYSTEMS\*KDI OF ANY DISCREPANCIES BETWEEN THE UTILITY OR PLANTING PLANS AND THE IRRIGATION PLAN. IF CONTRACTOR FAILS TO NOTIFY HYDROSYSTEMS\*KDI AND MAKES CHANGES TO THE IRRIGATION SYSTEM DESIGN, HE ASSUMES ALL COSTS AND LIABILITIES ASSOCIATED WITH THOSE FIELD CHANGES. REFER TO SPECIFICATIONS FOR ADDITIONAL PROJECT REQUIREMENTS.
- 2. SYSTEM PRESSURE HYDROSYSTEMS\*KDI HAS BEEN TOLD THAT THE STATIC WATER PRESSURE FOR THE EXISTING PUMP STATION SHOULD BE 82 PSI AT 500 GPM ( 2 PUMPS TOTAL OF 1000 GPM -MAX. OPERATING GALLONS = 800 GPM). THE CONTRACTOR IS RESPONSIBLE TO FIELD VERIFY PRESSURE PRIOR TO COMMENCING ANY CONSTRUCTION AND NOTIFY HYDROSYSTEMS\*KDI OF ANY VARIANCE FROM THE STATED PRESSURE IMMEDIATELY. WRITTEN DOCUMENTATION OF PRESSURE TEST AND RESULTS SHALL BE PROVIDED TO HYDROSYSTEMS\*KDI AT CONSTRUCTION ONSET. IF CONTRACTOR FAILS TO FIELD VERIFY PRESSURE AND/OR NOTIFY HYDROSYSTEMS\*KDI OR ANY VARIATIONS FROM THIS PRESSURE, THEN HE ASSUMES ALL CONSTRUCTION AND ENGINEERING COSTS ASSOCIATED WITH SYSTEM MODIFICATIONS REQUIRED TO ACCOMMODATE ACTUAL SITE PRESSURE. THIS SYSTEM HAS BEEN DESIGNED FOR A REQUIRED STATIC PRESSURE OF 82 PSI MINIMUM.
- 3. IRRIGATION SYSTEM OPERATION INTENT THIS IRRIGATION SYSTEM HAS BEEN DESIGNED TO IRRIGATE THE ESTABLISHED LANDSCAPE WITHIN A SIX NIGHT PER WEEK, SIX HOUR PER NIGHT WATERING WINDOW. ESTABLISHMENT WATERING WILL REQUIRE UP TO TWICE AS MUCH IRRIGATION FOR A FOUR TO SIX WEEK PERIOD. THE DESIGN IS BASED ON THE FOLLOWING PROJECTED WEEKLY APPLICATION RATES AFTER ESTABLISHMENT. THESE FIGURES ARE BASED ON A 30-YEAR AVERAGE WEATHER DATA AND WILL NEED TO BE ADJUSTED DUE TO SEASONAL CHANGES AND MEATHER CONDITIONS ABOVE AND BELOW THE AVERAGE VALUES UTILIZED

BLUEGRASS TURF 2.05" PER WEEK PEAK SEASON ORNAMENTAL PLANTINGS 0.74" PER WEEK PEAK SEASON

NATIVE SEED MIXES 0.95" PER WEEK PEAK SEASON (TWO SEASONS)

NOTE: IT IS THE INTENT OF THIS DESIGN THAT NATIVE AREAS WOULD ONLY BE IRRIGATED FOR ESTABLISHMENT.

- 4. EQUIPMENT INSTALLATION IT IS THE INTENT OF THIS DESIGN THAT ALL IRRIGATION EQUIPMENT BE INSTALLED WITHIN PROPERTY LIMITS AND WITHIN LANDSCAPED AREAS. ANY EQUIPMENT OTHER THAN VALVE BOXES OR SLEEVING THAT CONTAINS PIPE OR WIRES SHOWN OUTSIDE OF THESE LIMITS IS SHOWN IN THAT LOCATION FOR GRAPHICAL CLARITY ONLY. ALL VALVE BOXES SHALL BE INSTALLED A MINIMUM OF 2'-O" FROM EDGE OF ANY PAVED SURFACES UNLESS INDICATED ON PLANS. ALL VALVE BOXES SHALL BE PLACED A MINIMUM OF 3'-O" FROM THE CENTERLINE OF ANY DRAINAGE SMALE. ALL VALVE BOXES MITHIN PAVEMENT SHALL BE TIER 15 RATED BOXES FOR HEAVY DUTY NON-DELIBERATE TRAFFIC. BOX LID COLOR SHALL BE PURPLE FOR RECLAIMED WATER SYSTEMS. REFER TO LANDSCAPE PLANS FOR MATERIAL COLORS AND TYPES.
- 5. POP-UP SPRAY NOZZLES CONTRACTOR TO INSTALL PLASTIC NOZZLES ON ALL POP-UP SPRAY HEADS. INSTALL 15 SERIES NOZZLES ON ALL HEADS SPACED AT 12' TO 14'. INSTALL 12 SERIES NOZZLES ON ALL HEADS SPACED 10' TO 11'. INSTALL 10 SERIES NOZZLES ON ALL HEADS SPACED AT 8' TO 9'. INSTALL 8 SERIES NOZZLES ON ALL HEADS SPACED AT 6' TO 7'. INSTALL 5' NOZZLES ON ALL HEADS SPACED AT 5'. INSTALL SIDE STRIP NOZZLES ON ALL HEADS WITH AN "S" DESIGNATION AND RIGHT AND LEFT CORNER STRIP NOZZLES ON ALL HEADS WITH AN "L" OR "R" DESIGNATION. VARIABLE ARC NOZZLES SHOULD BE UTILIZED ADJACENT TO CURVILINEAR SHRUB BEDS OR FOR ANY ANGLES THAT ARE NOT A STANDARD NOZZLE ANGLE. WHERE INDICATED, INSTALL LOW FLOW SQ SERIES SQUARE NOZZLES AT SPACING SHOWN.
- 6. DRIP IRRIGATION REFER TO IRRIGATION DETAIL SHEET FOR DRIP EMITTER QUANTITIES AND PLACEMENT.
- 7. UNLABELED PIPING ALL UNLABELED LATERAL PIPING SHALL BE 1" MINIMUM UNLESS OTHERWISE NOTED
- 8. SLEEVING ALL SLEEVING UNDER PAVED SURFACES SHOWN ON PLANS IS BY CONTRACTOR UNLESS OTHERWISE NOTED. SLEEVING SHALL BE INSTALLED IN THE SIZES AND QUANTITIES SHOWN ON PLANS OR BASED ON THE SCHEDULE BELOW. WHERE SLEEVES ARE SHOWN, BUT NOT LABELED, FOLLOW THE SCHEDULE BELOW. ALL MAINLINE, CONTROL WIRES AND DRIP LINES UNDER PAVED SURFACES ARE TO BE INSTALLED IN SLEEVING. ALL MAINLINE SLEEVE LOCATIONS TO INCLUDE A SEPARATE WIRE SLEEVE.

SLEEVED PIPE SIZE/WIRE QUANTITY REQUIRED SLEEVE SIZE & (QUANTITY) 1" - 11/4" PIPING 2" PVC (1) 4" PVC (1) 11/2" - 2" PIPING 21/2" - 3" PIPING 6" PVC (1) 4" PIPING 8" PVC (1) 6" PIPING 10" PVC (1) 8" PIPING 12" PVC (1) COMMUNICATION CABLE 2" PVC (1)

- 9. ADJUSTMENT CONTRACTOR SHALL FINE TUNE/ADJUST THE IRRIGATION SYSTEM TO REDUCE/AVOID OVERSPRAY ONTO HARD SURFACES BY ADJUSTING NOZZLE
- 10. SIMULTANEOUS ZONE OPERATION THIS IRRIGATION SYSTEM HAS BEEN DESIGNED TO OPERATE MULTIPLE ZONES SIMULTANEOUSLY BASED ON INDIVIDUAL ZONE FLOW. THE DESIGN IS INTENDED TO OPERATE MULTIPLE VALVES, UP TO THE MAXIMUM FLOW IN THE POINT OF CONNECTION NOTE. REFER TO CONTROLLER SPECIFICATION FOR MAXIMUM SIMULTANEOUS VALVE COUNT.
- 11. 2-WIRE SYSTEM NOTES CONTRACTOR SHALL INSTALL ALL TWO-WIRE COMPONENTS PER MANUFACTURES RECOMMENDATIONS AND STANDARDS.
- 11.1. CONTRACTOR SHALL USE ONLY MANUFACTURED 2-WIRE DECODER CABLE (SEE SCHEDULE FOR SPECIFIC 2-WIRE CABLE).
- 11.2. USE DIFFERENT COLOR 2-WIRE DECODER CABLE AS NOTED, IN EACH DIRECTION FROM CONTROLLER (BLUE FOR WEST LEG AND BLACK FOR EAST LEG.).
- 11.3. ONLY USE SINGLE STATION DECODERS (SEE SCHEDULE FOR SPECIFIC MODEL). 11.4. ONLY USE SENSOR DECODER FOR FLOW SENSOR (SEE SCHEDULE FOR SPECIFIC MODEL) IF INDICATED ON PLANS
- LOOP 5' OF 2-WIRE DECODER CABLE INTO ALL VALVE BOXES (WITH DECODERS AND SPLICES) FOR MAINTENANCE.
- 11.6. LOOP 2' OF 2-WIRE DECODER CABLE AS AN EXPANSION LOOP AT ALL CHANGES OF DIRECTION.
- 11.7. USE ONLY 3M DBRY WATERPROOF CONNECTORS ON ALL WIRE SPLICES AND ALL WIRE SPLICES ARE TO BE MADE WITHIN A VALVE BOX WITH CONTROL VALVES OR A SEPARATE 10" ROUND VALVE BOX FOR MIRE SPLICES.
- 11.8. INSTALL SURGE PROTECTOR RODS 8 LF. FROM VALVES, DECODERS, AND COMMUNICATION WIRE.
- 11.9. GROUND ALL DECODERS AND DECODER WIRE A MINIMUM OF EVERY 600' OF WIRE AND AT ALL ENDS OF 2-WIRE DECODER CABLE RUN.
- 11.10. LOOP EXTRA 10' OF 2-WIRE DECODER CABLE INTO A VALVE BOX AT PHASING LINES FOR FUTURE CONNECTION (IF INDICATED ON PLANS).
- 11.11. CONTROLLER TO BE GROUNDED PER MANUFACTURES STANDARDS AND REQUIREMENT.
- 12. DEMO NOTE -CONTRACTOR SHALL DEMO ALL IRRIGATION CONTROL VALVES, VALVE BOXES, SPRINKLER HEADS, QUICK COUPLER VALVES & GATE VALVES WITHIN PARK AREA. ABANDON ALL LATERAL PIPING AND MAINLINE PIPING IN PLACE.
- 13. MOISTURE SENSORS CONTRACTOR WILL BE RESPONSIBLE TO COORDINATE WITH THE OWNER THE INSTALLATION OF SOIL MOISTURE SENSORS AND THEIR LOCATIONS, PRIOR TO ANY INSTALLATION. LOCATIONS ON THE PLAN ARE SHOWN FOR BID PURPOSES ONLY -16 MINIMUM. INSTALL SENSOR AND CONNECT TO THE CONTROL VALVE MITHIN THAT HYDROZONE. ALL OTHER CONTROL VALVES MITHIN THAT HYDROZONE MILL BE PROGRAMMED TO THAT VALVE/SENSOR USING THE CONTROLLER PROGRAM. ALL SENSOR LOCATIONS WILL BE TRENCHED AND WIRED BACK TO THE VALVE BOX USING A 14-2 MAXICABLE.
- 13.1. CONTRACTOR TO ENSURE THAT ONE SOIL MOISTURE SENSOR GETS INSTALLED IN AT LEAST ONE SOD AREA, ONE NATIVE AREA, ONE SHRUB BED AREA, ONE DRIP ZONE TO TREES IN NATIVE AND ONE ZONE OF TREES IN GRAVEL/CRUSHER FINES PER CONTROLLER.
- 13.2. AFTER GROW IN PERIOD, CONTRACTOR IS RESPONSIBLE TO ADD SOIL MOISTURE SENSORS AS NEEDED COORDINATE WITH PARKS STAFF & IRRIGATION CONSULTANT PRIOR TO ANY INSTALLATION.
- 13.3. REFER TO DETAILS NO. 25 TO NO. 27, TYPICAL, REFER TO MANUFACTURE FOR INSTALLATION STANDARDS.

**IRRIGATION DETAILS** 

14. UTILITIES - UTILITIES SHOWN ON PLANS ARE FOR REFERENCE ONLY, CONTRACTOR WILL BE RESPONSIBLE FOR COORDINATING AND LOCATING ALL UTILITY WITHIN THE SITE PRIOR TO ANY CONSTRUCTION. COORDINATE ALL PRIVATE LOCATES WITH PARKS STAFF.

REFER TO SHEET IR-0 **IRRIGATION NOTES** & SCHEDULE IR-1 TO IR-10 **IRRIGATION PLANS** IR-11 TO IR-12 JOINT RESTRAINT PLAN

IR-13 TO IR-16



o: 303.980.5327

Irrigation Consulting & Water Management 860 Tabor Street, Suite 200 Lakewood, Colorado 80401

www.hydrosystemskdi.com

SHT SHT SHT 4 SHT SHT SHT 5 6 **KEY MAP** SHT SHT SHT 8 9 10

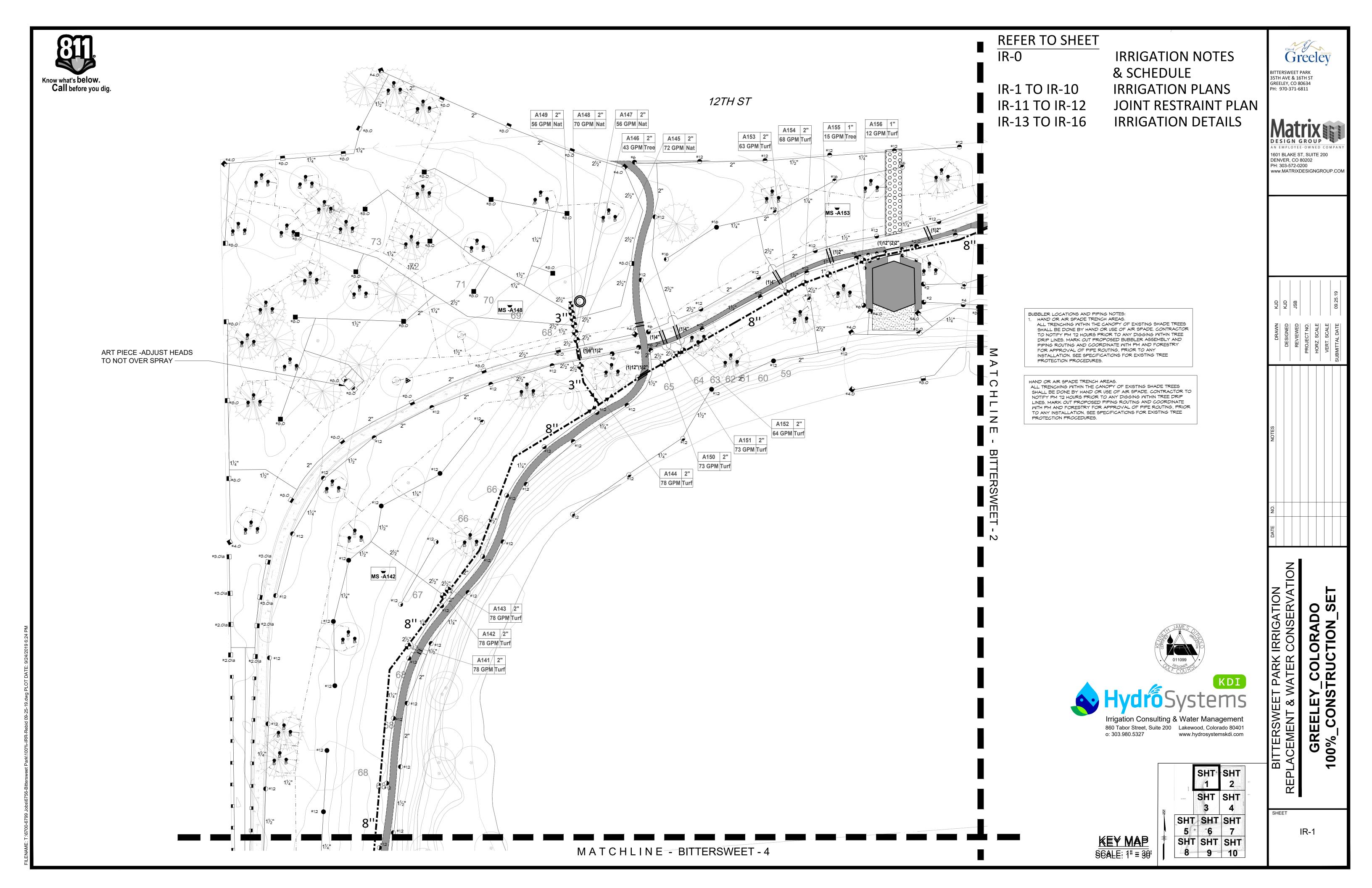
TTERSWEET PARK 35TH AVE & 16TH ST GREELEY, CO 80634 PH: 970-371-6811

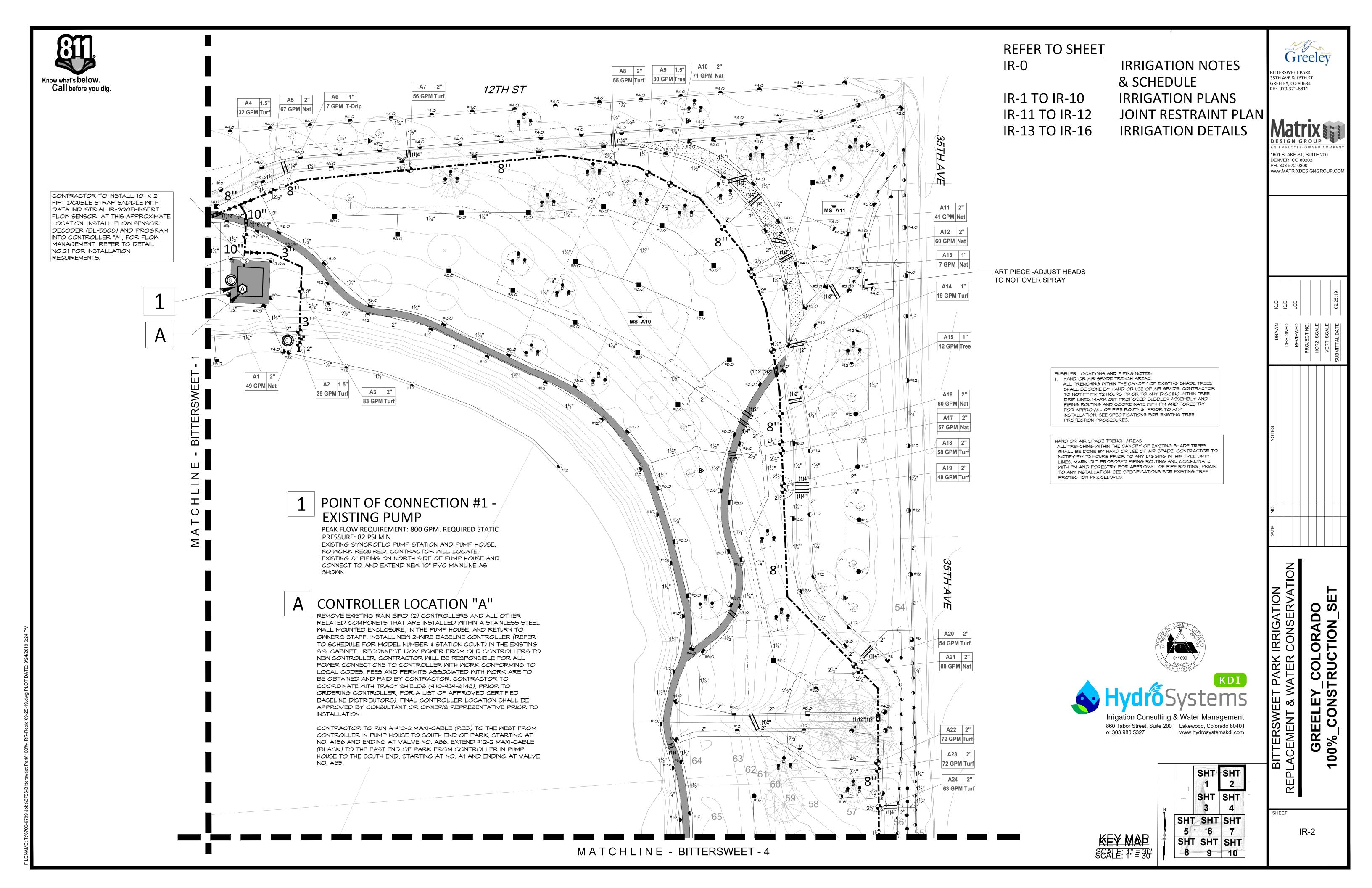
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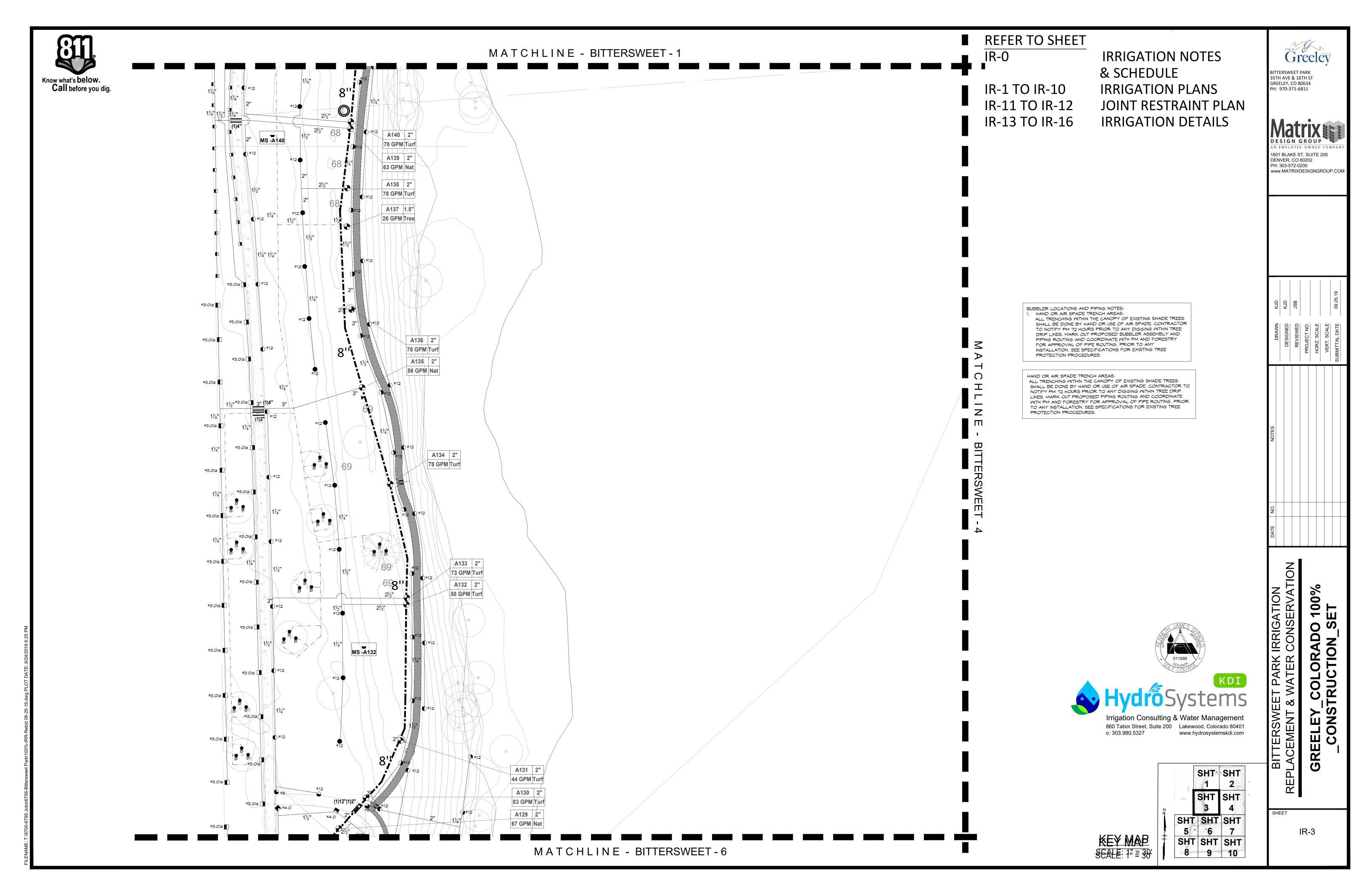
N EMPLOYEE-OWNED COMP 1601 BLAKE ST, SUITE 200 **DENVER, CO 80202** PH: 303-572-0200 www.MATRIXDESIGNGROUP.COM

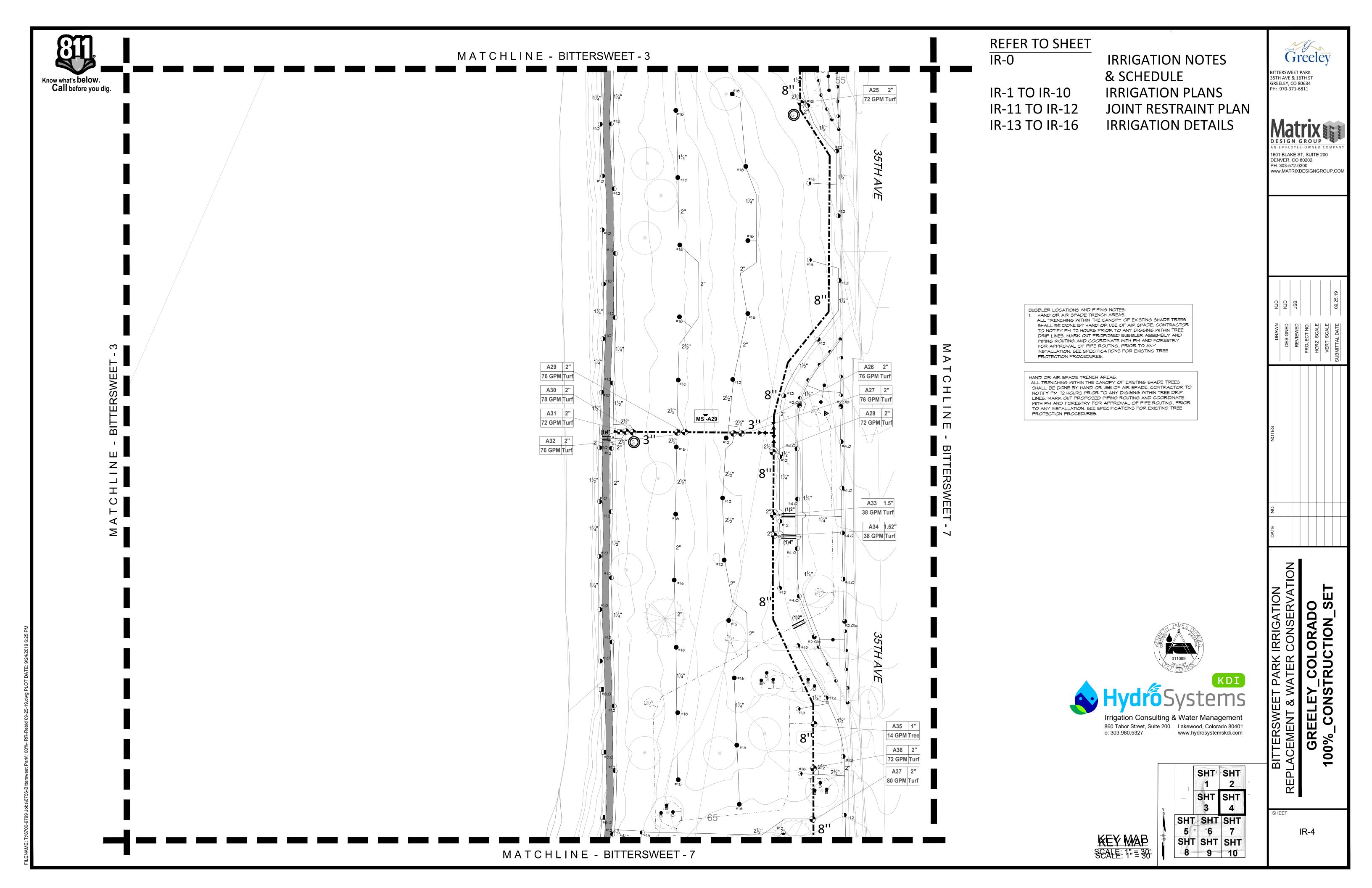
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IR-0 Know what's below.

Call before you dig. MATCHLINE - BITTERSWEET - 3 #3.0la A128 1" 2 GPM T-Drip A127 2" 64 GPM Nat A126 2" 74 GPM Nat A125 1" 6 GPM Drip EXTEND 1" PVC LATERAL LINE TO THIS POINT, INSTALL 1" PVC BALL VALVE AND INSTALL IN 10" ROUND VALVE BOX, FOR FUTURE CONNECTION TO DRIP LINE. USE EXISTING PVC SLEEVE SHOWN AT THIS APPROX. LOCATION. #2.0la A124 2" 42 GPM Nat A123 1.5" 36 GPM Turf MS -A123 RSW 76 GPM Turf INSTALL ONE 1.5" GATE VALVE AND EXTEND 1.5" PVC LINE AND DAY LIGHT A90 2" CLOSE TO WATER LINE, AT THIS 69 GPM Turf APPROX. LOCATION. TO BE USED AS A MANUAL DRAIN LINE, CONTRACTOR TO LOCATE AT LOW POINT ON MAINLINE. #2.0la 21 GPM Turf A92 2" 81 GPM Nat A93 1" #2.0la 13 GPM Nat ART PIECE -ADJUST HEADS #2.0|a TO NOT OVER SPRAY A94 2" 49 81 GPM Turf A122 2" 83 GPM Turf A121 1" 12 GPM Tree 152 GPM Turf 2½"

**REFER TO SHEET** 

IR-1 TO IR-10 IR-11 TO IR-12 IR-13 TO IR-16

BUBBLER LOCATIONS AND PIPING NOTES:

HAND OR AIR SPADE TRENCH AREAS.

PROTECTION PROCEDURES.

HAND OR AIR SPADE TRENCH AREAS.

ALL TRENCHING WITHIN THE CANOPY OF EXISTING SHADE TREES SHALL BE DONE BY HAND OR USE OF AIR SPADE. CONTRACTOR

TO NOTIFY PM 72 HOURS PRIOR TO ANY DIGGING WITHIN TREE

DRIP LINES. MARK OUT PROPOSED BUBBLER ASSEMBLY AND PIPING ROUTING AND COORDINATE WITH PM AND FORESTRY

ALL TRENCHING WITHIN THE CANOPY OF EXISTING SHADE TREES SHALL BE DONE BY HAND OR USE OF AIR SPADE. CONTRACTOR TO NOTIFY PM 72 HOURS PRIOR TO ANY DIGGING WITHIN TREE DRIP LINES. MARK OUT PROPOSED PIPING ROUTING AND COORDINATE

WITH PM AND FORESTRY FOR APPROVAL OF PIPE ROUTING, PRIOR TO ANY INSTALLATION. SEE SPECIFICATIONS FOR EXISTING TREE

FOR APPROVAL OF PIPE ROUTING, PRIOR TO ANY INSTALLATION. SEE SPECIFICATIONS FOR EXISTING TREE PROTECTION PROCEDURES.

**IRRIGATION NOTES** & SCHEDULE **IRRIGATION PLANS** JOINT RESTRAINT PLAN IRRIGATION DETAILS

BITTERSWEET PARK 35TH AVE & 16TH ST GREELEY, CO 80634 PH: 970-371-6811

1601 BLAKE ST, SUITE 200 DENVER, CO 80202 PH: 303-572-0200 www.MATRIXDESIGNGROUP.COM

Greeley

Y\_COLORADO STRUCTION\_SET GREELEY\_ 100%\_CONST

SHT

SHT SHT SHT 8 9 10

IR-5

860 Tabor Street, Suite 200 Lakewood, Colorado 80401 o: 303.980.5327 www.hydrosystemskdi.com

MATCHLINE - BITTERSWEET - 9

Know what's below.

Call before you dig.

**REFER TO SHEET** IR-0

IR-1 TO IR-10

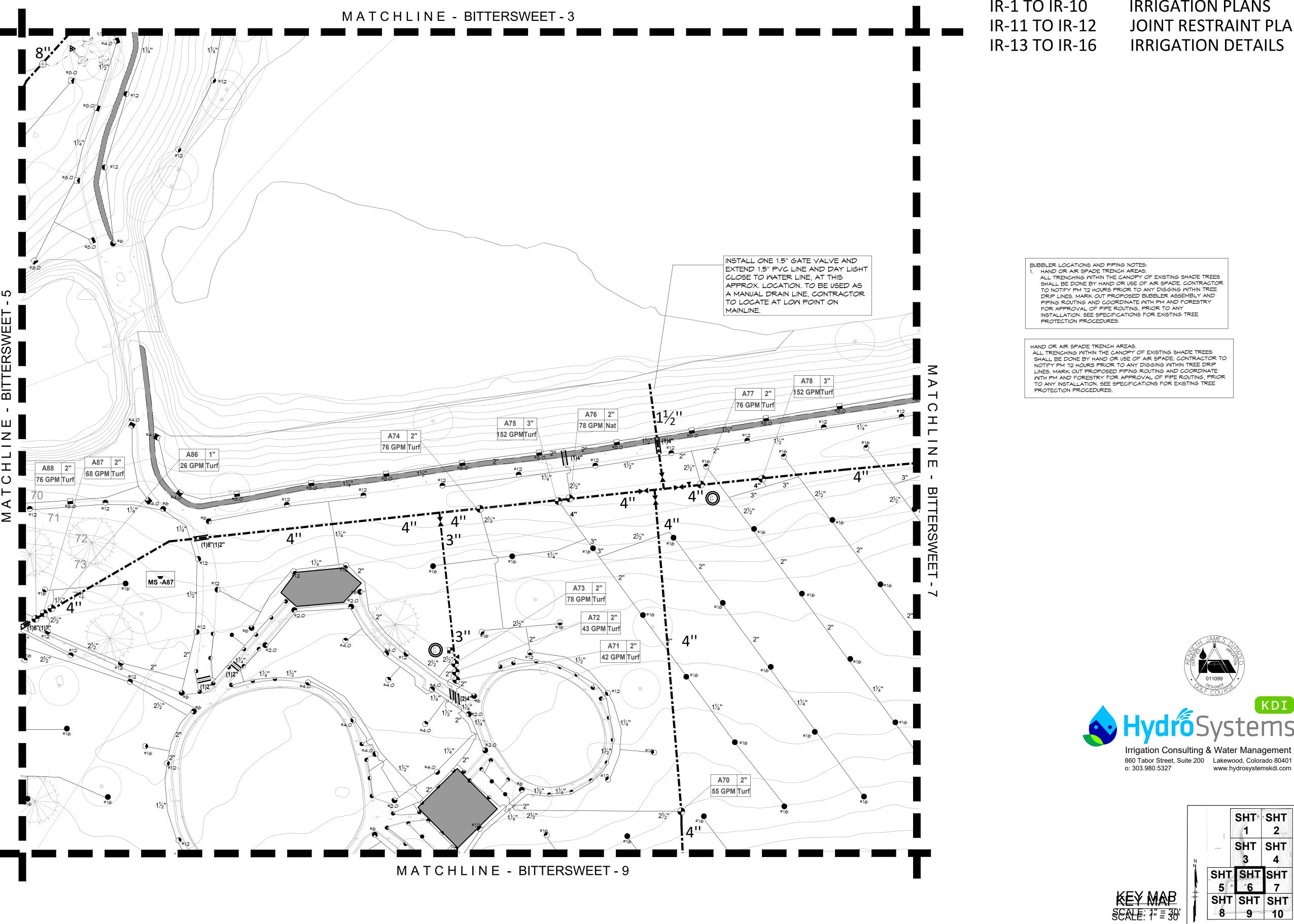
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Know what's below.

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**REFER TO SHEET** IR-0

IR-1 TO IR-10

**IRRIGATION NOTES** & SCHEDULE **IRRIGATION PLANS** JOINT RESTRAINT PLAN IRRIGATION DETAILS

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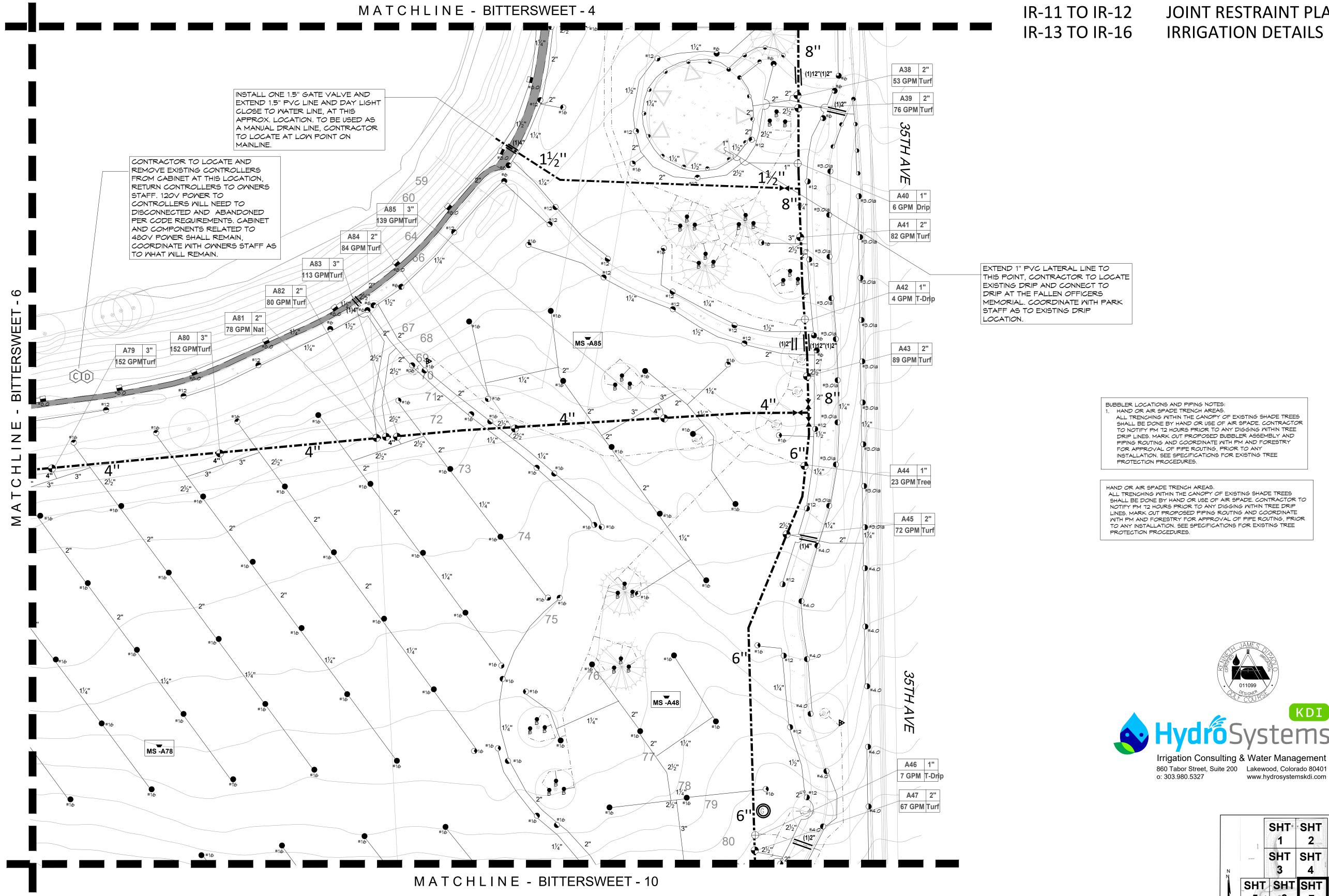
GREELEY\_COLORADO 100%\_CONSTRUCTION\_SE

BITTERSWEET REPLACEMENT & W

IR-7

SHT SHT SHT SHT SHT SHT SHT SHT 8 9 10

SEALE: 1" = 30'





REFER TO SHEET IR-0

> IR-1 TO IR-10 IR-11 TO IR-12 IR-13 TO IR-16

> > BUBBLER LOCATIONS AND PIPING NOTES:

PROTECTION PROCEDURES.

HAND OR AIR SPADE TRENCH AREAS.

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**IRRIGATION NOTES** & SCHEDULE **IRRIGATION PLANS** JOINT RESTRAINT PLAN **IRRIGATION DETAILS** 

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BITTERSWEET F REPLACEMENT

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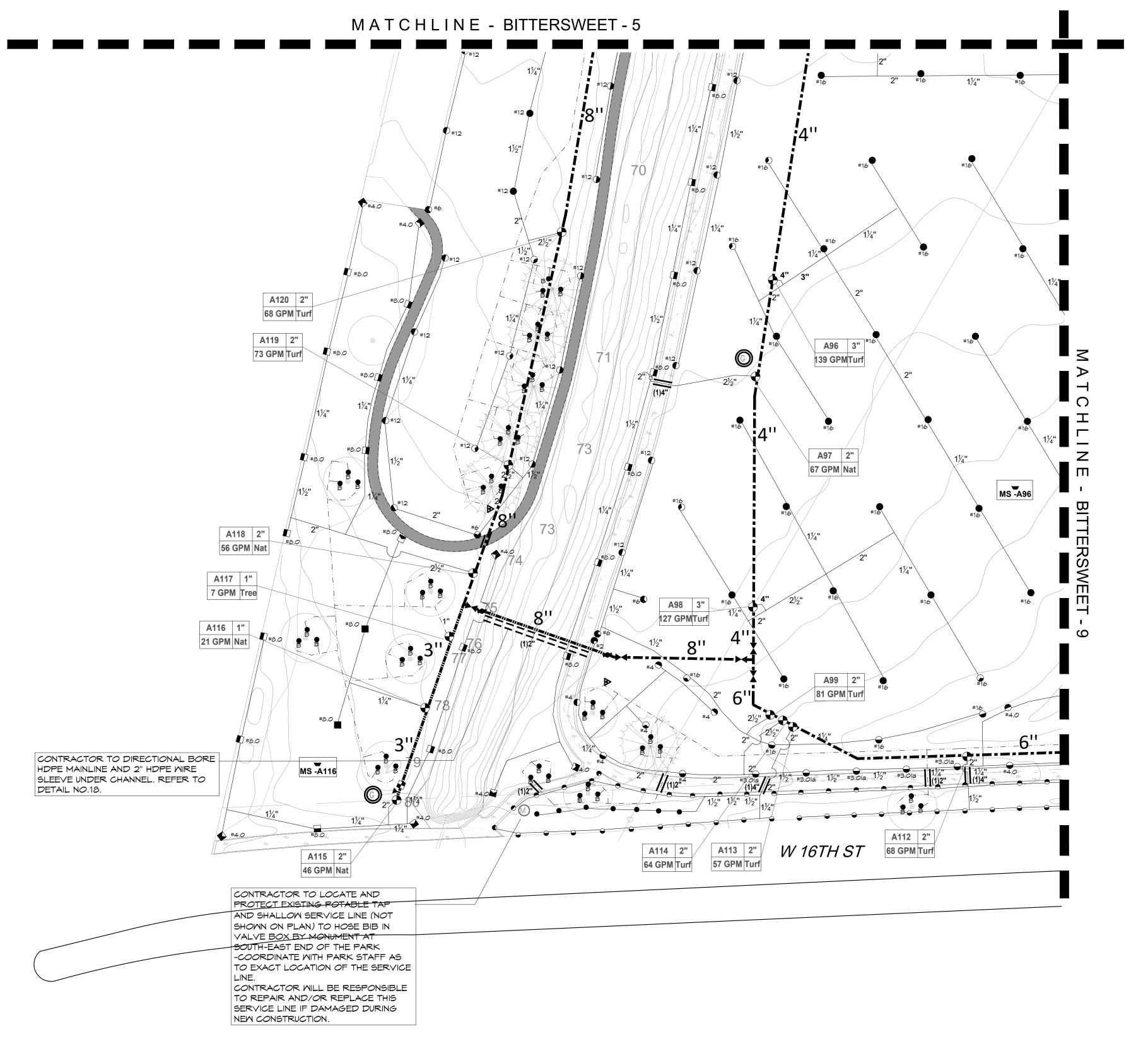
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IR-8



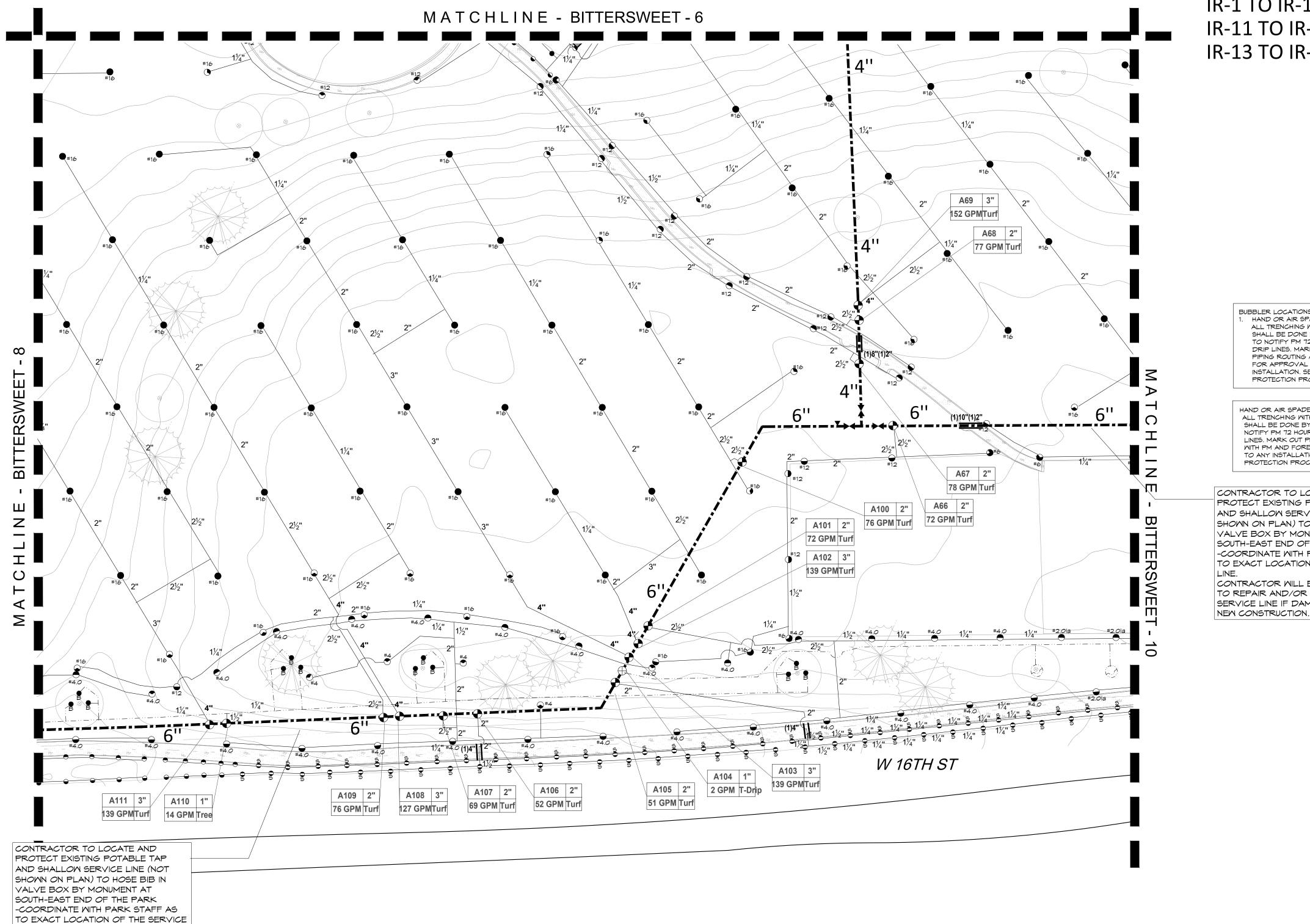
Irrigation Consulting & Water Management 860 Tabor Street, Suite 200 Lakewood, Colorado 80401 o: 303.980.5327 www.hydrosystemskdi.com



LINE.

NEW CONSTRUCTION.

CONTRACTOR WILL BE RESPONSIBLE TO REPAIR AND/OR REPLACE THIS SERVICE LINE IF DAMAGED DURING



**REFER TO SHEET** IR-0

IR-1 TO IR-10 IR-11 TO IR-12 IR-13 TO IR-16

**IRRIGATION NOTES** & SCHEDULE **IRRIGATION PLANS** JOINT RESTRAINT PLAN IRRIGATION DETAILS

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35TH AVE & 16TH ST

Greeley

BUBBLER LOCATIONS AND PIPING NOTES:

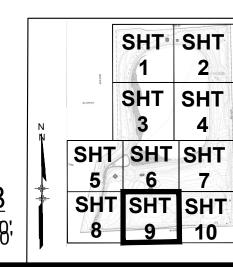
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TO ANY INSTALLATION. SEE SPECIFICATIONS FOR EXISTING TREE
PROTECTION PROCEDURES.

CONTRACTOR TO LOCATE AND PROTECT EXISTING POTABLE TAP AND SHALLOW SERVICE LINE (NOT SHOWN ON PLAN) TO HOSE BIB IN VALVE BOX BY MONUMENT AT SOUTH-EAST END OF THE PARK -COORDINATE WITH PARK STAFF AS TO EXACT LOCATION OF THE SERVICE CONTRACTOR WILL BE RESPONSIBLE TO REPAIR AND/OR REPLACE THIS SERVICE LINE IF DAMAGED DURING

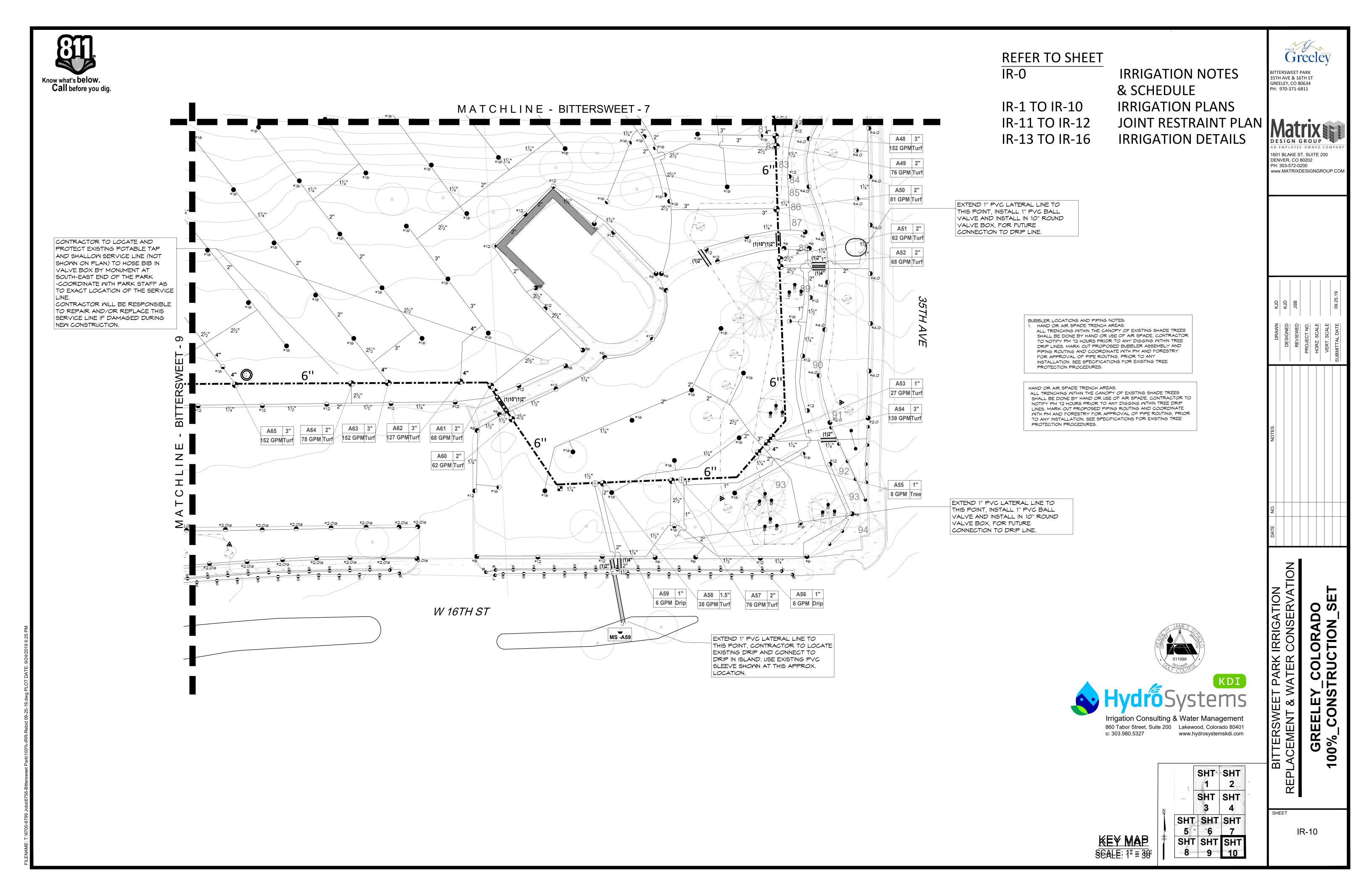


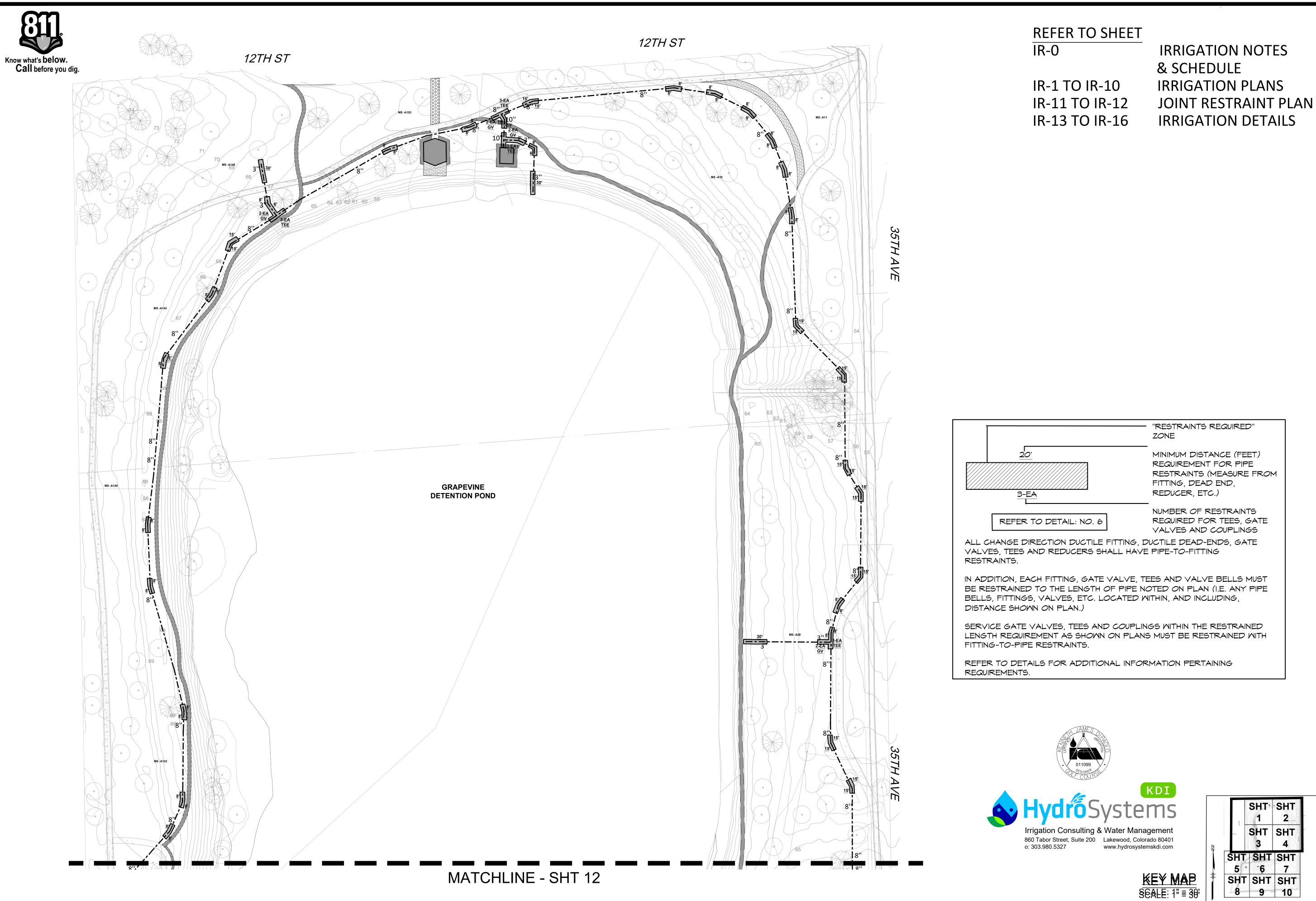


GREELEY\_COLORADO 100%\_CONSTRUCTION\_S BITTERSWEET REPLACFMENT

IR-9

KEY MAB





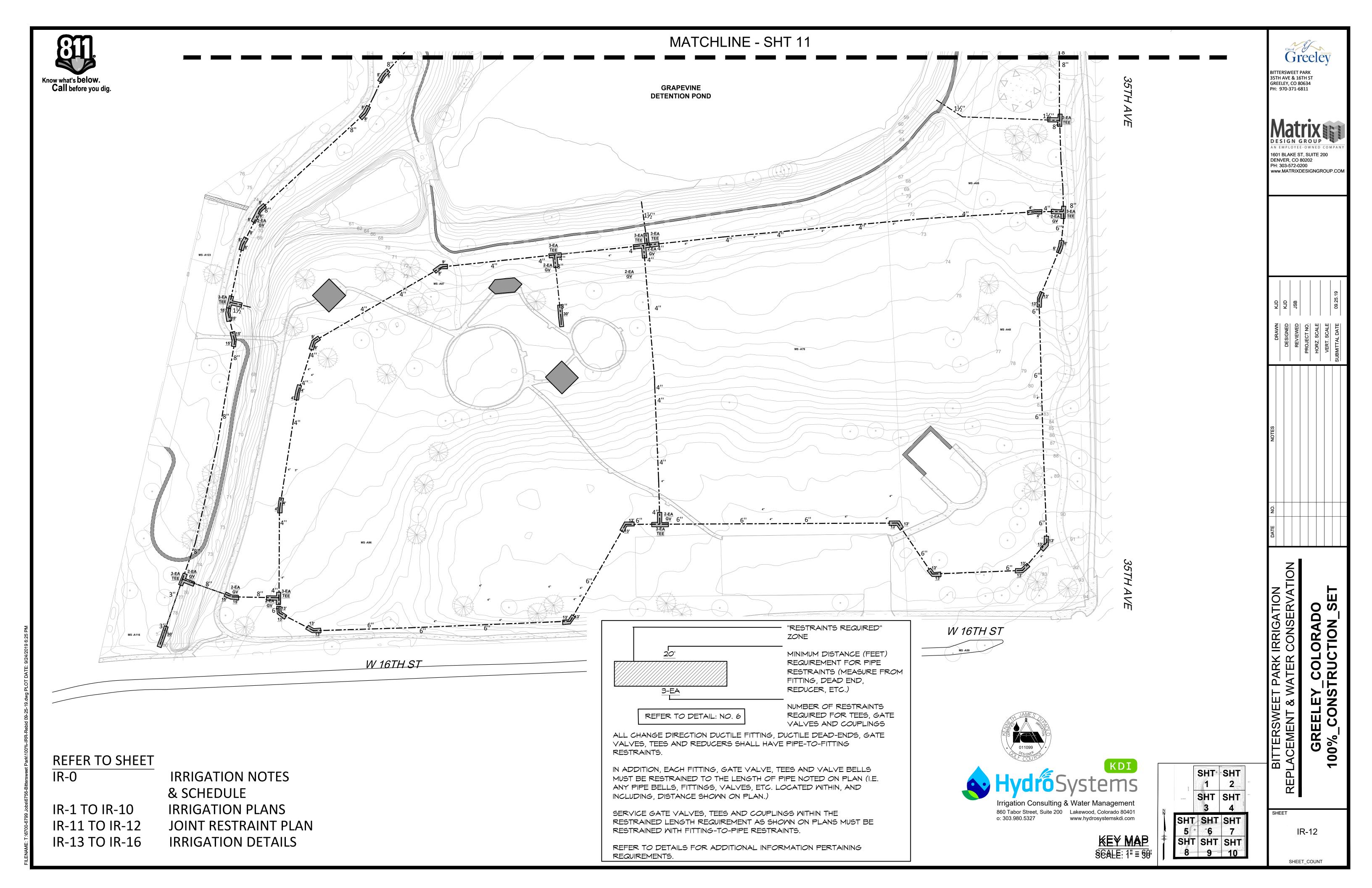
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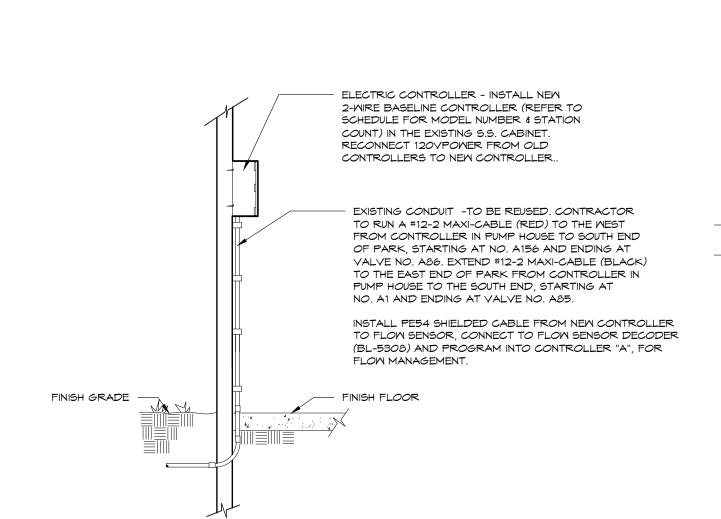
GREELEY\_COLORADO 100%\_CONSTRUCTION\_SE BITTERSWEET F REPLACEMENT & WA

IR-11

SHEET\_COUNT







**ELECTRIC CONTROLLER** 

INTERIOR WALL MOUNT

#6 CONTINUOUS SOLID BARE COPPER WIRE (TYPICAL)

CADWELD GT1161G "ONE SHOT" WELD

5/6" X 8FT COPPER-CLAD GROUNDING ROD

#6 CONTINUOUS SOLID BARE COPPER WIRE (TYPICAL)

COPPER GROUNDING PLATE 4"X96"X0.0626"

GROUND ENHANCEMENT MATERIAL PER

MANUFACTURER'S RECOMMENDATIONS

FINISH GRADE

1"

3"

VALVE BOX WITH COVER:
RAIN BIRD V9 — 10RND

6—INCH PVC DO PIPE
(LENGTH AS REQUIRED)

3-INCH MINIMUM DEPTH OF
3/4—INCH WASHED GRAVEL

BRICK PAVER (1 OF 4)

FILTER FABRIC

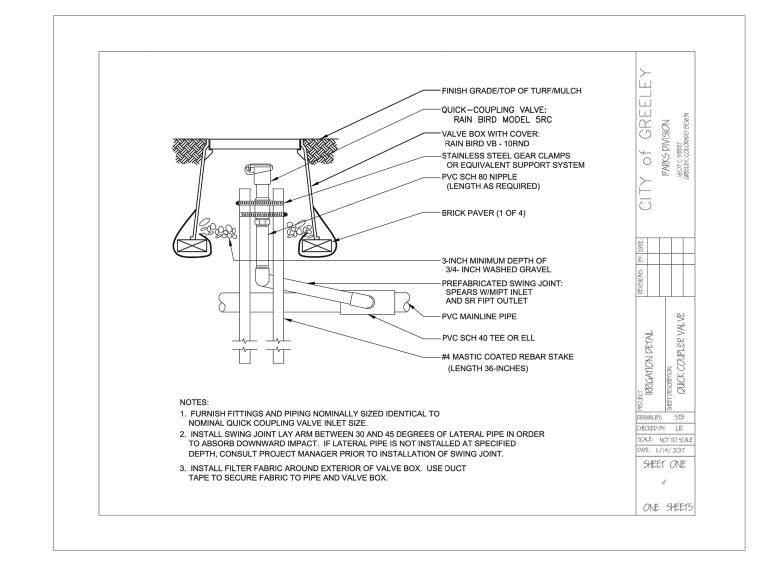
RESILIENT WEDGE GATE VALVE
WITH THREADED ENDS AND
2—INCH OPERATING NUT

PVC MAINLINE

PVC SCH 40 MALE ADAPTER
(1 OF 2)

NOTES:

1. NOMINAL SIZE OF GATE VALVE TO MATCH NOMINAL MAINLINE SIZE, THE
OPERATOR IS A WRENCH NUT.
2. INSTALL FILTER FABRIC AROUND EXTERIOR OF VALVE BOX. USE DUCT
TAPE TO SECURE FABRIC TO PIPE AND VALVE BOX.



CONTROLLER GROUNDING

GROUNDING PLATE(S) IN OWNER'S PRESENCE PRIOR TO BACKFILL.

GROUNDING PLATE DESIGN CONSISTS OF ONE VERTICAL 8-FOOT COPPER CLAD

GROUNDING ROD (AT LEAST EIGHT FEET FROM THE EQUIPMENT), AND ONE COPPER

GROUNDING PLATE PER 40 STATIONS REQUIRING GROUNDING. INSTALL GROUNDING PLATE HORIZONTALLY, THREE FEET DEEP AND 15' FROM THE GROUNDING ROD. SHOULD MULTIPLE RODS/PLATES BE REQUIRED, THEY SHALL BE PLACED A MINIMUM OF 3 LINEAR FEET FROM EACH OTHER. REFER TO ASIC STANDARDS FOR MORE

NOTE: PERFORM CADWELD CONNECTION TO GROUNDING ROD(S) AND PLACEMENT OF

TWO-WIRE SYSTEM

GATE VALVE

QUICK COUPLER VALVE

 $\left(4\right)$ 

MARKING TAPE WITH
TRACKING WIRE

FINISH GRADE

MANILINE PIPE

24" MIN

NOTE:

1. INSTALL 8-INCH AND LARGER PIPE AT 30-INCH MINIMUM DEPTH OF COVER.

MARKING TAPE WITH
TRACKING WIRE

FINISH GRADE

O.C. EVERY 10"

MARKING TAPE WITH
TRACKING WIRE

FINISH GRADE

TWENTY OF MARKING TAPE WITH
TRACKING WIRE

FINISH GRADE

TWENTY OF MARKING TAPE WITH
TRACKING WIRE

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NOTE:
WHEN THE DISTANCE BETWEEN A FITTING AND THE NEXT JOINT IS LESS THAN 20 FEET, THE FOLLOWING TABLE MUST BE USED. THE TABLE BELOW SHOWS THE DISTANCE (IN FEET) BETWEEN JOINTS WITHIN WHICH IF THERE IS A JOINT, IT MUST BE MECHANICALLY RESTRAINED. THE TABLE IS BASED ON 125 PSI, TYPE 3 TRENCH, AND 2-4 FEET DEPTH OF BURY (SMALL TO LARGE) DEPENDING ON PIPE SIZE. FOR OTHER PRESSURE MULTIPLY THE NUMBERS IN THE TABLE (FEET) BY THE ACTUAL PRESSURE AND DIVIDE BY 125.

PIPE		BENI	DS		STEP	REDUCT	ION	DEAD	GATE
SIZE	11	22	45	90	1	2	3	END	VALVE
2"	1	1	2	6				19	10
2.5"	1	2	4	9	4			23	12
3"	2	3	6	11	8	10		30	15
4"	2	4	9	20	14	20	31	45	23
6"	3	6	13	29	30	40	53	63	31
8"	4	8	15	38	33	55	63	75	38
10"	5	9	19	45	31	56	75	96	48
12"	5	10	21	53	54	58	79	112	56
14"	6	11	24	58	30	70	74	118	58
16"	6	1.3	27	65	.30	54	90	130	65

HARDWARE SIZE AND TORQUE REQUIREMENTS

PIPE	PIPE	NO OF	BOLT	TORQUE	DIMEN	SIONS	(INCH)	
SIZE	O.D.	BOLTS	SIZE	FT-LB	А	В	С	D
2"	2.375	2	3/8-16 X 2.5	20	4.1	3.1	4.8	5.0
2.5"	2.875	2	3/8-16 X 2.5	20	5.1	3.1	5.0	5.5
3"	3.500	2	3/8-16 X 2.5	20	5.6	3.4	5.9	6.5
4"	4.500	2	1/2-13 X 3	50	6.7	3.8	7.3	7.6
6"	6.625	2	1/2-13 X 3.5	50	9.0	4.6	9.8	9.9
8"	8.625	4	1/2-13 X 4	50	11.2	5.9	12.0	12.2
10"	10.750	4	5/8-11 X 5.5	100	13.4	7.3	14.8	14.8
12"	12.750	4	5/8-11 X 5.5	100	15.4	8.8	17.5	16.7
14"	15.300	4	5/8-11 X 5.5	100	23.0	9.5	21.0	29.0
16"	17.400	4	5/8-11 X 5.5	100	25.0	10.5	23.5	31.0

TRENCH DETAIL

(5)

LEEMCO RESTRAINT FITTINGS - 3" and LARGER

6

**REFER TO SHEET** 

IR-0 IRRIGATION NOTES

& SCHEDULE

IR-1 TO IR-10 IRRIGATION PLANS
IR-11 TO IR-12 JOINT RESTRAINT PLAN
IR-13 TO IR-16 IRRIGATION DETAILS





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W 12DH ST	SHT 3	SHT 4
SH 5	SHT 6	SHT 7
13-1	T SHT	

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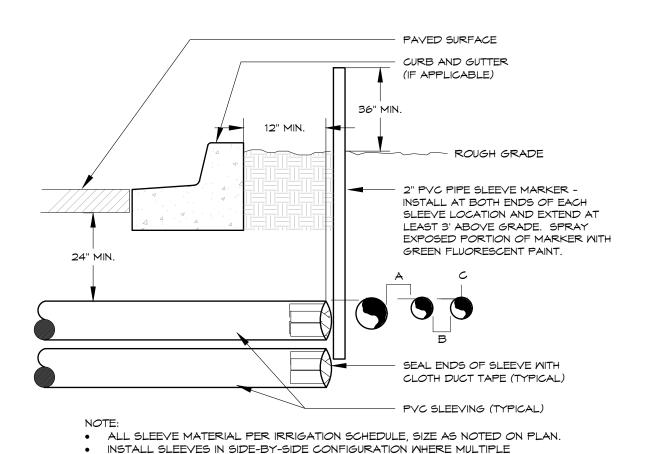
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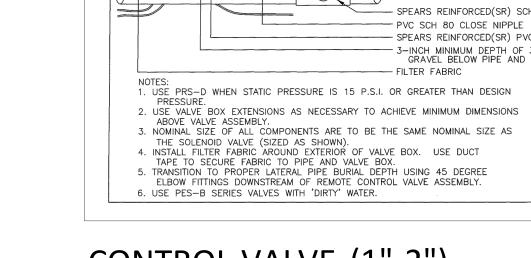
REPL





SLEEVES ARE TO BE INSTALLED. SPACE SLEEVES 4" TO 6" APART. DO NOT

 CONTRACTOR TO COORDINATE WITH FLATWORK INSTALLER TO BRAND A "Y" IN SIDEWALK OR CURB AT BOTH ENDS OF SLEEVE CROSSING.



- FINISH GRADE/TOP OF MULCH POP-UP SPRAY SPRINKLER RAIN BIRD 1800 SERIES SAM PRS - 1/2-INCH MALE NPT x .490 INCH BARBED ELBOW: RAIN BIRD MODEL SBE-050 OR USE RAIN BIRD SA SERIES SWING ASSEMBLIES PVC LATERAL PIPE SWING PIPE, 12-INCH LENGTH: RAIN BIRD MODEL SP-100 OR USE RAIN BIRD SA SERIES SWING ASSEMBLIES IF USING EITHER 1806 OR 1812 HEADS, THE SWNG PIPE ASSEMBLY MUST BE INSTALLED IN THE BOTTOM INLET. THE USE OF THE SIDE INLET IS PROHIBITED. ONE SHEETS

POP-UP SPRAY

**IRRIGATION SLEEVING** 

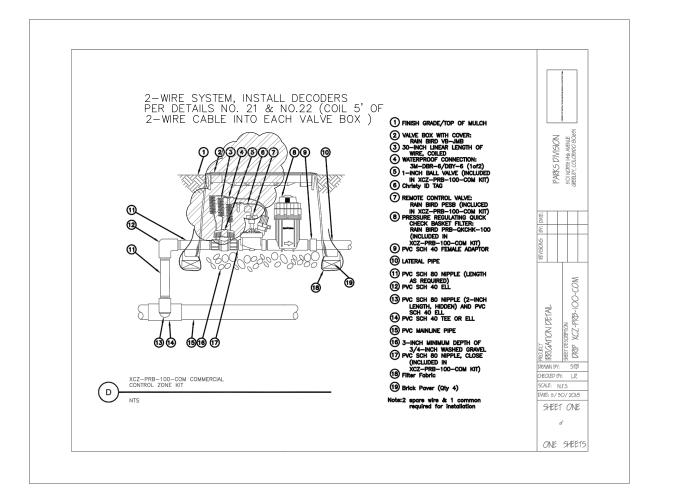
STACK SLEEVES VERTICALLY.

CONTROL VALVE (1"-2") (TURF, NATIVE AND TREES)

- RAIN BIRD GEAR DRIVEN ROTOR PVC SCH 40 TEE OR ELL NOTE:

1. INSTALL REDUCER COUPLING (1"X3/4") AND 3/4-INCH NIPPLE
ON OUTLET OF SWING JOINT FOR ROTORS WITH 3/4-INCH INLET.

2. INSTALL SWING JOINT LAY ARM BETWEEN 30 AND 45 DEGREES OF LATERAL
PIPE IN ORDER TO ABSORB DOWNWARD IMPACT. IF LATERAL PIPE IS NOT
INSTALLED AT SPECIFIED DEPTH, CONSULT PROJECT MANAGER PRIOR TO
INSTALLATION OF SWING JOINT.



30-INCH LENGTH OF COILED WIRE

FINISH GRADE/TOP OF TURF/MULCH

PVC BALL VALVE: SPEARS TRUE UNION
1821 STANDARD REINFORCED(SR) THREADED
VALVE BOX WITH COVER: RAIN BIRD JMB LOCKING

LID SS BOLTS OR HIGHLINE SNAP LOCK LID

SPEARS REINFORCED(SR) PVC SCH 40 ELL

PVC SCH 80 TOE NIPPLE (LENGTH AS

- SPEARS REINFORCED(SR) SCH 40 TEE PVC SCH 80 CLOSE NIPPLE

- SPEARS REINFORCED(SR) PVC UNION

ONE SHEETS

8

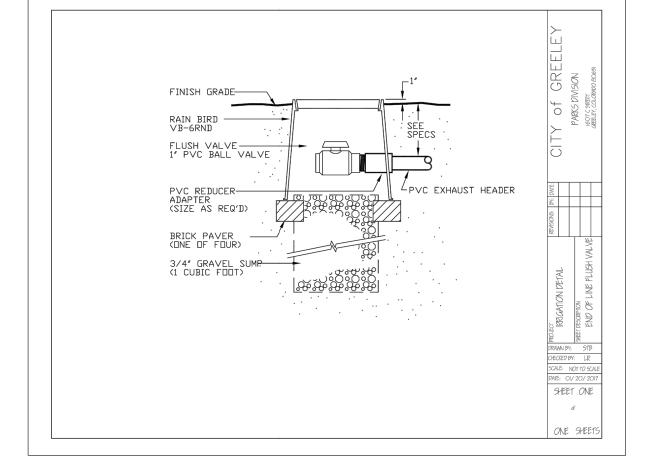
REQUIRED, HIDDEN) AND SCH 40 ELL

REMOTE CONTROL VALVE:

- SPARE COMMON WIRE - SPARE CONTROL WIRES

PVC SCH 80 TOE NIPPLE (LENGTH AS REQUIRED)

PVC CLASS 200 PIPE (LENGTH AS REQUIRED)



END OF LINE FLUSH VALVE

12

POP-UP ROTOR SPRAY

DRIP CONTROL VALVE

**REFER TO SHEET** 

IR-13 TO IR-16

IR-0 **IRRIGATION NOTES** 

& SCHEDULE

**IRRIGATION DETAILS** 

**IRRIGATION PLANS** IR-1 TO IR-10 IR-11 TO IR-12 JOINT RESTRAINT PLAN



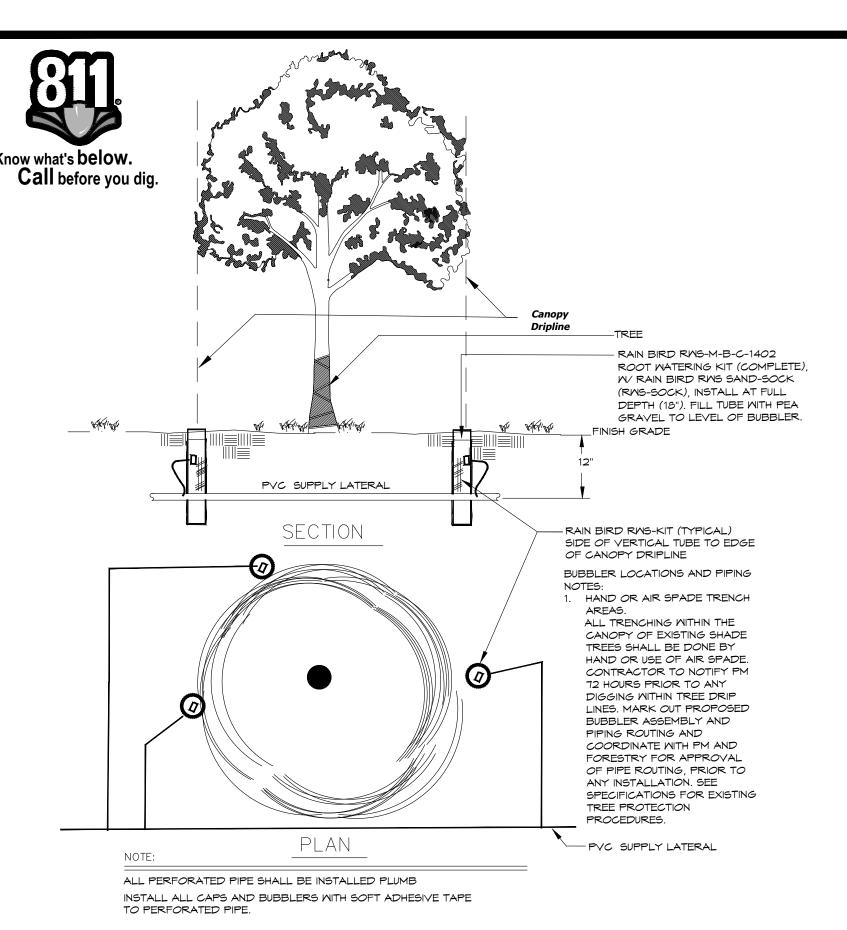
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Greeley

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USE BLANK TUBING TO CONNECT RINGS.

LATERAL LINE FROM DRIP VALVE

EXISTING TREES IN NATIVE:
CONTRACTOR SHALL RINE RES ON NATIVE AREAS, EXCEPT THE PREST RING ON THE INSIDE RILL BE PLACED TO FEET FROM TRUNK OF TREE WITH ADDITIONAL LOOPS EVERY 2 FIET OUT TO THE DRIP LINE OF THE TREE.

MISIDE RING - 12' CIRCLIMPERENCE, ELEVEN (11) EMITTERS.
OUTSIDE RING - 26' CIRCLIMPERENCE, TWENTY FIVE (25) EMITTERS.
OUTSIDE RING - 26' CIRCLIMPERENCE, TWENTY FIVE (25) EMITTERS.
USE .6 GPH EMITTER TUBING, WITH EMITTERS SPACED 12' O.C.
TOTAL FLOW FOR TREE = 32.4 GPH or .5.4 GPM
A TRUSH VALVE WILL BE REQUIRED AT THE TERMINAL TREE ON A TREE ROW. REFERENCE THE DRIP DRAIN FLUSH VALVE DETAIL.

ONE SHEETS

SEPARATION BETWEEN PIPES

2" HDPE SLEEVE FOR CONTROL WIRE

RESTORE CHANNEL EDGE AND GRADE WITHIN DITCH LIMITS UPON COMPLETION OF PIPE INSTALLATION DR 11 HIGH DENSITY POLYETHYLENE PIPE (HDPE)

FINISH GRADI 100 A 100 A

# BUBBLER ASSEMBLY -EXISTING TREES

DRIP TREE RING

CHANNEL CROSSING (HDPE)
NOT TO SCALE

**REFER TO SHEET** 

IR-1 TO IR-10 IR-11 TO IR-12 IR-13 TO IR-16

IR-0

IRRIGATION NOTES
& SCHEDULE
IRRIGATION PLANS
JOINT RESTRAINT PLAN
IRRIGATION DETAILS

15

HDPE IPS PIPE

LEEMCO
RESTRAINTS (2)
Pt # LH-XXX-C

HDPE IPS PIPE

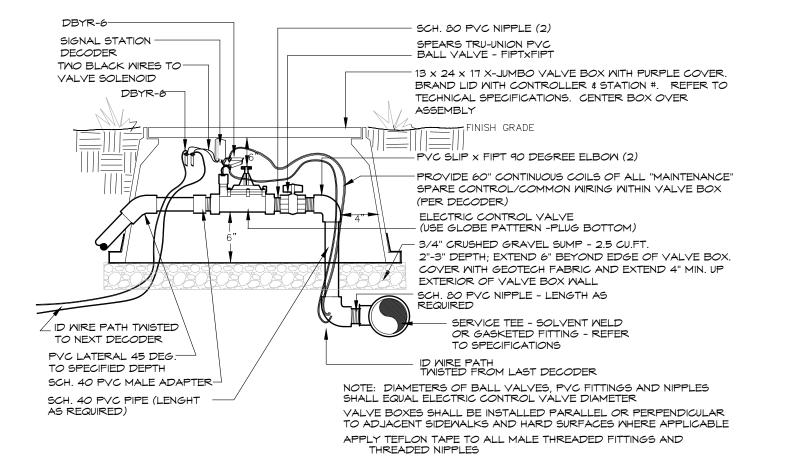
HDPE
STIFFENER
Pt # SSS-XXX

### NOTES:

- 1. THE RESTRAINT SCHEMES HERE ARE FOR SYSTEM PRESSURES UP TO 125 PSI. FOR HIGHER PRESSURES, CALL THE LEEMCO FACTORY.
- 2. EACH FITTING BELL, OF FITTING OR COUPLING) MUST BE RESTRAINED BY ONE (1) SINGLE RESTRAINT (LH-SERIES) ON THE PVC SIDE AND TWO (2) RESTRAINTS (LH-C SERIES) ON THE HDPE SIDE, ALONG WITH INSTALLATION OF A STIFFENER (SSS SERIES) INSIDE THE HDPE PIPE
- STIFFENER IS TO BE SIZED AND ORDERED BY HDPE DR RATING (SDR17, 13.5 AND 11).
   CONTACT TONY GARNER @ (208) 631-7787, THE LEEMCO REPRESENTATIVE, FOR ALL QUESTIONS CONCERNING LEEMCO PRODUCTS. COORDINATE AN INSTALLATION CLINIC WITH TONY GARNER PRIOR TO INSTALLING THE MAINLINE.

# LEEMCO HDPE TO PVC TRANSITION

-(16)

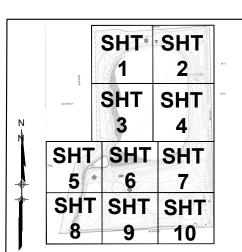


**ELECTRIC CONTROL VALVE -3"** 

WITH DECODER







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35TH AVE & 16TH ST
GREELEY, CO 80634
PH: 970-371-6811

Matrix
Design Group

An employee-owned compan
1601 BLAKE ST, SUITE 200

www.MATRIXDESIGNGROUP.COM

**DENVER, CO 80202** 

PH: 303-572-0200

NO. NOTES
DRAWN K
DESIGNED K
REVIEWED J
REVIEWED J
HORZ. SCALE
VERT. SCALE

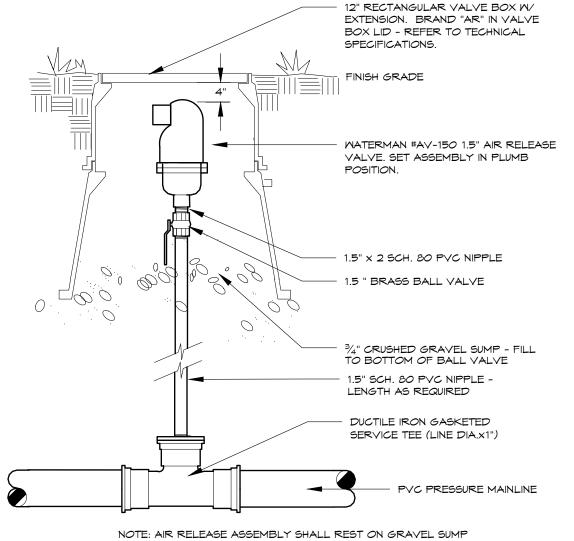
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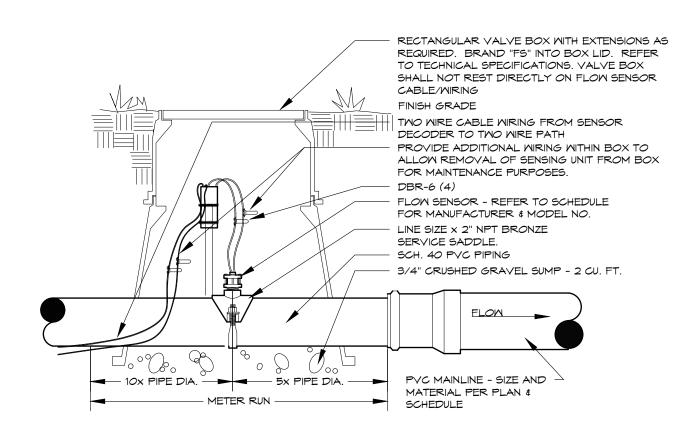
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GREELEY
100% CONS

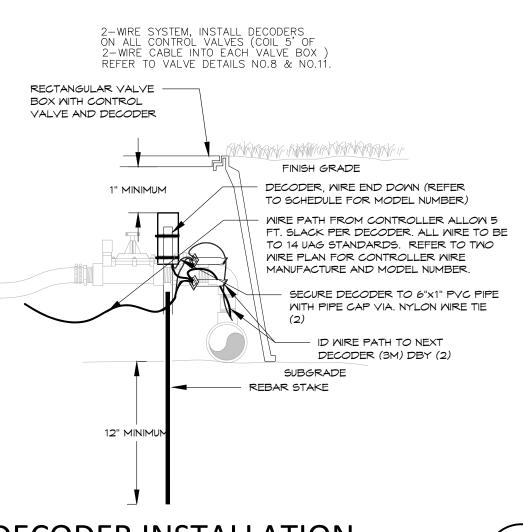


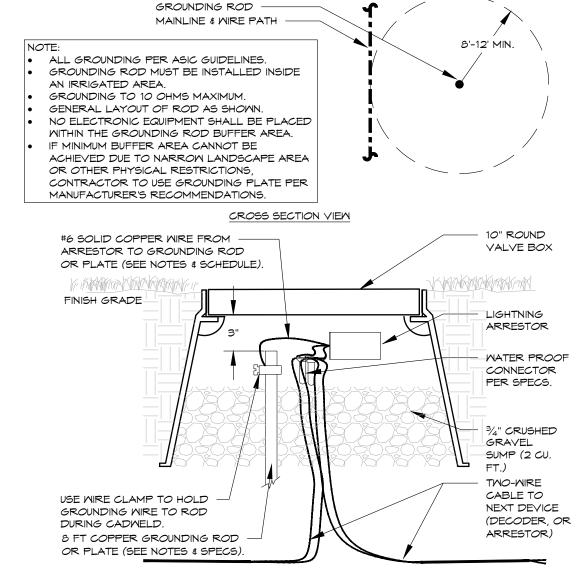


FIELD-LOCATE AIR RELEASE AT HIGH POINT IN MAINLINE PIPING APPLY

TEFLON TAPE TO ALL MALE THREADED FITTINGS AND NIPPLES







PLAN VIEW, TYPICAL

AIR RELIEF VALVE

TURF-2" TO 3" OR

TOP 1/3 ROOT ZONE 5

**FLOW SENSOR** VIA DECODER

RED TO RED AND BLK TO BLK

13 12" MIRE BURY OR PER NEC

IN WATER PROOF SPLICE CAP. DBR/Y OR EQ.

1) 24 VOLT REMOTE CONTROL VALVE

12 TWO-WIRE - GAUGE AS PER PLAN

**DECODER INSTALLATION** TWO-WIRE SYSTEM

ARRESTOR GROUNDING TWO-WIRE SYSTEM - TYPICAL

10" ROUND VALVE BOX MITH BOLT DOWN COVER. FINISHED GRADE. 3M DBRY CONNECTORS, TYP. 2-WIRE ACCESS LOOP, COIL 24" OF WIRE AROUND A 3/4" PIPE NIPPLE (10 REVOLUTIONS MINIMUM). 4" CL200 PVC SLEEVE TO ALLOW FOR COMPACTION OF GRAVEL LEVELING BED.  $^3\!\!/_4$ " CRUSHED GRANITE COMPACTED TO 95% M.P.D., EXTEND BEYOND VALVE BOX IN ALL MAINLINE INSTALLED AT SPECIFIED DEPTH WITH 2-WIRE CABLE IN TRENCH ADJACENT TO MAINLINE. SEE IRRIGATION TRENCH

1. SET TOP OF BOX LEVEL WITH FINISHED GRADE IN TURF AREAS AND LEVEL WITH TOP OF MULCH IN SHRUB BEDS. 2. USE STANDARD RECTANGULAR VALVE BOX WITH BOLT DOWN LID FOR SPLICES OF MORE THAN TWENTY (20)

**WIRE SPLICE BOX** TWO-WIRE SYSTEM

1) LAWN OR SURFACE TREATMENT

RECTANGULAR STANDARD OR

SUPPORT BLOCK - 2 REQUIRED 9 LATERAL - SIZE PER PLANS

BURY DEPTH - bISENSOR

FINISHED GRADE

(2) 6" ROUND JUNCTION BOX, WITH PURPLE LID

SENSOR WIRE -50' INCLUDE WITH EA. SENSOR

JUMBO VALVE BOX AS REQUIRED, WITH PURPLE LID

VERTICAL POSITION WITH WIRES OUT OF BOTTOM

| bisensor - Set Length Horizontally and Blade in

(4) SUPPORT BLOCK - TYPICAL EACH CORNER (4 REQUIRED) (5) GRANULAR MATERIAL FOR DRAINAGE 2" MINUMUM DEPTH (6) PRESSURE LINE - SIZE PER PLAN NOTE: THIS BOX MAY BE A VALVE BOX OR A ROUND BOX. IF A VALVE BOX WITH VALVE, CONNECT BICODER FOR VALVES TO TWO-WIRE AND WIRE TO THE BISENSOR

MIDWAY --> MIDWAY ○ MOISTURE SENSOR

O SPRINKLER HEAD

O EDGE OF TURF

SENSOR LOCATION WITHIN A PART CIRCLE ZONE

26

SOIL MOISTURE SENSOR

1) FIELD CONTROLLER

2 CONTROL VALVE WIRE

ZONE CONTROL VALVES:

3) GROUPS IN SAME HYDROZONES

MOISTURE SENSOR: ONE PER TYPICAL HYDROZONE

(5) MOISTURE SENSOR WIRING (50' INCLUDED MITH EACH SENSOR)

ONE MOISTURE SENSOR PER GROUPING OF CONTROL VALVES THAT HAVE SIMILIAR HYDROZONE CHARACTERISTICS.

CONNECT MOISTURE SENSOR TO ONE CONTROL VALVE WITHIN LIKE HYDROZONES. THAT CONTROL VALVE WILL BE THE HYDROZONE CONTROL AT THE CONTROLLER FOR THAT GROUPING WITHIN THE SAME

TYPICAL FIELD CONTROLLER DIAGRAM





	SHT.	SHT
SEPACES.	1	2
wizhat	SHT	SHT
	3	4
SHT	SHT	SHT
5	6	7
SHT	SHT	SHT
8	9	10

COLORADO STRUCTION\_SE

Greeley

AN EMPLOYEE-OWNED COMP

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1601 BLAKE ST, SUITE 200

**DENVER, CO 80202** 

PH: 303-572-0200

35TH AVE & 16TH ST

GREELEY, CO 80634

PH: 970-371-6811

IR-16

REFER TO SHEET IR-0

& SCHEDULE

IR-1 TO IR-10 IR-11 TO IR-12 IR-13 TO IR-16 **IRRIGATION DETAILS** 

**IRRIGATION NOTES** 

**IRRIGATION PLANS** JOINT RESTRAINT PLAN



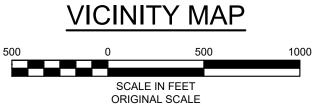
# BITTERSWEET IRRIGATION & WATER CONSERVATION PROJECT GREELEY, COLORADO

100% CONSTRUCTION SET

# **INDEX OF SHEETS**

SHEET NO.	DRAWING DESCRIPTION	DRAWING <u>NO.</u>
1	TITLE SHEET	TS01
2	LANDSCAPE - OVERALL, GENERAL NOTES	GN01
3-12	LANDSCAPE - PLANTING SCHEDULE, LEGENDS AND NOTES	LS01-LS10
13	LANDSCAPE - DETAILS	LDT01
14	IRRIGATION - GENERAL NOTES	IR0
15-26	IRRIGATION - SHEETS	IR01-IR12
27-30	IRRIGATION - DETAILS	IR13-IR16





LANDSCAPE ARCHITECT

MATRIX DESIGN GROUP

1601 BLAKE STREET, #200 303-572-0200
DENVER, CO 80202

IRRIGATION DESIGNER
HYDROSYSTEMS IRRIGATION CONSULTING
& WATER MANAGEMENT
860 TABOR STREET, SUITE 200 303-980-5327

CONTACT

IS HELD HARMLESS.

LANDSCAPE ARCHITECT - IAN ANDERSON
IAN\_ANDERSON@MATRIXDESIGNGROUP.COM

		<del></del>
CITY OF GREELEY		
		DATE
ANDY MCROBERTS, DIRECTO PARKS & RECREATION	OR OF CULTURE,	_
		DATE
SARAH BOYD, PARKS PLANI	NER	_
		DATE
EDIC BLOOMED DADYS SUF	PERINTENDENT	_

Greeley

BITTERSWEET PARK
35TH AVE & 16TH ST
GREELEY, CO 80634

Matrix Design Group

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CEMENT & WATER CONSERVA

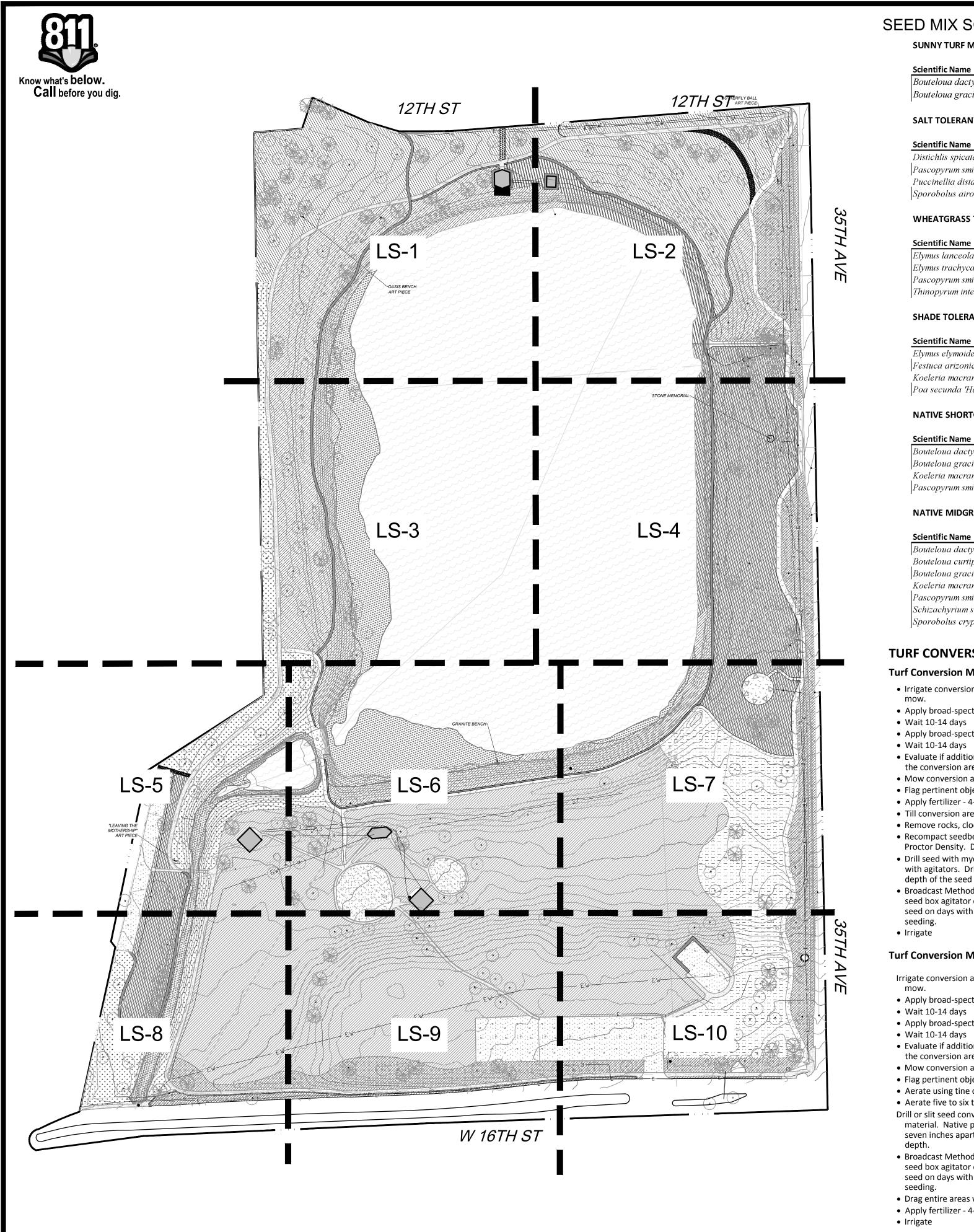
GREELEY COLORADO

10% CONSTRICTION SET

BITTERS

TS01

KEY MAP SCALE: 1" = 30'



# SEED MIX SCHEDULE

### **SUNNY TURF MIX**

Bouteloua dactyloides 'Sundancer'	Buffalograss, Sundancer	85	127.5	56,000	163.91	warm
Bouteloua gracilis 'Hachita'	Blue Grama, Hachita	15	22.5	825,000	426.14	warm
•		100	150		590	
SALT TOLERANT MIX						
		% of mix by	PLS			
Scientific Name	Common Name	wt.	lbs/Acre	Seeds/lb	Seeds/SF	Season
Distichlis spicata	Inland Saltgrass	15	4.5	520,000	53.72	warm
Pascopyrum smithii 'Arriba'	Western Wheatgrass, Arriba	35	10.5	110,000	26.52	cool
Puccinellia distans 'Fults II'	Alkaligrass, Fults II	25	7.5	1,200,000	206.61	cool
Sporobolus airoides	Alkali Sacaton	25	7.5	1,750,000	301.31	warm
		100	30		588	
WHEATGRASS TURF MIX						
		% of mix by	PLS			
Scientific Name	Common Name	wt.	lbs/Acre	Seeds/lb	Seeds/SF	Season
Elymus lanceolatus ssp. psammophilus 'Sodar'	Streambank Wheatgrass, Sodar	18	54	156,000	193.39	cool
Elymus trachycaulua ssp. trachycaulus 'Pryor'	Slender Wheatgrass, Pryor	19	57	159,000	208.06	cool
Pascopyrum smithii 'Arriba'	Western Wheatgrass, Arriba	23	69	110,000	174.24	cool
Thinopyrum intermedium ssp. barbulatum 'Luna'	Pubescent Wheatgrass, Luna	40	120	100,000	275.48	cool

Common Name

% of mix by PLS

100

wt. Ibs/Acre Seeds/Ib Seeds/SF Season

# **SHADE TOLERANT MIX**

		% of mix by	PLS			
Scientific Name	Common Name	wt.	lbs/Acre	Seeds/lb	Seeds/SF	Season
Elymus elymoides	Bottlebrush Squirreltail	20	7	192,000	30.85	cool
Festuca arizonica 'Redondo'	Arizona Fescue, Redondo	50	17.5	550,000	220.96	cool
Koeleria macrantha	Prairie Junegrass	10	3.5	2,315,000	186.01	cool
Poa secunda 'Hanford'	Sandberg Bluegrass, Hanford	20	7	1,047,000	168.25	cool
		100	25		505	

### **NATIVE SHORTGRASS MIX**

		% of mix by	PLS			
Scientific Name	Common Name	wt.	lbs/Acre	Seeds/lb	Seeds/SF	Season
Bouteloua dactyloides 'Sundancer'	Buffalograss, Sundancer	20	6	825,000	113.64	warm
Bouteloua gracilis 'Hachita'	Blue Grama, Hachita	45	13.5	56,000	17.36	warm
Koeleria macrantha	Prairie Junegrass	10	3	2,315,000	159.44	cool
Pascopyrum smithii 'Arriba'	Western Wheatgrass, Arriba	25	7.5	110,000	18.94	cool
•		100	20		200	

### **NATIVE MIDGRASS MIX**

		% of mix by	PLS			
Scientific Name	Common Name	wt.	lbs/Acre	Seeds/lb	Seeds/SF	Season
Bouteloua dactyloides 'Sundancer'	Buffalograss, Sundancer	14	4.2	825,000	79.55	warm
Bouteloua curtipendula 'Butte'	Sideoats Grama, Butte	22	6.6	191,000	28.94	warm
Bouteloua gracilis 'Hachita'	Blue Grama, Hachita	18	5.4	56,000	6.94	warm
Koeleria macrantha	Prairie Junegrass	8	2.4	2,315,000	127.55	cool
Pascopyrum smithii 'Arriba'	Western Wheatgrass, Arriba	25	7.5	110,000	18.94	cool
Schizachyrium scoparium 'Cimmaron'	Little Bluestem, Cimmaron	10	3	260,000	17.91	warm
Sporobolus cryptandrus	Sand Dropseed	3	0.9	5,298,000	109.46	warm
•		100	30		389	

### **TURF CONVERSION APPROACHES**

### Turf Conversion Method 1 - Tilling

- Irrigate conversion areas well, grow existing turf to vigorous health. Time frame typically May 1-August 31. Ensure conversion area is not drought stressed. Do not
- Apply broad-spectrum herbicide, (Roundup® or other glyphosate product) at 2-3 oz/1000 SF rate or per label rates and directions.
- Wait 10-14 days
- Apply broad-spectrum herbicide Wait 10-14 days
- Evaluate if additional application needed. This is a 4-6 week process for a complete kill. Care should be taken to minimally affect trees and shrubs that are within the conversion areas. Signs should be posted prior to application and during to ensure the safety of the public using the park.
- Mow conversion area as short as possible, raking and removing all debris
- Flag pertinent objects to avoid damage, ie: valve boxes, utilities, etc.
- Apply fertilizer 4-1-1, 1 lb/1000 sf N (fescue and wheatgrass areas) and Biosol Forte (fertilizer/conditioner), 1200lbs/acre (native grass areas)
- Till conversion area 6" depth minimum Remove rocks, clods, and debris
- Recompact seedbed using irrigation prior to seeding. Water deeply and allow several days for seedbed to settle. Compaction should not exceed 85% Standard Proctor Density. Do not use sheep's foot compactor.
- Drill seed with mycorrhizae, use 20 lbs/acre granular material. Native prairie and grassland mixtures must be installed by a grassland drill with separate seed boxes with agitators. Drill rows should be no greater than seven inches apart. Seed the area twice in perpendicular directions using half the seed in each direction. The depth of the seed should be set at 0.3 to 0.5 inch depth.
- Broadcast Method: Only recommended for irregular, steep or areas under 1000 square feet. Broadcast the seed by using a rotary seeder, a drop spreader with a seed box agitator or hand broadcast. Apply seed in repeated parallel passes across the entire site. Repeat the process perpendicular to the first application. Do not seed on days with winds over five mph. Harrow or rake all broadcast seeded areas using a spring tooth or metal drag mat or similar device immediately after seeding.
- Irrigate

### **Turf Conversion Method 2 - Aerating**

Irrigate conversion areas well, grow existing turf to vigorous health. Time frame typically May 1-August 31. Ensure conversion area is not drought stressed. Do not

- Apply broad-spectrum herbicide, (Roundup® or other glyphosate product) at 2-3 oz/1000 SF rate or per label rates and directions.
- Wait 10-14 days
- Apply broad-spectrum herbicide
- Wait 10-14 days
- Evaluate if additional application needed. This is a 4-6 week process for a complete kill. Care should be taken to minimally affect trees and shrubs that are within
- the conversion areas. Signs should be posted prior to application and during to ensure the safety of the public using the park.
- Mow conversion area as short as possible, raking and removing all debris • Flag pertinent objects to avoid damage, ie: valve boxes, utilities, etc.
- Aerate using tine core aerator that pulls 2-3 inch plugs, three passes at different angles for turfgrass conversion.
- Aerate five to six times in different directions for grassland conversions.
- Drill or slit seed conversion area with appropriate grassland drill or slit seeder seed in two directions. Add mycorrhizae in with seed, use 20 lbs/acre granular material. Native prairie and grassland mixtures must be installed by a grassland drill with separate seed boxes with agitators. Drill rows should be no greater than seven inches apart. Seed the area twice in perpendicular directions using half the seed in each direction. The depth of the seed should be set at 0.3 to 0.5 inch
- Broadcast Method: Only recommended for irregular, steep or areas under 1000 square feet. Broadcast the seed by using a rotary seeder, a drop spreader with a seed box agitator or hand broadcast. Apply seed in repeated parallel passes across the entire site. Repeat the process perpendicular to the first application. Do not seed on days with winds over five mph. Harrow or rake all broadcast seeded areas using a spring tooth or metal drag mat or similar device immediately after seeding.
- Drag entire areas with drag mat
- Apply fertilizer 4-1-1, 1 lb/1000 sf N (fescue and wheatgrass areas) and Biosol, 20lbs/1000 sf (native grass areas)

# **LEGEND**



REELEY, CO 80634 H: 970-371-6811

01 BLAKE ST, SUITE 200 DENVER, CO 80202

PH: 303-572-0200

www.MATRIXDESIGNGROUP.COM **EXISTING CONCRETE PATH** PROPOSED CONCRETE PATH

CRUSHER FINE PATH SHOULDER

EXISTING ELECTRICAL LINE

**EXISTING STORM LINE** 

**EXISTING WATER LINE** 

PLAY SURFACE

PROJECT BOUNDARY

**EXISTING CONTOUR** 

**EXISTING WETLAND** 

**GRAPEVINE DETENTION POND** 

**EXISTING BLUEGRASS** 

SUNNY TURF MIX - 4.63 AC

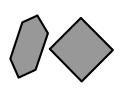
SALT TOLERANT MIX - 3.20 AC

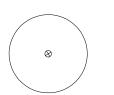
WHEATGRASS TURF MIX - 2.66 AC

SHADE TOLERANT MIX - 4.14 AC

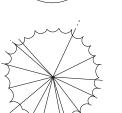
NATIVE SHORTGRASS MIX - 5.01 AC

NATIVE MIDGRASS MIX - 2.46 AC





**EXISTING TREE - DECIDUOUS** 



**EXISTING TREE - EVERGREEN** 

SOIL AMENDMENT APPROACH for the Tilling Conversion Method

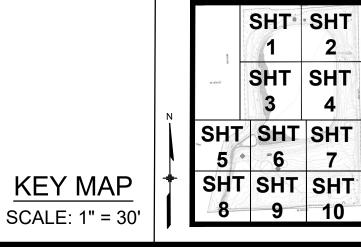
Amend all areas to undergo turf conversion with one of the following approaches.

### Soil Amendment

Apply and till into soil during the tilling operations of the turf conversion a Class 1 certified compost material at a rate of 5 cubic yards/1000 SF for the fescue and wheatgrass areas only. Fertilizer at the rate as described in the turf conversion approach.

### **Soil Conditioner**

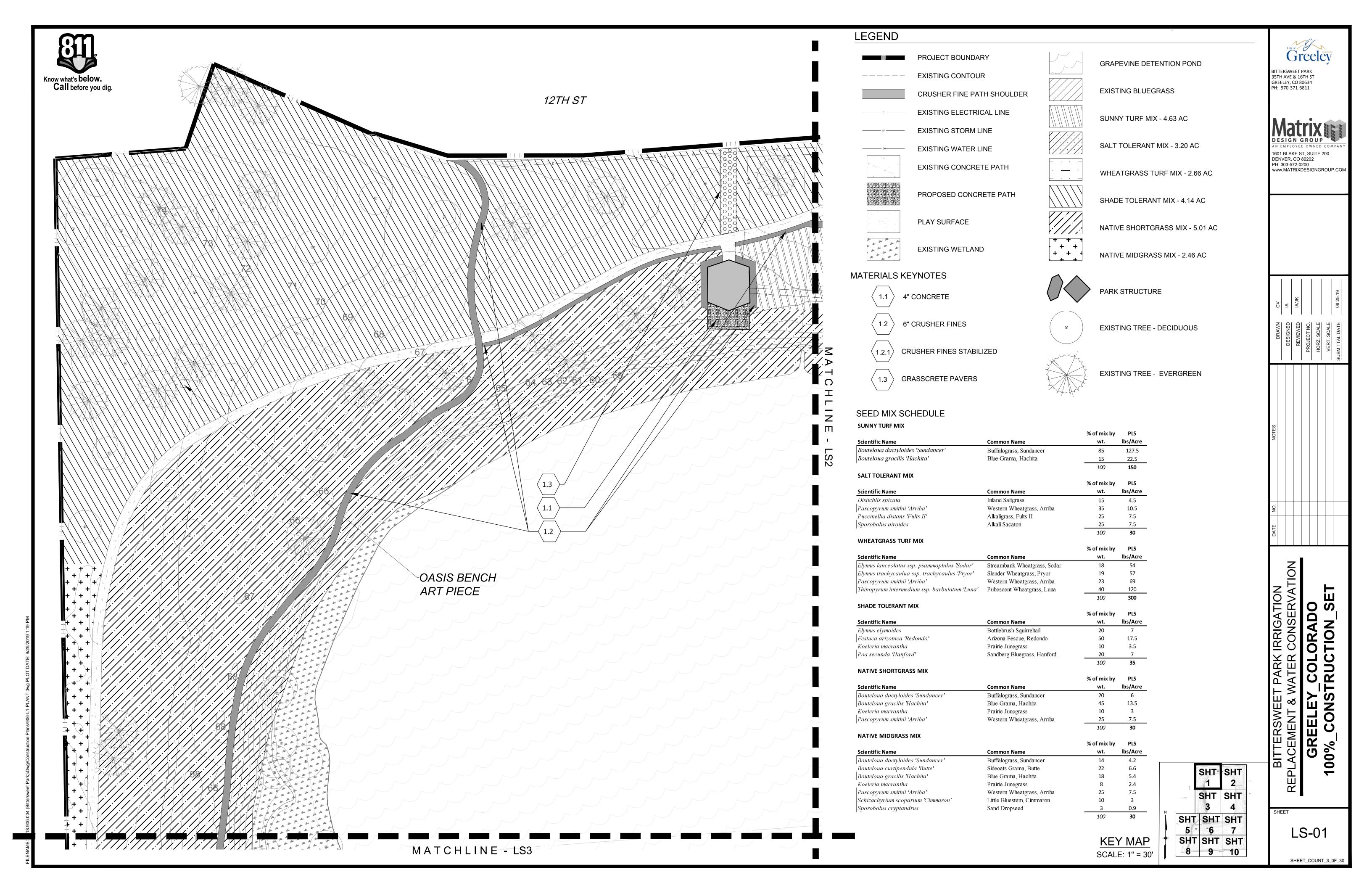
Apply and till into soil during tilling operations of the turf conversion 1200 lbs/acre of Biosol Forte® and 600 lbs/acre of humates from fresh water sources. The Biosol Forte® would be used in place of the straight Biosol® cited in the turf conversion approach.

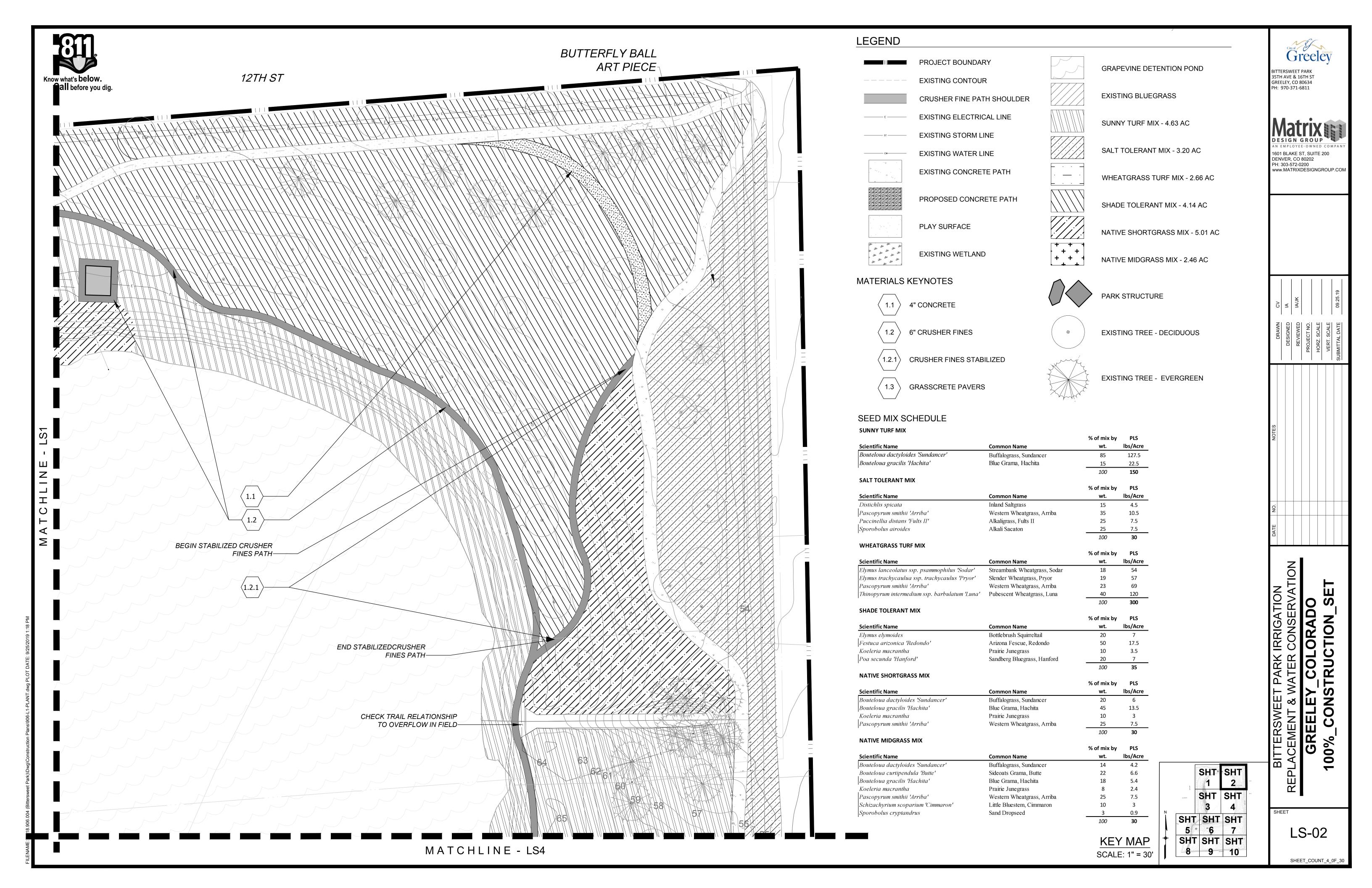


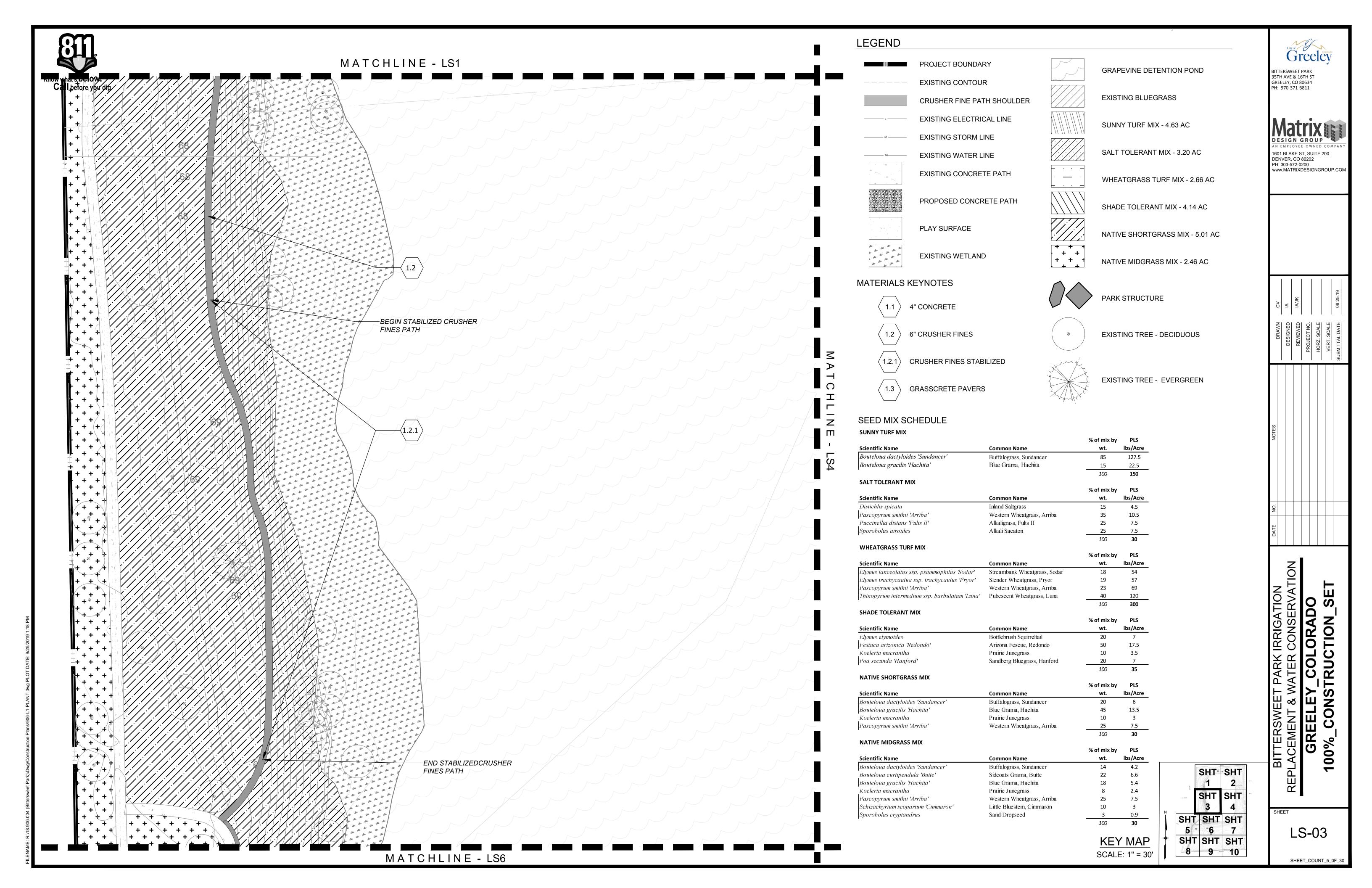
**GN01** 

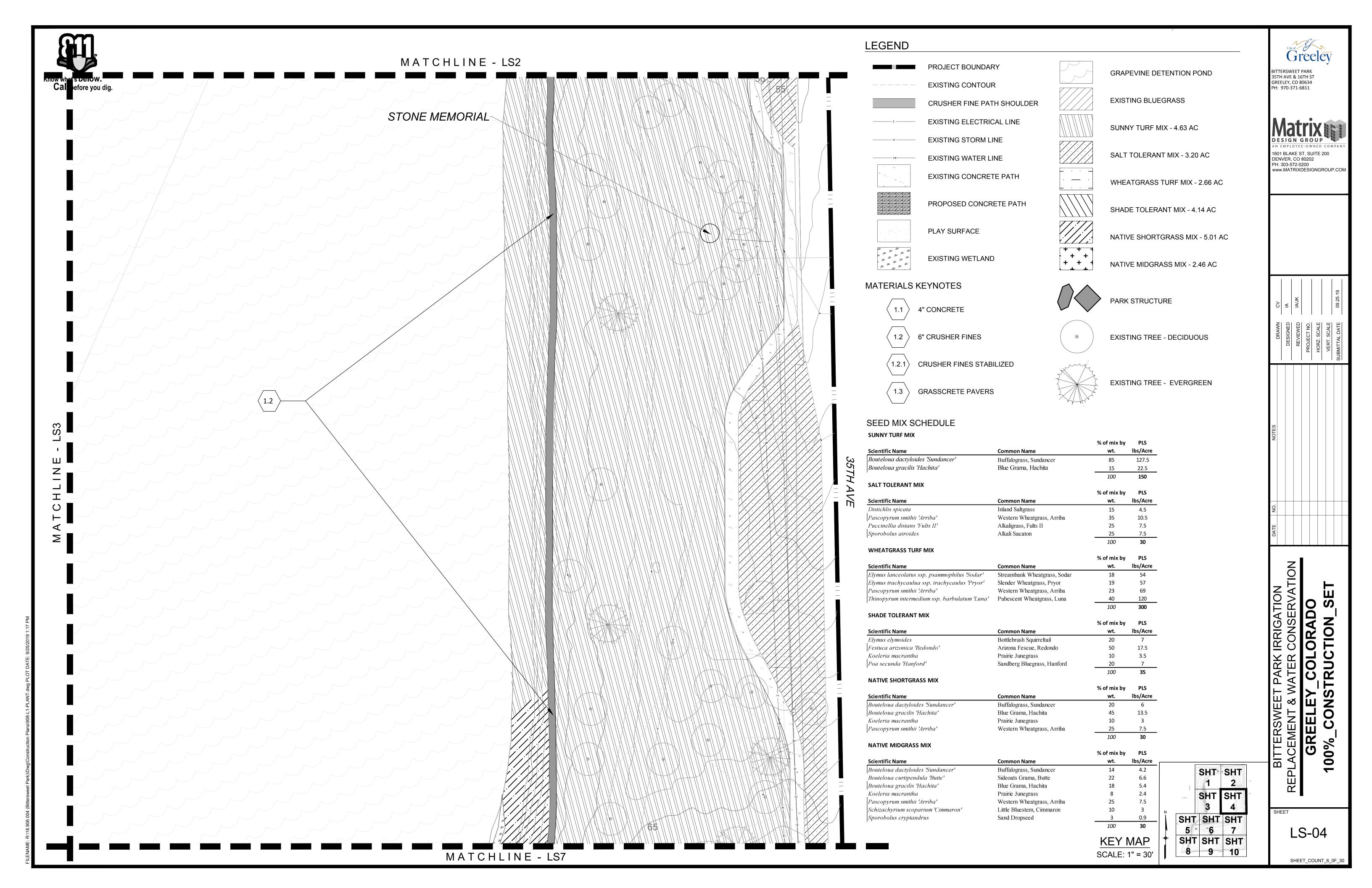
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LEGEND

PROJECT BOUNDARY EXISTING CONTOUR CRUSHER FINE PATH SHOULDER

**EXISTING ELECTRICAL LINE** 

**EXISTING CONCRETE PATH** 

EXISTING STORM LINE

**EXISTING WATER LINE** 

GRAPEVINE DETENTION POND



**EXISTING BLUEGRASS** 





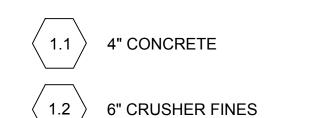
WHEATGRASS TURF MIX - 2.66 AC

PROPOSED CONCRETE PATH SHADE TOLERANT MIX - 4.14 AC

PLAY SURFACE NATIVE SHORTGRASS MIX - 5.01 AC

**EXISTING WETLAND** NATIVE MIDGRASS MIX - 2.46 AC

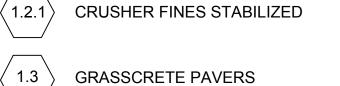
### MATERIALS KEYNOTES





**EXISTING TREE - DECIDUOUS** 

% of mix by PLS



CRUSHER FINES STABILIZED



EXISTING TREE - EVERGREEN

### SEED MIX SCHEDULE

### **SUNNY TURF MIX**

Scientific Name	Common Name	wt.	lbs/Acre
Bouteloua dactyloides 'Sundancer'	Buffalograss, Sundancer	85	127.5
Bouteloua gracilis 'Hachita'	Blue Grama, Hachita	15	22.5
		100	150
SALT TOLERANT MIX			
		% of mix by	PLS
Scientific Name	Common Name	wt.	lbs/Acre
Distichlis spicata	Inland Saltgrass	15	4.5
Pascopyrum smithii 'Arriba'	Western Wheatgrass, Arriba	35	10.5
Puccinellia distans 'Fults II'	Alkaligrass, Fults II	25	7.5
Sporobolus airoides	Alkali Sacaton	25	7.5
		100	30
WHEATGRASS TURF MIX			
		0/ - €!	DIC

		% of mix by	PLS
Scientific Name	Common Name	wt.	lbs/Acre
Elymus lanceolatus ssp. psammophilus 'Sodar'	Streambank Wheatgrass, Sodar	18	54
Elymus trachycaulua ssp. trachycaulus 'Pryor'	Slender Wheatgrass, Pryor	19	57
Pascopyrum smithii 'Arriba'	Western Wheatgrass, Arriba	23	69
Thinopyrum intermedium ssp. barbulatum 'Luna'	Pubescent Wheatgrass, Luna	40	120
		100	300

		% of mix by	PLS
Scientific Name	Common Name	wt.	lbs/Acre
Elymus elymoides	Bottlebrush Squirreltail	20	7
Festuca arizonica 'Redondo'	Arizona Fescue, Redondo	50	17.5
Koeleria macrantha	Prairie Junegrass	10	3.5
Poa secunda 'Hanford'	Sandberg Bluegrass, Hanford	20	7
		100	35

### **NATIVE SHORTGRASS MIX** % of mix by PLS **Common Name** Bouteloua dactyloides 'Sundancer' Buffalograss, Sundancer Bouteloua gracilis 'Hachita' Blue Grama, Hachita 13.5 Koeleria macrantha Prairie Junegrass Western Wheatgrass, Arriba Pascopyrum smithii 'Arriba'

		% of mix by	PLS
Scientific Name	Common Name	wt.	lbs/Acre
Bouteloua dactyloides 'Sundancer'	Buffalograss, Sundancer	14	4.2
Bouteloua curtipendula 'Butte'	Sideoats Grama, Butte	22	6.6
Bouteloua gracilis 'Hachita'	Blue Grama, Hachita	18	5.4
Koeleria macrantha	Prairie Junegrass	8	2.4
Pascopyrum smithii 'Arriba'	Western Wheatgrass, Arriba	25	7.5
Schizachyrium scoparium 'Cimmaron'	Little Bluestem, Cimmaron	10	3
Sporobolus cryptandrus	Sand Dropseed	3	0.9

**KEY MAP** SCALE: 1" = 30'

SHT SHT SHT SHT SHT 5 6 7 SHT SHT SHT 8 9 10

SHT SHT

CONS

Greeley

BITTERSWEET PARK 35TH AVE & 16TH ST

GREELEY, CO 80634

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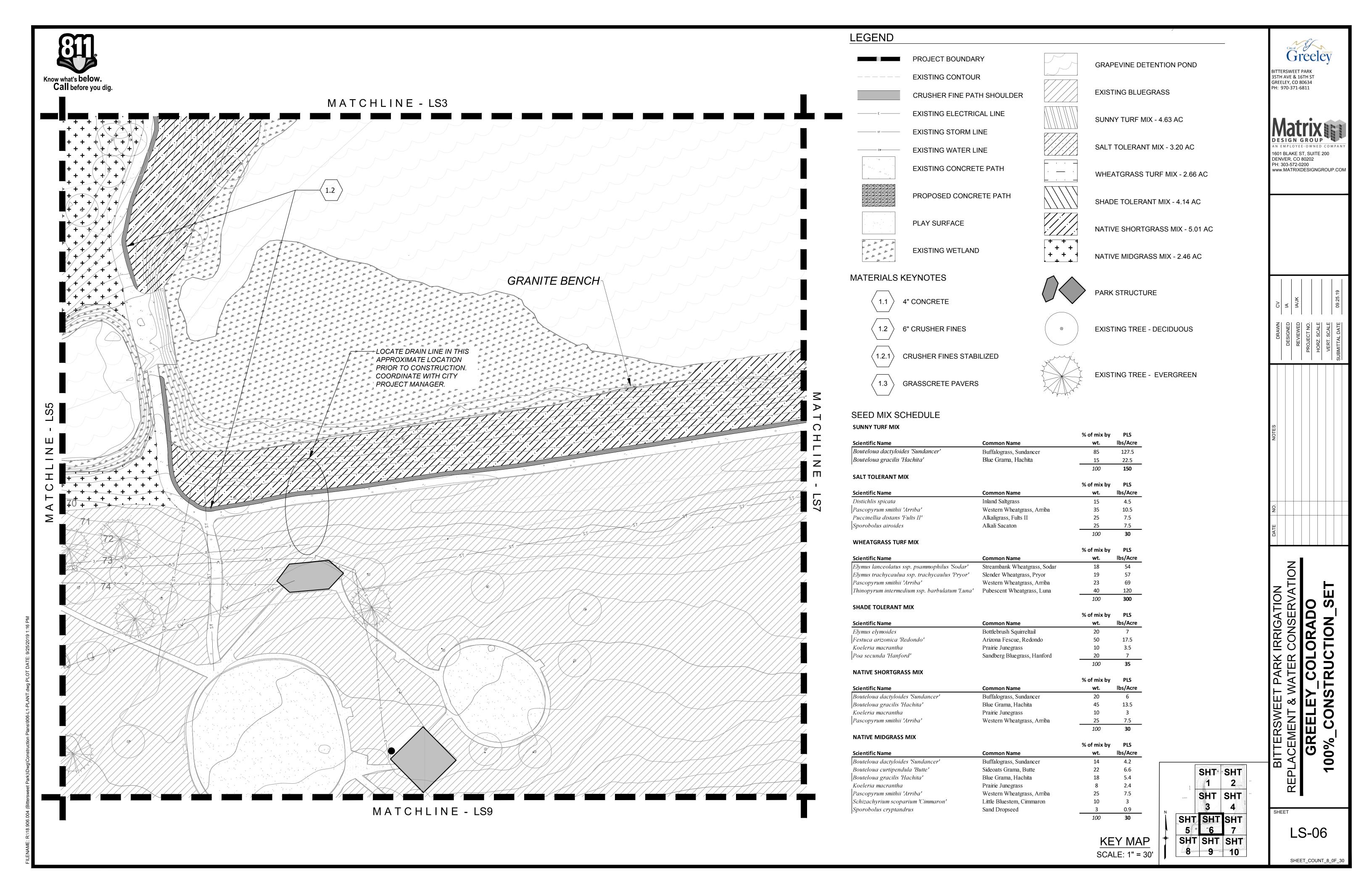
DENVER, CO 80202 PH: 303-572-0200

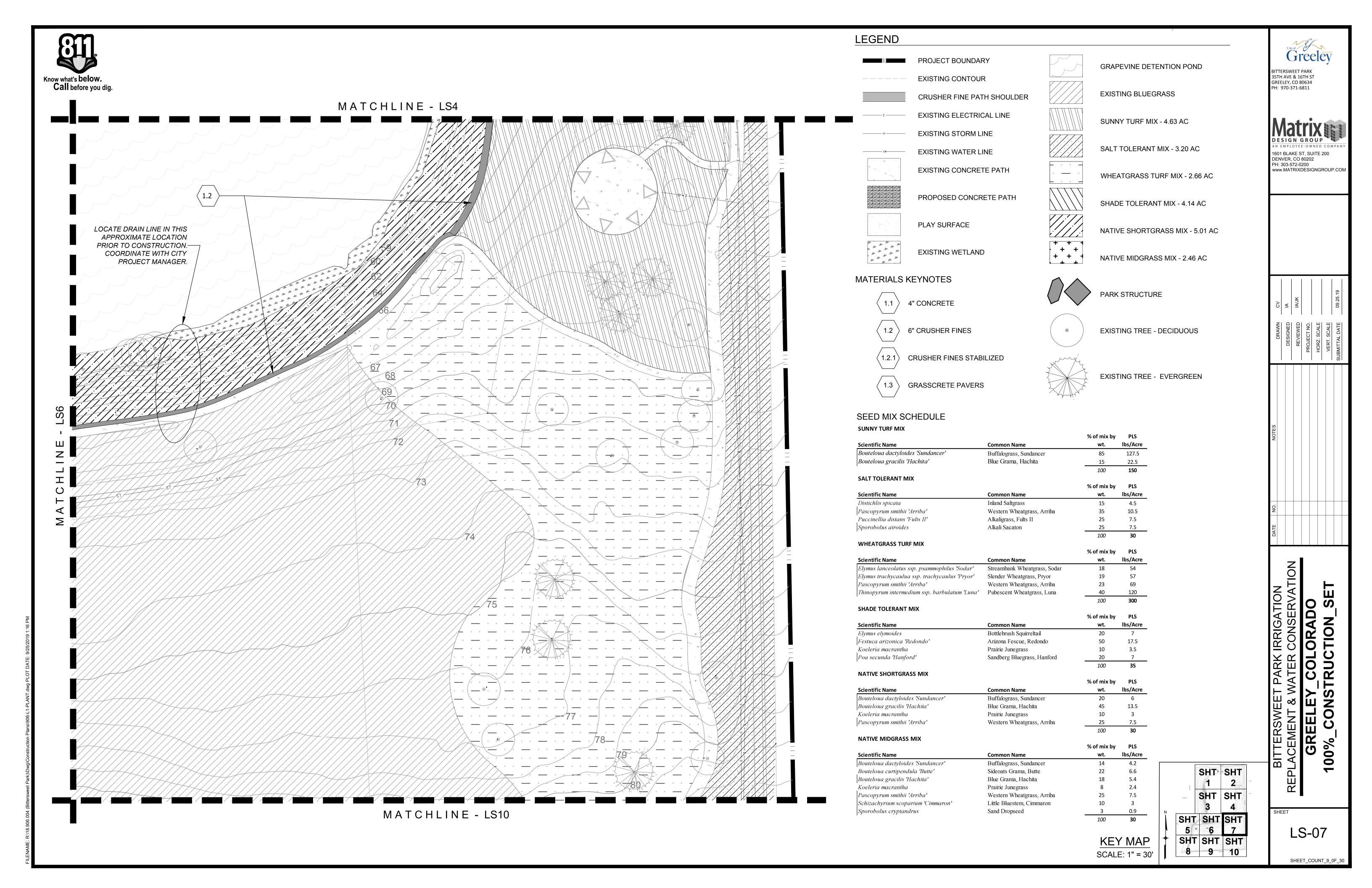
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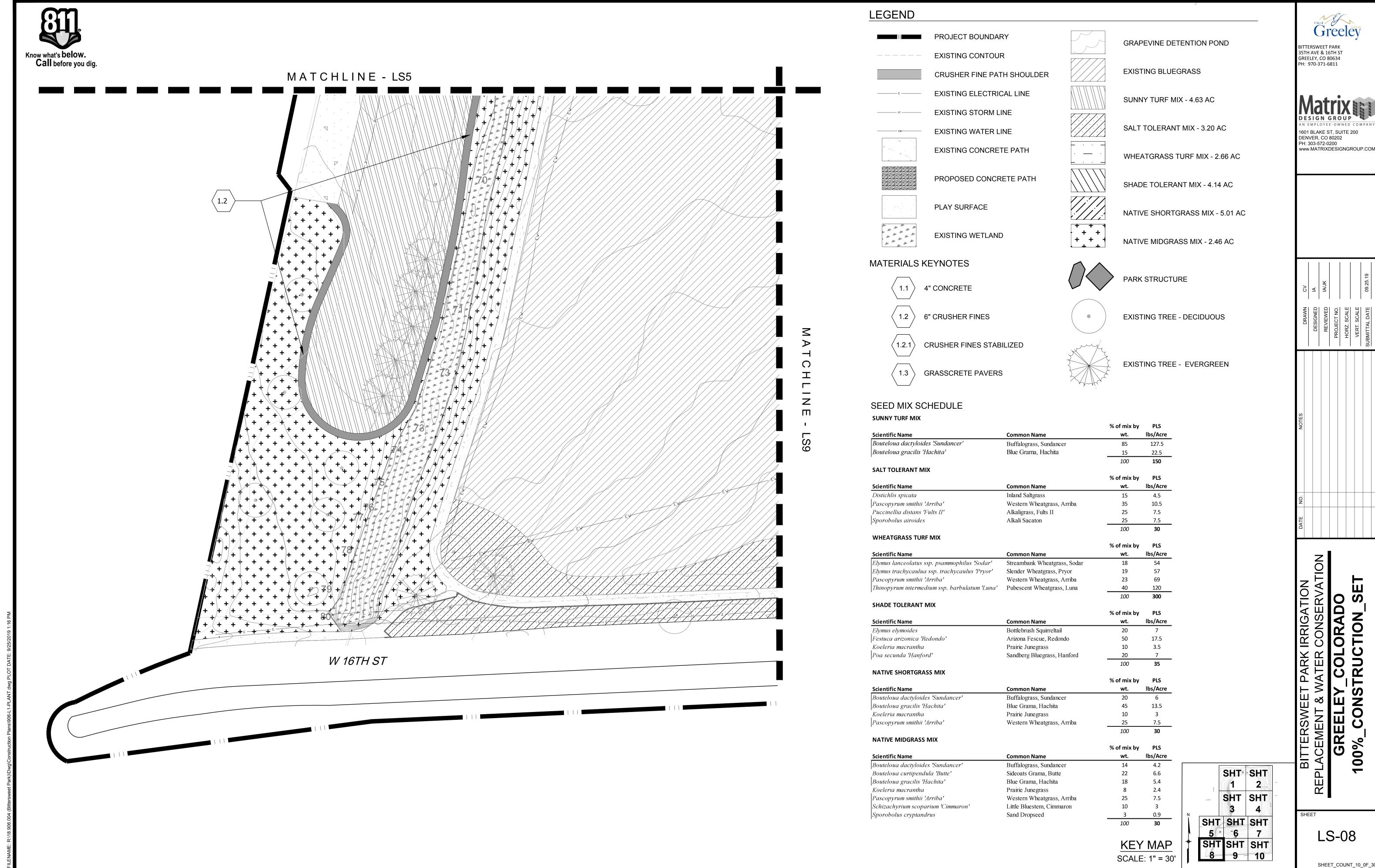
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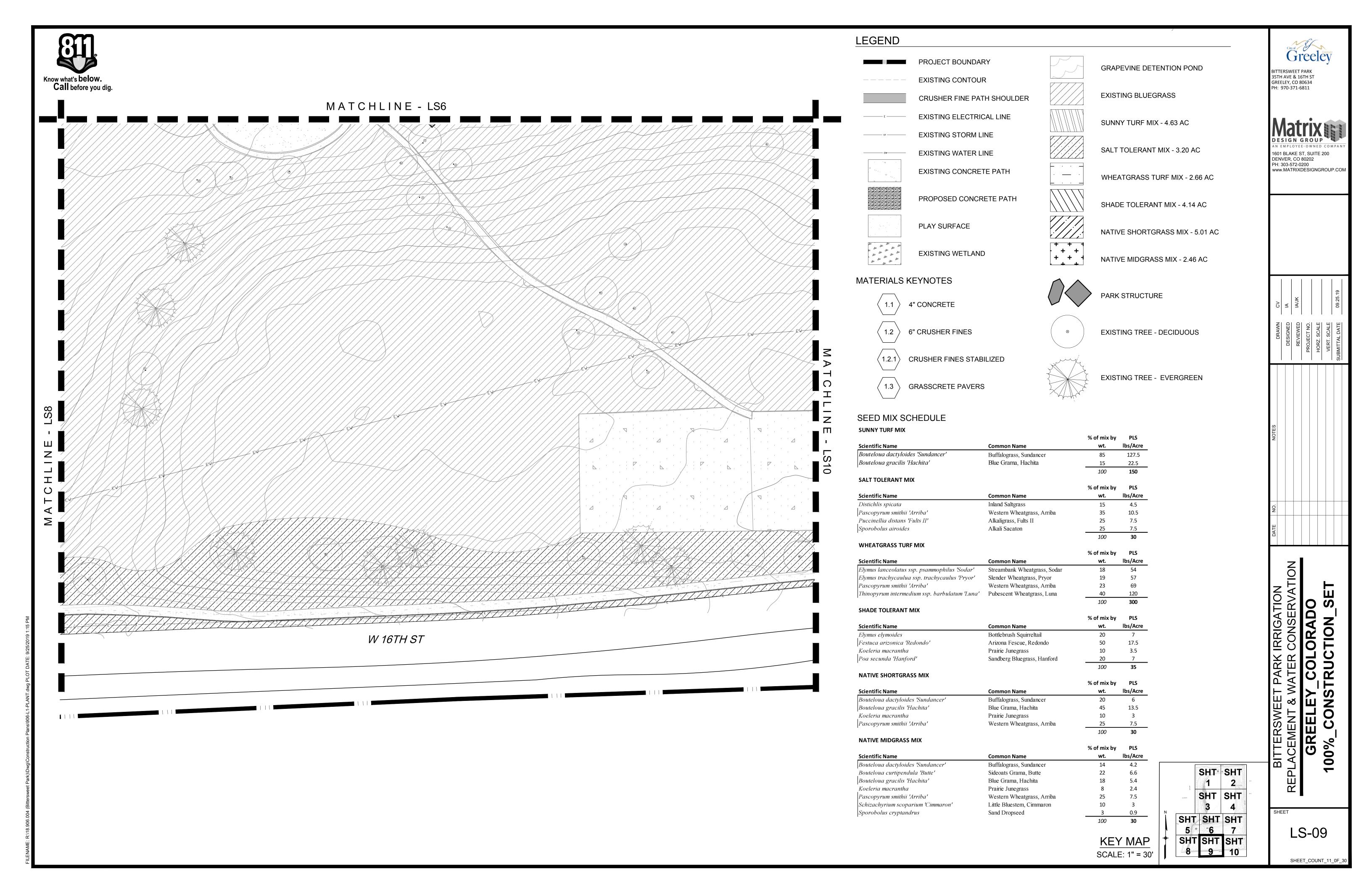
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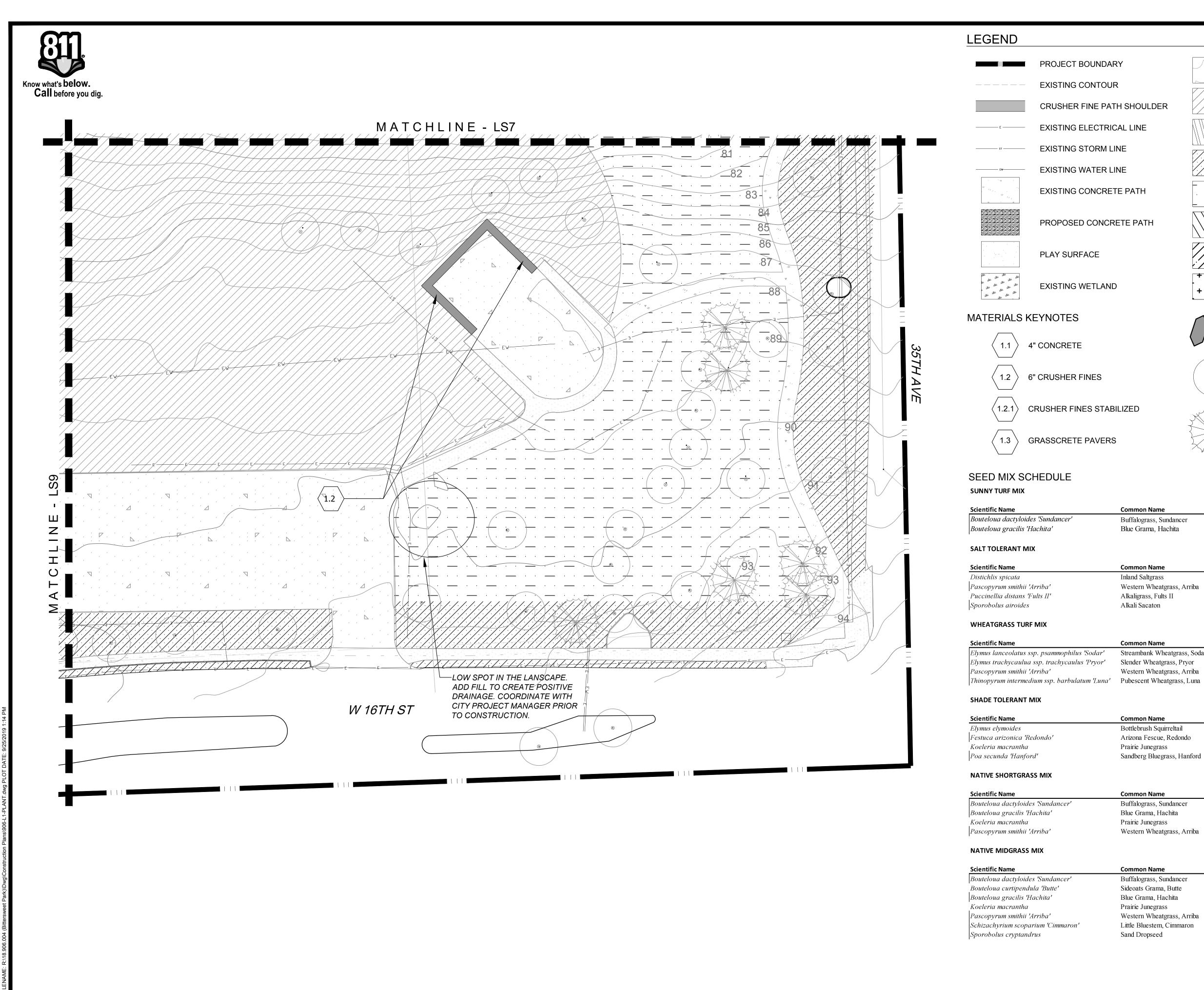
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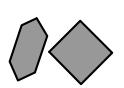


GRAPEVINE DETENTION POND CRUSHER FINE PATH SHOULDER **EXISTING BLUEGRASS** EXISTING ELECTRICAL LINE SUNNY TURF MIX - 4.63 AC

SALT TOLERANT MIX - 3.20 AC

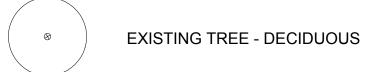
PROPOSED CONCRETE PATH SHADE TOLERANT MIX - 4.14 AC

NATIVE SHORTGRASS MIX - 5.01 AC



WHEATGRASS TURF MIX - 2.66 AC

NATIVE MIDGRASS MIX - 2.46 AC





% of mix by PLS

100

100

300

Scientific Name	Common Name	wt.	lbs/Acre
Bouteloua dactyloides 'Sundancer'	Buffalograss, Sundancer	85	127.5
Bouteloua gracilis 'Hachita'	Blue Grama, Hachita	15	22.5
		100	150
SALT TOLERANT MIX			
		% of mix by	PLS
Scientific Name	Common Name	wt.	lbs/Acre

% of mix by	PLS	
wt.	lbs/Acre	
15	4.5	
35	10.5	
25	7.5	
25	7.5	
100	30	
	wt.  15 35 25 25	wt.         lbs/Acre           15         4.5           35         10.5           25         7.5           25         7.5

### % of mix by PLS wt. lbs/Acre **Common Name** Streambank Wheatgrass, Sodar Slender Wheatgrass, Pryor 19 Western Wheatgrass, Arriba 23 69 40 120

### % of mix by PLS wt. lbs/Acre **Common Name** Bottlebrush Squirreltail 20 Arizona Fescue, Redondo 50 17.5 Prairie Junegrass 10 3.5

### % of mix by PLS lbs/Acre wt. **Common Name** Buffalograss, Sundancer Blue Grama, Hachita 45 13.5 Prairie Junegrass 10 Western Wheatgrass, Arriba 7.5

		% of mix by	PLS
Scientific Name	Common Name	wt.	lbs/Acre
Bouteloua dactyloides 'Sundancer'	Buffalograss, Sundancer	14	4.2
Bouteloua curtipendula 'Butte'	Sideoats Grama, Butte	22	6.6
Bouteloua gracilis 'Hachita'	Blue Grama, Hachita	18	5.4
Koeleria macrantha	Prairie Junegrass	8	2.4
Pascopyrum smithii 'Arriba'	Western Wheatgrass, Arriba	25	7.5
Schizachyrium scoparium 'Cimmaron'	Little Bluestem, Cimmaron	10	3
Sporobolus cryptandrus	Sand Dropseed	3	0.9
		100	30

SHT SHT SHT 5 • 6 **KEY MAP** SHT SHT SHT 8 9 10 SCALE: 1" = 30'

Greeley ITTERSWEET PARK 35TH AVE & 16TH ST GREELEY, CO 80634 H: 970-371-6811

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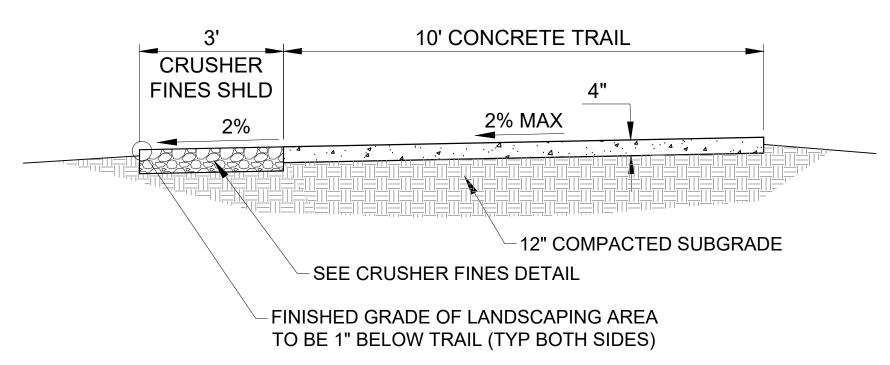
100%

SHT SHT

SHT SHT

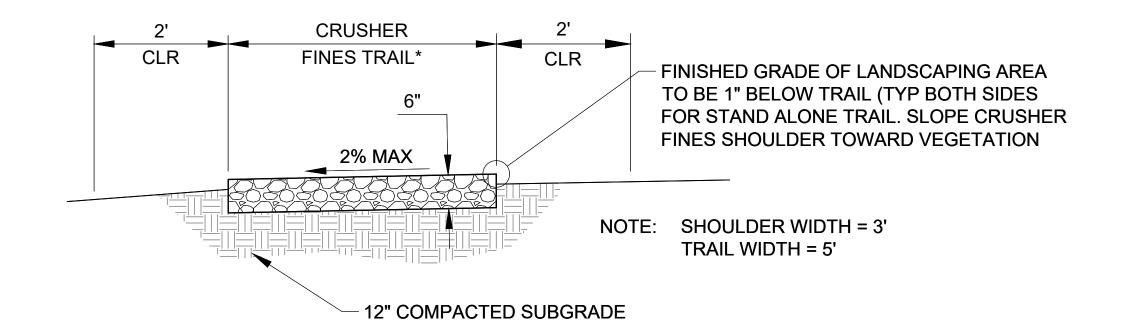
LS-10 SHEET\_COUNT\_12\_0F\_3



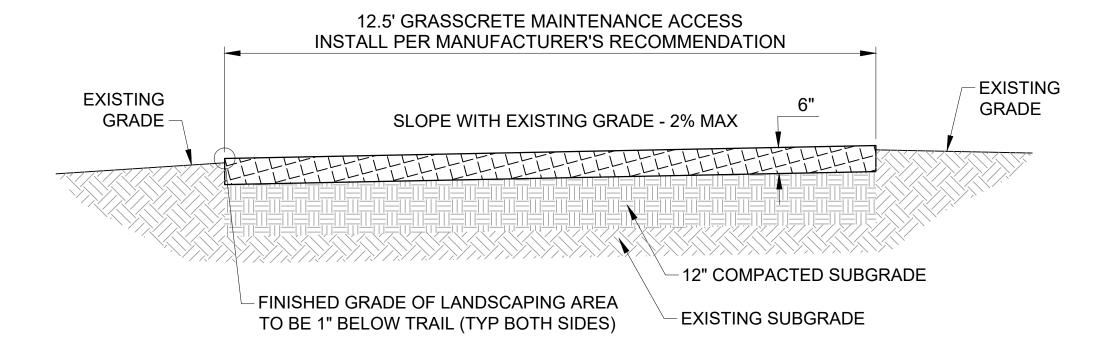


**CONCRETE TRAIL** 

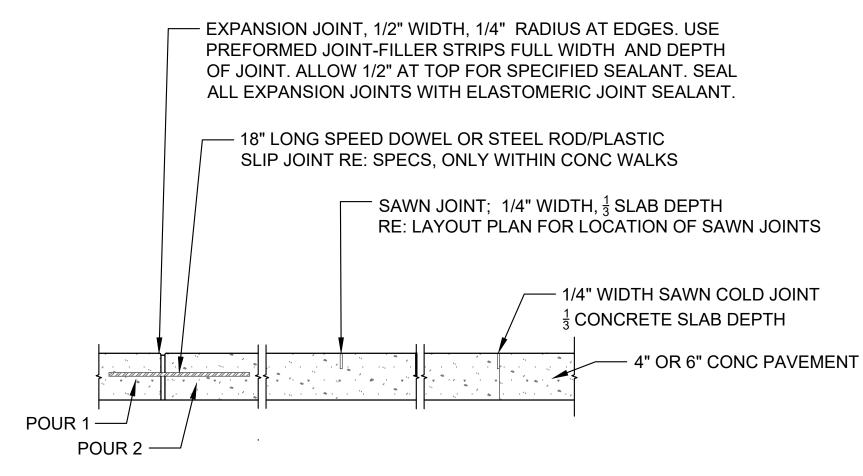
SCALE: NTS



CRUSHER FINES TRAIL SCALE: NTS



GRASSCRETE MAINTENANCE TRAIL SCALE: NTS

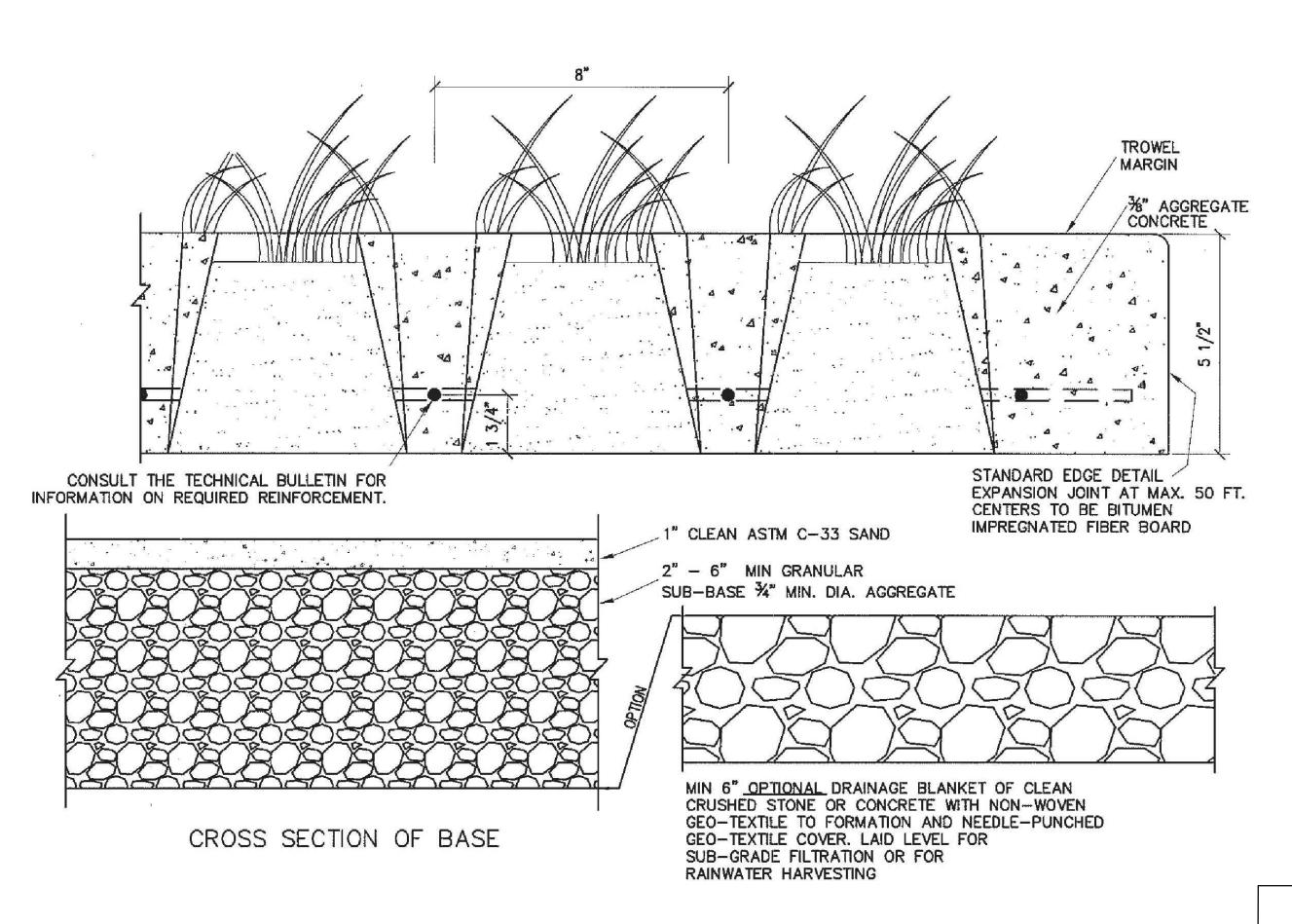


CONTROL JOINT CONSTRUCTION JOINT **EXPANSION JOINT** 

- EXPANSION JOINTS EVERY 100' O.C.
- CONTROL JOINTS EVERY 8' OR 10' DEPENDING ON WIDTH OF TRAIL.
- CONSTRUCTION JOINTS OCCUR BETWEEN SEPARATE POURS THAT DO NOT REQUIRE AN EXPANSION JOINT

CONCRETE JOINT DETAIL

SCALE: NTS



SINGLE USE 5 1/2" MOLDED PULP VOID GRASSED SYSTEM SCALE: NTS

> **KEY MAP** SCALE: 1" = 30'

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100%

LDT-01

SHEET\_COUNT\_13\_0F\_30