



**Denver Public Works**

Engineering Division  
Capital Projects Management – Dept. 506  
Right-of-Way Services – Dept. 507  
Traffic Engineering Services – Dept. 508  
Policy and Planning – Dept. 509

201 West Colfax Avenue  
Denver, CO 80202  
[www.Work4Denver.com](http://www.Work4Denver.com)

**NOTICE OF APPARENT LOW BIDDER**

CTM, Inc.  
P. O. Box 118  
Englewood, CO 80151

The MANAGER OF PUBLIC WORKS has considered the Bids submitted on March 14, 2013, for work to be done and materials to be furnished in and for:

**CONTRACT NO. 201309801 State Home-Harvard Gulch Irrigation**

as set forth in detail in the Contract Documents for the City and County of Denver, Colorado. It appears that your Bid is fair, equitable, and to the best interest of the City and County; therefore, said Bid is hereby accepted at the bid price contained herein, subject to the approval and execution of the Contract Documents by the City in accordance with the Charter of the City and County of Denver, and to your furnishing the items specified below. The award is based on the **lump sum bid** the total estimated cost thereof being: **One Million fifty eight thousand three hundred seventy five dollars and no cents (\$1,058,375.00)**.

It will be necessary for you to appear forthwith at the office of the Department of Public Works, Contract Administration, 201 W. Colfax Ave., Dept 614, Denver, Colorado 80202, to receive the said Contract Documents, execute the same and return them to the Department of Public Works, Contract Administration within the time limit set forth in the Bid Package Documents.

In accordance with the requirements set forth in the Contract Documents, you are required to furnish the following documents:

- a. Insurance Certificates: General Liability and Automotive Liability, Workman's Compensation and Employer Liability;
- b. Payment and Performance Bond along with One original Power of Attorney relative to Performance and/or Payment Bond; and,

All construction Contracts made and entered into by the City and County of Denver are subject to Affirmative Action and Equal Opportunity Rules and Regulations, as adopted by the Manager of Public Works, and each contract requiring payment by the City of one-half million dollars (\$500,000.00) or more shall first be approved by the City Council acting by ordinance and in accordance with Section B1.12.2 of the Charter of the City and County of Denver.

Prior to issuance of Notice to Proceed, all Equal Opportunity requirements must be completed. Additional information may be obtained by contacting the Director of Contract Compliance at (720-913-1700).

**NOTICE OF APPARENT LOW BIDDER**

**CONTRACT NO. 201309801**

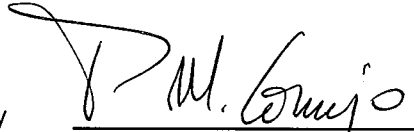
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The Bid Security submitted with your Bid, will be returned upon execution of the Contract and furnishing of the Performance Bond. In the event you should fail to execute the Contract and to furnish the performance Bond within the time limit specified, said Bid Security will be retained by the City and County of Denver as liquidated damages, and not as a penalty for the delay and extra work caused thereby.

Dated at Denver, Colorado this \_\_\_\_\_ day of \_\_\_\_\_ 2013.

CITY AND COUNTY OF DENVER

By



\_\_\_\_\_  
Jose M. Cornejo, P.E.  
Manager of Public Works

**CITY AND COUNTY OF DENVER  
DEPARTMENT OF PUBLIC WORKS**

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BID FORM AND SUBMITTAL PACKAGE**

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***This Checklist is provided solely for the assistance of the bidders, and need not be returned by Bidders with your BID FORM PACKAGE.***

**BIDDER'S CHECKLIST**

These forms comprise the Bid Form and Submittal Package. Designated forms must be completed and turned in at the time of Bid Opening. Bidders should refer to the Contract Documents, particularly the Instructions to Bidders, accompanying this package, in completing these forms.

<b>FORM/ PAGE NO.</b>	<b>COMMENTS</b>	<b>COMPLETE</b>
BF-4 – BF-5	a.) Acknowledgment signature and attestation required.	<input type="checkbox"/>
BF-6+	a.) Fill in individual bid item dollars and totals in Numerical figures only b.) Complete all blanks	<input type="checkbox"/> <input type="checkbox"/>
BF-7	a.) Write out bid total or bid totals in words and figures in the blank form space(s) provided	<input type="checkbox"/>
BF-8	a.) List all subcontractors who are performing work on this project	<input type="checkbox"/>
BF-9 – BF-10	a.) Fully complete List of Proposed Minority /Woman Business Enterprise Bidders, Subcontractors, Suppliers, Manufacturers, or Brokers – check appropriate boxes.	<input type="checkbox"/>
BF-11	a.) Complete all blanks b.) If Addenda have been issued, complete bottom section.	<input type="checkbox"/> <input type="checkbox"/>
BF-12	a.) Complete appropriate sections - signature(s) required. b.) If corporation, then corporate seal required.	<input type="checkbox"/> <input type="checkbox"/>
BF-13	a.) Fully complete Commitment to M/WBE, DBE or SBE Participation	<input type="checkbox"/>
BF-16	a.) If applicable, fully complete Joint Venture Affidavit	<input type="checkbox"/>
BF-17 – BF-19	a.) If applicable, fully complete Joint Venture Eligibility Form	<input type="checkbox"/>



BF-20	a.) Fill in all Bid Bond blanks b.) Signatures required c.) Corporate Seal if required d.) Dated e.) Attach Surety Agents Power of Attorney or Certified or cashier's check made out to the Manager of Revenue referencing Bidder's Company and CE Number.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
BF-21-BF-23	a.) Per form Instructions, fully complete and sign the Bidder/Contractor/Vendor/Proposer Disclosure form as required by IB-24. Ensure form is complete and signed.	<input type="checkbox"/>

**CITY AND COUNTY OF DENVER  
DEPARTMENT OF PUBLIC WORKS**

**BID FORM AND SUBMITTAL PACKAGE ACKNOWLEDGMENT**

**CONTRACT NO. 201309801**

**State Home-Harvard Gulch Irrigation**

**BIDDER:**

CTM, Inc

**ADDRESS:**

P.O. Box 118

Englewood, CO 80151

The undersigned bidder states that the undersigned bidder has received and had an opportunity to fully and thoroughly examine a complete set of the Contract Documents for **Contract No. 201309801, State Home-Harvard Gulch Irrigation**, made available to the undersigned bidder pursuant to Notice of Invitation for Bids dated February 19, 2013.

The undersigned bidder acknowledges that a complete and final set of the Contract Documents for the referenced Project, the components of which are identified below, are bound and maintained as the record set of Contract Documents by the Contract Administration Division of the Department of Public Works and that this Record Set is available for examination by the undersigned bidder.

The undersigned bidder, having thoroughly examined each of the components identified below and contained in Contract Documents, **HEREBY SUBMITS THIS BID FORM AND SUBMITTAL PACKAGE**, fully understanding that the Contract Documents, as defined in Paragraph 1 of the contract, including this executed Bid Form and Submittal Package, constitute all of the terms, conditions and requirements upon which this submission is based and further understanding that, by submission of this Bid Form and Submittal Package, the City shall rely on the representations and commitments of the undersigned bidder contained herein.

The following completed documents comprising this Bid Form and Submittal Package will be included with and, by this reference, are expressly incorporated into the Contract Documents specified at Paragraph 1 of the Contract:

- Bid Form and Submittal Package Acknowledgment Form
- Bid Form
- List of Proposed Minority/Woman Owned Business Enterprise(s)
- Commitment to Minority/Woman Owned Business Enterprise Participation
- Minority/Woman Owned Business Enterprise(s) of Intent
- Joint Venture Affidavit (if applicable)
- Joint Venture Eligibility Form (if applicable)
- Bid Bond
- Bidder / Contractor / Vendor / Proposer Disclosure Form
- Certificate of Insurance

The following designated documents constitute that portion of the Contract Documents made available by the Notice of Invitation for Bids, but not included in the Bid Form and Submittal Package:

- Notice of Invitation for Bids
- Instructions to Bidders
- Addenda (as applicable)
- Equal Employment Opportunity Provisions (Appendix A and Appendix F)
- Contract Form
- General Contract Conditions
- Special Contract Conditions
- Performance and Payment Bond
- Notice to Apparent Low Bidder
- Notice to Proceed
- Contractor's Certification of Payment Form
- Final/Partial Lien Release Form
- Final Receipt
- Change Orders (as applicable)
- Federal Requirements (as applicable)
- Prevailing Wage Rate Schedule(s)
- Technical Specifications
- Contract Drawings
- Accepted Shop Drawings

The undersigned bidder expressly assumes responsibility for the complete contents of these designated documents as bound together with the Bid Form and Submittal Package submitted herewith and designated the Contract Documents.

IN WITNESS WHEREOF, the undersigned bidder has signed personally or by duly authorized officer or agent and duly attested.

**BIDDER:**

Name: \_\_\_\_\_

By: \_\_\_\_\_

Title: CEO

**ATTEST:**

By: \_\_\_\_\_

[SEAL]



**CITY AND COUNTY OF DENVER  
DEPARTMENT OF PUBLIC WORKS**

**BID FORM**

**CONTRACT NO. 201309801  
State Home-Harvard Gulch Irrigation**

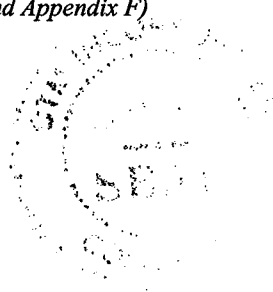
**BIDDER** CTM, INC

**TO:** The Manager of Public Works  
City and County of Denver  
c/o Contract Administration  
201 West Colfax, Dept. 614  
Denver, Colorado 80202

The Undersigned Bidder, having examined the plans, technical specifications, and remainder of the proposed Contract Documents as designated and enumerated in the General and Special Contract Conditions and any and all addenda thereto; having investigated the location of and conditions affecting the proposed Work; and being acquainted with and fully understanding the extent and character of the Work covered by this bid, and all factors and conditions affecting or which may be affected by Work, **HEREBY SUBMITS THIS BID**, pursuant to an advertisement of a Notice of Invitation for Bids as published on **February 19, 2013**, to furnish all required materials, tools, appliances, equipment and plant; to perform all necessary labor and to undertake and complete: **CONTRACT NO. 201309801, State Home-Harvard Gulch Irrigation**, in Denver, Colorado, in full accordance with and conformity to the Plans, Technical Specifications, and Contract Documents hereto attached or by reference made a part hereof, at and for the following price(s) set forth on this Bid Form.

The following documents, which taken as a whole constitute the Contract Documents for this Project, and which are incorporated herein, by reference, were made available to the Bidder as provided in the Advertisement of Notice of Invitation for Bids, were received by the bidder, and form the basis for this bid:

*Advertisement of Notice of Invitation for Bids*  
*Instructions to Bidders*  
*Commitment to M/WBE Participation*  
*Article III, Divisions 1 and 3 of Chapter 28, D.R.M.C.*  
*Bid Bond*  
*Addenda (as applicable)*  
*Equal Employment Opportunity Provisions (Appendix A and Appendix F)*  
*Bid Form*  
*Contract Form*  
*General Contract Conditions*  
*Special Contract Conditions*  
*Performance and Payment Bond*  
*Notice to Apparent Low Bidder*  
*Notice to Proceed*  
*Contractor's Certification of Payment Form*  
*Final/Partial Lien Release Form*  
*Final Receipt*  
*Change Orders (as applicable)*  
*Federal Requirements (as applicable)*  
*Prevailing Wage Rate Schedule(s)*  
*Technical Specifications*  
*Contract Drawing*  
*Accepted Shop Drawings*  
*Certificate of Insurance*



**LUMP SUM BASE BID:** Bidder is to show the cost of materials and labor associated with installation of each of the following bid items as specified on the Drawings and in accordance with the Specifications as referenced:

A. **Mobilization (01010 through 01050 and 01600 through 01999):**

Lump Sum Price \$ 30,000.00

B. **Erosion Control (01565):**

Lump Sum Price \$ 19,995.00

C. **Tree Protection (02150):**

Lump Sum Price \$ 2,000.00

D. **Irrigation System (02810):**

Lump Sum Price \$ 977,767.00

E. **Sodding, Seeding, and Surfacing (02935):**

Lump Sum Price \$ 78,613.00

**TOTAL LUMP SUM BASE BID AMOUNT (Bid Items A thru E):**

One million Fifty eight thousand Three hundred seventy five dollars (\$ 1,058,375.00)

If the Manager mails a written Notice of Apparent Low Bidder, addressed to the Bidder's business address stated on this Bid Form, the Undersigned Bidder shall, in accordance with the Contract Documents, be ready to, and shall, within five (5) days after the date of the Notice: (i) execute the attached form of Contract in conformity with this bid; (ii) furnish the required proofs of insurance; and (iii) furnish the required bond or bonds in the sum of the full amount of this bid, executed by a surety company acceptable to the Manager.

The Developers Surety & Indemnity Co a corporation of the State of Iowa, is hereby offered as Surety on said bond. If such surety is not approved by the Manager, another and satisfactory surety company shall be furnished.

Enclosed with this bid is a bid guarantee, as defined in the attached Instructions to Bidders, in the amount of 1.25 million. The Undersigned Bidder agrees that the entire amount of this bid guarantee is to be paid to and become the property of the City as liquidated damages, and not as a penalty, if: (i) the bid is considered to be the best by the City; (ii) the City notifies the Undersigned Bidder that it is the Apparent Low Bidder; and (iii) the Undersigned Bidder fails to execute the Contract in the form prescribed or to furnish the required bond and proofs of insurance, within five (5) days after the date of such notification.

The following persons, firms or corporations are interested with the Undersigned Bidder in this bid:

Name: \_\_\_\_\_ Name: \_\_\_\_\_

Address: \_\_\_\_\_ Address: \_\_\_\_\_

If there are no such persons, firms, or corporations, please so state in the following space:

None

The Undersigned Bidder proposes to subcontract the following Work in accordance with General Contract Conditions, Title 5, SUBCONTRACTS, and represents that, to the greatest degree practical, all subcontractors known at the time of bid submittal have been identified.

Item of Work	Percent (%) of Total Work	Proposed Subcontractor and Address
Plumbing/tap	7%	CCSI 7581 N. Broadway Denver, CO 80221
directional boring	3%	Temple Const LLC 1404 Swift Dr. Ft Collins CO 80524
Electrical	25%	C&R Electrical Contractors, Inc. P.O. Box 33418, Northglenn, CO 80233
Pump Shed	1%	A Shed 4755 Lipan St Denver, CO 80211

(Copy this page if additional room is required.)



**List of Proposed  
MWBE or DBE  
Bidders, Subcontractors,  
Suppliers (Manufacturers) or Brokers**

Office of Economic Development  
Division of Small Business Opportunity  
Compliance Unit  
201 West Colfax Avenue, Dept. 907  
Denver, CO 80202  
Phone: 720-913-1999  
Fax: 720-913-1803  
OSBO@denvergov.org

City and County of Denver, State of Colorado

The undersigned Bidder proposes to utilize the following MWBE or DBE for the project. All listed firms are **CURRENTLY** certified by the City and County of Denver. Only the level of MWBE or DBE participation listed at the bid opening will count toward satisfaction of the project goal. Only bona fide commissions may be counted for Brokers. MWBE or DBE prime bidders must detail their bid information below. Please copy and attach this page to list additional MWBE or DBE.

Address:	Contact Person:	
Type of Service:	Dollar Amount: \$:	Percent of Project:

**MWBE or DBE Prime Bidder**

Business Name: <i>OTM, Inc</i>		
Address: <i>P.O. Box 118, Englewood, CO 80151</i>		Contact Person: <i>Shannon Willis</i>
Type of Service: <i>erosion control</i>	Dollar Amount: \$: <i>\$24,000.00</i>	Percent of Project: <i>2%</i>

**Subcontractors, Suppliers, Manufacturers or Brokers (check one box)**

<input checked="" type="checkbox"/> Subcontractor (✓)	<input type="checkbox"/> Supplier (✓)	<input type="checkbox"/> Manufacturer (✓)	<input type="checkbox"/> Broker (✓)
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Business Name: <i>CCSI</i>			
Address: <i>7581 No Broadway, Denver, CO 80221</i>		Type of Service: <i>plumbing</i>	
Contact Person: <i>Phil Covarrubias</i>	Dollar Amount: \$: <i>\$20,000.00</i>	Percent of Project: <i>7%</i>	
<input type="checkbox"/> Subcontractor (✓)	<input type="checkbox"/> Supplier (✓)	<input type="checkbox"/> Manufacturer (✓)	<input type="checkbox"/> Broker (✓)

Business Name:			
Address:		Type of Service:	
Contact Person:		Dollar Amount: \$:	Percent of Project:
<input type="checkbox"/> Subcontractor (✓)	<input type="checkbox"/> Supplier (✓)	<input type="checkbox"/> Manufacturer (✓)	<input type="checkbox"/> Broker (✓)

Business Name:			
Address:		Type of Service:	
Contact Person:		Dollar Amount: \$:	Percent of Project:

**Subcontractors, Suppliers, Manufacturers or Brokers (check one box)**

<input type="checkbox"/> Subcontractor (✓)	<input type="checkbox"/> Supplier (✓)	<input type="checkbox"/> Manufacturer (✓)	<input type="checkbox"/> Broker (✓)
Business Name:			
Address:		Type of Service:	
Contact Person:		Dollar Amount: \$:	Percent of Project:
<input type="checkbox"/> Subcontractor (✓)	<input type="checkbox"/> Supplier (✓)	<input type="checkbox"/> Manufacturer (✓)	<input type="checkbox"/> Broker (✓)
Business Name:			
Address:		Type of Service:	
Contact Person:		Dollar Amount: \$:	Percent of Project:
<input type="checkbox"/> Subcontractor (✓)	<input type="checkbox"/> Supplier (✓)	<input type="checkbox"/> Manufacturer (✓)	<input type="checkbox"/> Broker (✓)
Business Name:			
Address:		Type of Service:	
Contact Person:		Dollar Amount: \$:	Percent of Project:
<input type="checkbox"/> Subcontractor (✓)	<input type="checkbox"/> Supplier (✓)	<input type="checkbox"/> Manufacturer (✓)	<input type="checkbox"/> Broker (✓)
Business Name:			
Address:		Type of Service:	
Contact Person:		Dollar Amount: \$:	Percent of Project:
<input type="checkbox"/> Subcontractor (✓)	<input type="checkbox"/> Supplier (✓)	<input type="checkbox"/> Manufacturer (✓)	<input type="checkbox"/> Broker (✓)
Business Name:			
Address:		Type of Service:	
Contact Person:		Dollar Amount: \$:	Percent of Project:
<input type="checkbox"/> Subcontractor (✓)	<input type="checkbox"/> Supplier (✓)	<input type="checkbox"/> Manufacturer (✓)	<input type="checkbox"/> Broker (✓)
Business Name:			
Address:		Type of Service:	
Contact Person:		Dollar Amount: \$:	Percent of Project:
<input type="checkbox"/> Subcontractor (✓)	<input type="checkbox"/> Supplier (✓)	<input type="checkbox"/> Manufacturer (✓)	<input type="checkbox"/> Broker (✓)
Business Name:			
Address:		Type of Service:	
Contact Person:		Dollar Amount: \$:	Percent of Project:



The undersigned Bidder hereby certifies that the aforementioned subcontractors and suppliers have full knowledge that their names have been offered as subcontractors and suppliers for the work, and the Bidder further certifies that the dollar amount of work to be performed by the aforementioned M/WBE(s) was furnished to the Bidder prior to the bid opening. The undersigned Bidder agrees that after the bid opening, it shall submit to the City an executed and completed W/MBE "Letter of Intent" in three working days (3) on each of its M/WBE subcontractors. The "Letter of Intent" form is contained in the Contract Documents.

The undersigned Bidder acknowledges the right of the City to reject any or all bids submitted, to waive informalities in bids and to re-advertise this Project for bids.

The undersigned certifies that it has carefully checked all works and figures and all statements made in these Bid Forms.

This bid is submitted upon the declaration that neither, I (we), nor, to the best of my (our) knowledge, none of the members of my (our) firm or company have either directly or indirectly entered into any agreement, participated in any collusion or otherwise taken any action in restraint of free competitive bidding in connection with this bid.

Business Address of Bidder: P.O. Box 118  
City, State, Zip Code: Englewood, CO 80151  
Telephone Number of Bidder: 303-975-9399 Fax No. 303-975-1323  
Social Security or Federal Employer ID Number of Bidder: 84-1290608

Name and location of the last work of this kind herein contemplated upon which the Bidder was engaged:  
Margaret Carpenter Ree Center, Thornton, CO

For information relative thereto, please refer to:

Name: Ted Johnson, EIT site Construction  
Title: Vice President  
Address: P.O. Box 2135, Loveland, CO 80539

The undersigned acknowledges receipt, understanding, and full consideration of the following addenda to the Contract Documents:

Addenda Number 1 Date 3/1/2013  
Addenda Number 2 Date 3/7/2013  
Addenda Number \_\_\_\_\_ Date \_\_\_\_\_

Dated this 12<sup>th</sup> day of March, 2013.

**Signature of Bidder:**

If an Individual: \_\_\_\_\_ doing business  
as \_\_\_\_\_

If a Partnership: \_\_\_\_\_  
by: \_\_\_\_\_ General Partner.

If a Corporation: CTM Inc.  
a Colorado Corporation,  
by: [Signature], its CEO President.

Attest: [Signature]  
Secretary [Signature]



**If a Joint Venture, signature of all Joint Venture participants.**

Firm: \_\_\_\_\_

Corporation ( ), Partnership ( ) or ( ) Limited Liability Company

By: \_\_\_\_\_ (If a Corporation)  
Attest: \_\_\_\_\_  
Title: \_\_\_\_\_ Secretary (Corporate Seal)

Firm: \_\_\_\_\_

Corporation ( ), Partnership ( ) or ( ) Limited Liability Company

By: \_\_\_\_\_ (If a Corporation)  
Attest: \_\_\_\_\_  
Title: \_\_\_\_\_ Secretary (Corporate Seal)

Firm: \_\_\_\_\_

Corporation ( ), Partnership ( ) or ( ) Limited Liability Company

By: \_\_\_\_\_ (If a Corporation)  
Attest: \_\_\_\_\_  
Title: \_\_\_\_\_ Secretary (Corporate Seal)



# COMMITMENT TO MWBE OR SBE PARTICIPATION

Office of Economic Development  
Division of Small Business Opportunity  
Compliance Unit  
201 West Colfax Avenue, Dept. 907  
Denver, CO 80202  
Phone: 720-913-1999  
Fax: 720-913-1803  
DSBO@denvergov.org

This and/or similar has submitted its offer of sub-participation requirements by the following company (fill in blank lines for the company name):

The Bidder/Proposer is committed to a minimum of 7 % MWBE or SBE utilization on the project, and will submit Letters of Intent (LOI) for each subcontractor/subconsultant listed in the Bid Forms as follows:  
Hard Bids: Three (3) business days after the bid opening  
Request for Proposals: With the proposal when due

The Bidder/Proposer is unable to meet the project goal of \_\_\_\_\_% MWBE or SBE, but is committed to a minimum of \_\_\_\_\_% MWBE or SBE utilization on the project. The Bidder/Proposer understands that they must submit a detailed statement of their good faith effort in accordance with DRMC Section 28-62 and 28-67 of Ordinance 760 and must submit Letters of Intent for each MWBE or SBE listed in the Bid Forms, within three (3) business days after the bid opening or at time proposal is submitted.

The Bidder/Proposer is a certified MWBE or SBE in good standing with the City and is committed to self-perform a minimum of 2 % of the work on the contract.

Bidder/Proposer (Name of Firm): CTM, Inc

Firm's Representative (Please print): Shannon Willis

Signature (Firm's Representative):

Title: CEO

Address: P.O. Box 118

City: Englewood State: CO Zip: 80151

Phone: 303-975-9399 Fax: 303-975-1323 Email: shannon@coloradototal.com

A copy of the MWBE or SBE Certification must be attached.



**DENVER**  
THE MILE HIGH CITY

Office of Economic Development  
Division of Small Business Opportunity  
Compliance Unit  
201 West Colfax Ave., Dept. 907  
Denver, CO 80202  
Phone: 720-913-1999 Fax: 720-913-1803

**LETTER OF INTENT (LOI)**  
**INSTRUCTIONS FOR COMPLETION & SUBMISSION:**

- All lines must be completed or marked N/A for Not Applicable
- Submit the attached completed checklist with this letter
  - Email to [dsbo@denvergov.org](mailto:dsbo@denvergov.org), **OR**
  - Fax: 720-913-1803, **OR**
  - Hand-Delivery: Office Economic Dev. 1st Fl., **"Business Assistance Center (BAC)"**
- **FOR RFPs: LOIs should be submitted with Proposal.**

Contract No.:

Project Name:

**A. The Following Section Is To Be Completed by the Bidder/Consultant**  
**This Letter of Intent Must be Signed by the Bidder/Consultant and M/WBE, SBE or DBE**

Name of Bidder/Consultant:		Self-Performing: <input type="checkbox"/> Yes <input type="checkbox"/> No	Phone:	
Contact Person:	Email:		Fax:	
Address:	City:	State:	Zip:	

**B. The Following Section is To Be Completed by the M/WBE, SBE or DBE, at any Tier**  
**This Letter of Intent Must be Signed by the M/WBE, SBE or DBE and Bidder/Consultant**

Name of Certified Firm:		Phone:		
Contact Person:	Email:		Fax:	
Address:	City:	State:	Zip:	

Please check the designation which applies to the certified firm.	<input type="checkbox"/>	MBE/WBE (√)	<input type="checkbox"/>	SBE (√)	<input type="checkbox"/>	DBE (√)	<input type="checkbox"/>	Self-Performing (√)
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Indirect Utilization:** If this M/WBE, SBE or DBE is not a direct first tier subcontractor/subconsultant, supplier or broker to the Bidder/ Consultant, please indicate the name of the subcontractor/subconsultant, supplier or broker which is utilizing the participation of this firm:

**A Copy of the M/WBE, SBE or DBE Letter of Certification must be Attached**

Identify the scope of the work to be performed or supply item that will be provided by the M/WBE/SBE/DBE. **On unit price bids only, identify which bid line items the M/WBE/SBE/DBEs scope of work or supply corresponds to.**

<input type="checkbox"/>	Subcontractor/Subconsultant (√)	<input type="checkbox"/>	Supplier (√)	<input type="checkbox"/>	Broker (√)
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**Bidder** intends to utilize the aforementioned M/WBE, SBE or DBE for the Work/Supply described above. The cost of the work and percentage of the total subcontractor M/WBE, SBE or DBE bid amount is:

\$		%
----	--	---

**Consultant** intends to utilize the aforementioned M/WBE, SBE or DBE for the Work/Supply described above. The percentage of the work of the total subconsultant M/WBE, SBE or DBE will perform is:

If the fee amount of the work to be performed is requested, the fee amount, is:	\$	%
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Bidder/Consultant's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Title: \_\_\_\_\_

M/WBE, SBE or DBE or Self-Performing Firm's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Title: \_\_\_\_\_

If the above named Bidder/Consultant is not determined to be the successful Bidder/Consultant, this Letter of Intent shall be null and void.

## Letter of Intent (LOI) Checklist

*All lines must be completed or marked N/A for Not Applicable  
Submit the attached completed checklist with this letter.*

<b>Completed ✓</b>	
<input type="checkbox"/>	Project Number & Project Name
<input type="checkbox"/>	<b>Section A:</b> Name of Bidder/Consultant, Contact Person, Address, City, State, Zip, Phone, Email
<input type="checkbox"/>	<b>Section B:</b> Name of Certified Firm, Contact Person, Address, City, State, Zip, Phone, Email
<input type="checkbox"/>	Designation checked for MBE/WBE, SBE or DBE
<input type="checkbox"/>	<b>Indirect Utilization:</b> Name of subcontractor/subconsultant, supplier or broker is indicated if using the participation of a 2 <sup>nd</sup> tier subcontractor/subconsultant, supplier or broker.
<input type="checkbox"/>	Scope of work performed or item supplied by M/WBE, SBE or DBE
<input type="checkbox"/>	Line items performed, if line-item bid.
<input type="checkbox"/>	Copy of M/WBE, SBE or DBE Letter of Certification Attached
<input type="checkbox"/>	Designation checked for Subcontractor/Subconsultant, Supplier or Broker
	<b>If project is a hard bid...</b>
<input type="checkbox"/>	Bidder has indicated dollar amount for value of work going to Subcontractor/ Subconsultant, Supplier or Broker
<input type="checkbox"/>	Bidder has indicated percentage for value of work going to Subcontractor/ Subconsultant, Supplier or Broker
	<b>If project is an RFP/RFQ...</b>
<input type="checkbox"/>	Consultant has indicated percentage for value of work going to Subcontractor/ Subconsultant, Supplier or Broker Name & contact name for MWBE.
<input type="checkbox"/>	Fee amount if fee amount of work to be performed is requested.
<input type="checkbox"/>	Bidder/Consultant's Signature, Title & Date
<input type="checkbox"/>	M/WBE, SBE or DBE Firm's Signature, Title and Date

<b>Select One ✓</b>	<b>SUBMITTED VIA...</b> (Bidder/Consultant is strongly urged to deliver the LOI via one of the methods below. Delivery to any other point cannot be guaranteed timely delivery.)
<input type="checkbox"/>	Email to DSBO@denvergov.org
<input type="checkbox"/>	Fax to 720-913-1803
<input type="checkbox"/>	Hand Delivery to Office of Economic Development, <b>1<sup>st</sup> Floor, "Business Assistance Center"</b>

**The complete and accurate information that is required for the Letter of Intent is based on the following sections of the Ordinance: Section 28-63 and Section 28-68. Failure to complete this information on the Letter of Intent (LOI) may automatically deem a bid or proposal non-responsive.**

COMP-FRM-012 Revised 04/12/12



**DENVER**  
THE MILE HIGH CITY

# JOINT VENTURE AFFIDAVIT

Office of Economic Development  
Division of Small Business Opportunity  
Compliance Unit  
201 West Colfax Avenue, Dept. 907  
Denver, CO 80202  
Phone: 720-913-1999  
Fax: 720-913-1803  
DSBO@denvergov.org

The Undersigned swear that the foregoing statements are correct and include all material information necessary to identify and explain the terms and operation of our joint venture and the intended participation by each joint venturer in the undertaking. Further, the Undersigned covenant and agree to provide the City current, complete, and accurate information regarding actual joint venture work and the payment thereof and any proposed changes in any of the joint venture arrangements and to permit the audit and examination of the books, records, and files of the joint venture, by authorized representatives of the City or Federal funding agency, if applicable. Any material misrepresentation will be grounds for terminating any contract which may be awarded and for initiating action under Federal or State laws concerning false statements.

Name of Firm: _____		
Print Name: _____		Title _____
Signature: _____		Date: _____
<b>Notary Public</b>		
County of _____	State of _____	My Commission Expires: _____
Subscribed and sworn before me this _____ day of _____, 20_____		Notary Seal
Notary Signature: _____		
Address: _____		
Name of Firm: _____		
Print Name: _____		Title _____
Signature: _____		Date: _____
<b>Notary Public</b>		
County of _____	State of _____	My Commission Expires: _____
Subscribed and sworn before me this _____ day of _____, 20_____		Notary Seal
Notary Signature: _____		
Address: _____		
Name of Firm: _____		
Print Name: _____		Title _____
Signature: _____		Date: _____
<b>Notary Public</b>		
County of _____	State of _____	My Commission Expires: _____
Subscribed and sworn before me this _____ day of _____, 20_____		Notary Seal
Notary Signature: _____		
Address: _____		

Rev 122910 JG



## JOINT VENTURE ELIGIBILITY FORM

Office of Economic Development  
 Division of Small Business Opportunity  
 Compliance Unit  
 201 West Colfax Ave. Dept. 907  
 Denver, CO 80202  
 Phone: (720) 913-1999  
 Fax: (720) 913-1803

**Joint Venture means** an association of two (2) or more business enterprises to constitute a single business enterprise to perform a City construction or professional design and construction services contract for which purpose they combine their property, capital, efforts, skills and knowledge, and in which each joint venturer is responsible for a distinct, clearly defined portion of the work of the contract, performs a commercially useful function, and whose share in the capital contribution, control, management responsibilities, risks and profits of the joint venture are equal to its ownership interest. Joint ventures must have an agreement in writing specifying the terms and conditions of the relationships between the joint venturers and their relationship and responsibility to the contract.

The Division of Small Business Opportunity (DSBO) requires the following information be provided from participants of a prospective joint venture, to assist DSBO in evaluating the proposed joint venture. This Joint Venture Eligibility form and the Joint Venture Affidavit apply if SBEs, MBEs, WBEs or DBEs participate in this joint venture.

Please return this form, the Joint Venture Affidavit and a copy of your Joint Venture Agreement to: Division of Small Business Opportunity, 201 West Colfax Avenue, Denver, CO 80202, at least ten (10) days prior to bid opening or proposal.

If you have questions regarding this process, please contact DSBO at 720-913-1999.

### Joint Venture Information

Name:		Contact Person:	
Address:			
City:	State:	Zip:	Phone:

### Joint Venture Participants

Name:		Contact Person:	
Address			
City	State:	Zip:	Phone:
% Ownership:	Certifying Entity:	Type Certification & Date: (S/M/W or DBE)	
Type of Work for which Certification was granted:			

Name:		Contact Person:	
Address			
City	State:	Zip:	Phone:
% Ownership:	Certifying Entity:	Type Certification & Date: (S/M/W or DBE)	
Type of Work for which Certification was granted:			

### General Information

SBE/MBE/WBE/DBE Initial Capital Contributions: \$ _____ %
Future capital contributions (explain requirements) (attach additional sheets if necessary):
Source of Funds for the SBE/MBE/WBE/DBE Capital Contributions:
Describe the portion of the work or elements of the business controlled by the SBE/MBE/WBE or DBE (attach additional sheets if necessary):
Describe the portion of the work or elements of the business controlled by non-SBE/MBE/WBE or DBE: (attach additional sheets if necessary)

## JOINT VENTURE ELIGIBILITY FORM

### General information

Describe the SBE/MBE/WBE or DBE's involvement in the overall management of the joint venture (e.g., participation on a management committee or managing board voting rights, etc.) (attach additional sheets if necessary)

Describe the SBE/MBE/WBE or DBE's share in the profits of the joint venture:

Describe the SBE/MBE/WBE or DBE's share in the risks of the joint venture:

Describe there roles and responsibilities of each joint venture participant with respect to managing the joint venture (use additional sheets if necessary):

a. SBE/MBE/WBE or DBE joint venture participant:

b. Non- SBE/MBE/WBE or DBE joint venture participant:

Describe the roles and responsibilities of each joint venture participant with respect to operation of the joint venture (use additional sheets if necessary):

a. SBE/MBE/WBE or DBE joint venture participant:

b. Non- SBE/MBE/WBE or DBE joint venture participant:

Which firm will be responsible for accounting functions relative to the joint venture's business?

Explain what authority each party will have to commit or obligate the other to insurance and bonding companies, financing institutions, suppliers, subcontractors, and/or other parties?

Please provide information relating to the approximate **number** of management, administrative, support and non-management employees that will be required to operate the business and indicate whether they will be employees of the SMWBE, non-SMWBE or joint venture:

	Non- SBE/MBE/WBE/DBE	SBE/MBE/WBE/DBE	Joint Venture
<b>Management</b>			
<b>Administrative</b>			
<b>Support</b>			
<b>Hourly Employees</b>			



## JOINT VENTURE ELIGIBILITY FORM

### General Information

Please provide the name of the person who will be responsible for hiring employees for the joint venture.

Who will they be employed by?

Are any of the proposed joint venture employees currently employees of any of the joint venture partners?

Yes  
(√)

No  
(√)

If yes, please list the number and positions and indicate which firm currently employs the individual(s), (use additional sheets if necessary)

Number of employees		Position	Employed By

Attached a copy of the proposed joint venture agreement, promissory note or loan agreement (if applicable), and any and all written agreements between the joint venture partners.

List all other business relationships between the joint venture participants, including other joint venture agreements in which the parties are jointly involved.


If there are any significant changes in or pertaining to this submittal, the joint venture members must immediately notify the Division of Small Business Opportunity.

COMP-FRM-015

**CITY AND COUNTY OF DENVER  
DEPARTMENT OF PUBLIC WORKS**

**BID BOND**

KNOW ALL MEN BY THESE PRESENTS:

THAT \_\_\_\_\_, as Principal, and \_\_\_\_\_, a corporation organized and existing under and by virtue of the laws of the State of \_\_\_\_\_, and authorized to do business within the State of Colorado, as Surety, are held and firmly bound unto the City and County of Denver, Colorado, as Oblige, in full and just sum of \_\_\_\_\_ Dollars, (\$ \_\_\_\_\_), lawful money of the United States, for the payment of which sum, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents:

WHEREAS, the said Principal is herewith submitting its bid, dated \_\_\_\_\_, 20\_\_ , for the construction of: **Contract No. 201309801, STATE HOME-HARVARD GULCH IRRIGATION**, as set forth in detail in the Contract Documents for the City and County of Denver, Colorado, and said Oblige has required as a condition for receiving said bid that the Principal deposit specified bid security in the amount of not less than five percent (5%) of the amount of said bid, as it relates to work to be performed for the City, conditioned that in event of failure of the Principal to execute the Contract, for such construction and furnish required Performance and Payment Bond if the contract is offered him that said sum be paid immediately to the Oblige as liquidated damages, and not as a penalty, for the Principal's failure to perform.

The condition of this obligation is such that if the aforesaid Principal shall, within the period specified therefore, on the prescribed form presented to him for signature, enter into a written contract with the Oblige in accordance with his bid as accepted and give Performance and Payment Bond with good and sufficient surety or sureties, upon the form prescribed by the Oblige, for the faithful performance and the proper fulfillment of said Contract, or in the event of withdrawal of said bid within the time specified, or upon the payment to the Oblige of the sum determined upon herein, as liquidated damages and not as penalty, in the event the Principal fails to enter into said contract and give such Performance and Payment Bond within the time specified, then this Obligation shall be null and void, otherwise to remain in full force and effect.

Signed, sealed and delivered this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_ .

ATTEST

\_\_\_\_\_  
Secretary

\_\_\_\_\_  
Principal

By \_\_\_\_\_

Title \_\_\_\_\_

\_\_\_\_\_  
Surety

By \_\_\_\_\_

Seal if Bidder is Corporation  
(Attach Power-of-Arrowney)

[SEAL]

**CITY AND COUNTY OF DENVER  
DEPARTMENT OF PUBLIC WORKS**

**BIDDER/CONTRACTOR/VENDOR/PROPOSER DISCLOSURE FORM**

Bidding Entity's/Proposer's Name	Date this form was completed
Address	(____)_____
City, State, Zip Code	Telephone Number
	Name of Officer/Owner completing this Form

**INSTRUCTIONS**

1. Section 20-69 of the Denver Revised Municipal Code provides that the public interest is best served by maximum disclosure of political contributions made to candidates seeking election to City office by persons transacting business with the City and County of Denver. This Disclosure Form was devised to insure that City Bidder/Contractor/Vendor/Proposers comply with all applicable requirements of Section 20-69, D.R.M.C.
  
2. Complete each applicable Section of this Form in accordance with the following instructions and return it to the appropriate City official as directed.
  
3. If your business entity has previously submitted a Form **and** the information provided in this previously submitted Form **has not changed**, you need only complete Section 6 and return the Form.
  
4. If your business entity has not previously submitted a Form or any of the information contained in a previously submitted Form **has changed**, you must identify in Section 1 the **name of each** of the following for your business entity: (a) any director, (b) any officer, (c) any principal, (d) any owner and (e) any shareholder who owns or controls 5% or more of your entity.
  
5. If you are required to complete Section 1, you must also **EITHER**:
  - (A) Identify in Section 2, for each person listed in Section 1, that person's spouse, if any, and any children of that person, under the age of eighteen (18);
  
  - OR**
  
  - (B) Identify in Section 3, any person listed in Section 1 and any spouse or age eighteen (18) or under child of any person listed in Section 1 that made a CONTRIBUTION, as defined in D.R.M.C. 15-32, to any CANDIDATE, as also defined in D.R.M.C. 15-32, during the last five (5) years,
  
- AND**
  
- Certify in Section 4 that, except as disclosed in Section 3, no other person listed in Section 1 or any spouse or child under the age of eighteen (18) of any person listed in Section 1 made a contribution to any candidate, as these terms are defined in D.R.M.C. 15-32, during the last five (5) years.
  
6. And finally, if your bid/contract/purchase order/proposal includes subcontractors, subconsultants or suppliers receiving **more than** \$100,000.00 for any work performed, materials provided or services rendered **or** your business entity has a collective bargaining agreement with any union, you must identify each such subcontractor/subconsultant/supplier and each such union in Section 5.

**SECTION 1. MUST BE FILLED OUT BY ALL BIDDER/PROPOSERS/CONTRACTORS/VENDORS:**

Identify below each individual having the noted relationship with the business entity listed above. Show appropriate letter in the box to the left. A = Officer, B= Director, C = Principal, D = Owner, E= Controller of 5% or more of the stock. If more than one category applies, show in second box.

- |                  |                   |
|------------------|-------------------|
| 1. [ ] [ ] _____ | 9. [ ] [ ] _____  |
| 2. [ ] [ ] _____ | 10. [ ] [ ] _____ |
| 3. [ ] [ ] _____ | 11. [ ] [ ] _____ |
| 4. [ ] [ ] _____ | 12. [ ] [ ] _____ |
| 5. [ ] [ ] _____ | 13. [ ] [ ] _____ |
| 6. [ ] [ ] _____ | 14. [ ] [ ] _____ |
| 7. [ ] [ ] _____ | 15. [ ] [ ] _____ |
| 8. [ ] [ ] _____ | 16. [ ] [ ] _____ |

EITHER FILL OUT SECTION 2 OR SECTION 3 AND SECTION 4 IF APPLICABLE.

**SECTION 2. Identify below each individual that is the spouse or a child under the age of eighteen (18) of any individual listed in Section 1 above.** Use the first box to designate relationship as follows; F = Spouse, G = Child under 18. Use the second box to identify relationship to person listed in Section 1 above. For example, if on Line 3 of Section 1 the name of John Doe is listed and his spouse, Jane Doe is listed on line 7 of Section 2, the number 3 should be placed in the second box of line 7 of Section 2.

- |                  |                   |
|------------------|-------------------|
| 1. [ ] [ ] _____ | 9. [ ] [ ] _____  |
| 2. [ ] [ ] _____ | 10. [ ] [ ] _____ |
| 3. [ ] [ ] _____ | 11. [ ] [ ] _____ |
| 4. [ ] [ ] _____ | 12. [ ] [ ] _____ |
| 5. [ ] [ ] _____ | 13. [ ] [ ] _____ |
| 6. [ ] [ ] _____ | 14. [ ] [ ] _____ |
| 7. [ ] [ ] _____ | 15. [ ] [ ] _____ |
| 8. [ ] [ ] _____ | 16. [ ] [ ] _____ |

**SECTION 3. DISCLOSURE OF CONTRIBUTION BY PERSONS LISTED IN SECTION 1 AND DISCLOSURE OF ANY SPOUSE OR CHILD UNDER THE AGE OF EIGHTEEN (18) OF A PERSON LISTED IN SECTION 1 WHO HAS MADE A CONTRIBUTION:**

List the names of any person listed in Section 1 who has made a contribution and the name of any spouse or child under the age of eighteen (18) of any person listed in Section 1 who has made a contribution during the last five (5) years. Use the first box to identify the person: A = Officer, B = Director, C = Principal, D = Owner, E = Controller of 5% or more of the stock, F = Spouse, G= Child under 18, use the second box to identify relationship of spouse or child listed to person listed in Section 1.

- |                  |                   |
|------------------|-------------------|
| 1. [ ] [ ] _____ | 9. [ ] [ ] _____  |
| 2. [ ] [ ] _____ | 10. [ ] [ ] _____ |
| 3. [ ] [ ] _____ | 11. [ ] [ ] _____ |
| 4. [ ] [ ] _____ | 12. [ ] [ ] _____ |
| 5. [ ] [ ] _____ | 13. [ ] [ ] _____ |
| 6. [ ] [ ] _____ | 14. [ ] [ ] _____ |
| 7. [ ] [ ] _____ | 15. [ ] [ ] _____ |
| 8. [ ] [ ] _____ | 16. [ ] [ ] _____ |

**SECTION 4. BIDDER/CONTRACTOR/VENDOR/PROPOSER CERTIFIED STATEMENT IN LIEU OF DISCLOSURE.**

I hereby certify that, except as listed above, no officer, director, shareholder who owns or controls 5% or more of the business entity, principal, owner or his or her spouse or child under eighteen years of age has made a contribution, as defined in Section 15-32 D.R.M.C., or a contribution in kind, as defined at Section 15-32 D.R.M.C., to a candidate, as defined at Section 15-32 D.R.M.C., during the last five years.

\_\_\_\_\_  
Authorized Signature of Officer/Owner of Business Entity

**SECTION 5. DISCLOSURE OF SUBCONTRACTORS, SUPPLIERS AND UNIONS.** List the names of any unions with which your entity has a collective bargaining agreement and the names of any subcontractors or suppliers whose share of the amount to be paid by the City for this contract, purchase order or proposal will exceed One Hundred Thousand Dollars (\$100,000.00), identifying them in the box provided as follows: H = Subcontractor, I = Supplier, J = Union.

- |                  |                   |
|------------------|-------------------|
| 1. [ ] [ ] _____ | 9. [ ] [ ] _____  |
| 2. [ ] [ ] _____ | 10. [ ] [ ] _____ |
| 3. [ ] [ ] _____ | 11. [ ] [ ] _____ |
| 4. [ ] [ ] _____ | 12. [ ] [ ] _____ |
| 5. [ ] [ ] _____ | 13. [ ] [ ] _____ |
| 6. [ ] [ ] _____ | 14. [ ] [ ] _____ |
| 7. [ ] [ ] _____ | 15. [ ] [ ] _____ |
| 8. [ ] [ ] _____ | 16. [ ] [ ] _____ |

**SECTION 6. CERTIFIED STATEMENT OF PREVIOUS DISCLOSURE.**

I hereby certify that the information required to be disclosed by Section 20-69(d) D.R.M.C. [i.e. the information contained in responses to Sections 1, 2, 3, 4, 5 and 6 of this Form] for \_\_\_\_\_ has previously been furnished

Name of Entity

to the City and County of Denver and is on file with the City Clerk and further certify that such information is current as of the date indicated below.

\_\_\_\_\_  
 Authorized Signature of Officer/Owner of  
 Business

\_\_\_\_\_  
 Date

Entity



**DENVER**  
THE MILE HIGH CITY

MAR 07 2013

Department of Public Works  
Office of the Manager

201 W. Colfax Avenue, Dept. 608  
Denver, CO 80202  
P: 720-865-8630  
F: 720-865-8795  
[www.denvergov.org/PublicWorks](http://www.denvergov.org/PublicWorks)

March 1, 2013

Ms. Shannon Willis  
CTM INC.  
PO Box 118  
Englewood, CO 80151

Dear Ms. Willis:

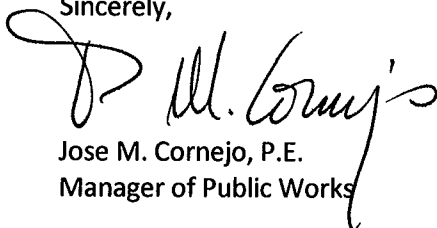
The Contractor's Prequalification Board has reviewed the application submitted by your firm. The Board has recommended that your firm be allowed to bid City and County of Denver construction projects requiring approval in category 2a-Landscape Improvements at \$1,500,000.00. The Manager of the Department of Aviation and I have reviewed the recommendation and approve your prequalification. Your firm will not need to prequalify for bids that open prior to Sunday, June 30, 2013.

Compliance with the "RULES FOR PREQUALIFICATION OF CONSTRUCTION CONTRACTORS" with the Departments of Aviation and Public Works of the City and County of Denver is necessary in order to ensure acceptable bids. Should you wish to bid on any other project in which the cost of construction is estimated to exceed your bid limit, or if you intend to participate in excess of \$1,000,000 in a joint venture, you must submit a written request for further consideration by the Prequalification Board.

We appreciate your interest in bidding on City and County of Denver contracts and look forward to working with you in the future.

Should you have any questions concerning the prequalification process, do not hesitate to contact us at 720.865.2539.

Sincerely,

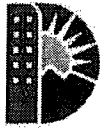


Jose M. Cornejo, P.E.  
Manager of Public Works

cc: Prequalification Board File



*Protecting the Present & Building the Future*  
Accountability, Innovation, Empowerment, Performance, Integrity,  
Diversity, Teamwork, Respect, Excellence, Safety



**DENVER**  
THE MILE HIGH CITY

OCT 22 2012

Office of Economic Development  
Division of Small Business Opportunity

201 W. Colfax Ave, Dept 907  
Denver, CO 80202  
p: 720.913.1999  
f: 720.913.1809  
www.milehigh.com

10/15/2012

2012  
extend

Shannon Willis  
CTM, Inc. DBA Colorado Total Maintenance  
PO Box 118  
Englewood, CO 80151

Denver International Airport  
Airport Office Building, Suite 7810  
8500 Peña Boulevard  
Denver, CO 80249-6340  
p: 303.342.2180  
f: 303.342.2190  
www.flydenver.com

Dear Shannon Willis:

The City and County of Denver, Division of Small Business Opportunity (DSBO) is in receipt of your renewal application for CTM, Inc. DBA Colorado Total Maintenance.

We are extending your certification while your application is in process. Therefore, CTM, Inc. DBA Colorado Total Maintenance will have the following certifications until further notice:

- Airport Concessionaire Disadvantaged Business Enterprise (ACDBE)
- Disadvantaged Business Enterprise (DBE)
- Small Business Enterprise (SBE)
- Small Business Enterprise-Concessions (SBEC)
- Minority/Women Business Enterprise (MWBE)

Review of your documentation will begin in the near future. Please note that at any time during this review, a Certification Analyst may request additional information to complete the review.

Please notify our office immediately, if there are any changes in legal status, management, control, or ownership of your business, contact information, etc, from that provided on the documentation submitted to our office.

If you have any questions, please contact us at (720) 913-1999 or via email at [certificationinfo@denvergov.org](mailto:certificationinfo@denvergov.org). Thank you.

Sincerely,

Bridget Tetteh  
Certification Team  
[certificationinfo@denvergov.org](mailto:certificationinfo@denvergov.org)  
(720) 913-1714



**DENVER**  
THE MILE HIGH CITY

NOV 22 2011

Office of Economic Development  
Division of Small Business Opportunity

201 W. Colfax Ave, Dept 907  
Denver, CO 80202  
p: 720.913.1999  
f: 720.913.1809  
www.milehigh.com

Denver International Airport  
Airport Office Building, Suite 7810  
8500 Peña Boulevard  
Denver, CO 80249-6340  
p: 303.342.2180  
f: 303.342.2190  
www.flydenver.com

November 14, 2011

Shannon Willis  
CTM, Inc. DBA Colorado Total Maintenance  
PO Box 118  
Englewood, CO 80151

Dear Shannon Willis:

**SUBJECT: SBE PROGRAM CERTIFICATION, Pursuant to Article VII, Div. 1, Chapter 28 of the D.R.M.C. Construction, Reconstruction, Remodeling and Professional Design, Construction Services and Concessions**

The City and County of Denver's Division of Small Business Opportunity (DSBO), has approved CTM, Inc. DBA Colorado Total Maintenance for certification as a Small Business Enterprise (SBE). CTM, Inc. DBA Colorado Total Maintenance will be listed in the City and County of Denver's Small Business Enterprise (SBE) Certification Directory with the certification dates of:

**November 3, 2011 to November 2, 2012**

The following is each Category, Subcategory and Work Specialty for which CTM, Inc. DBA Colorado Total Maintenance is certified:

**CATEGORY/SUB CATEGORY:**

DENVER-101: ATHLETIC FIELD CONSTRUCTION  
DENVER-10204: CONCRETE FLATWORK AND CURB AND GUTTER (REMOVE AND INSTALL)  
DENVER-103: DEMOLITION/SITE CLEARING/ETC.  
DENVER-106: EXCAVATING/EARTHWORK/CLEARING AND GRUB/ETC.  
DENVER-10902: TRASH PICK-UP  
DENVER-10904: CONSTRUCTION CLEANUP  
DENVER-10905: GROUND MAINTENANCE  
DENVER-205: CONCRETE FLATWORK  
DENVER-21003: GRADING  
DENVER-214: FENCING  
DENVER-23904: CONCRETE FLATWORK/PAVEMENT  
DENVER-241: RETAINING WALLS (OTHER THAN CAST IN PLACE CONCRETE)  
DENVER-24601: CONCRETE  
DENVER-248: SNOW REMOVAL-HIGHWAY  
DENVER-261: LAND RECLAMATION  
DENVER-26701: EROSION LOG  
DENVER-26702: SILT FENCE  
DENVER-26703: CONCRETE WASHOUT STRUCTURE  
DENVER-26704: STORM DRAIN INLET PROTECTION

**311**

for City Services  
Denver gets it done!



**WORK SPECIALTY:**

Retaining Wall Installation, Tree Trimming and Removal, Concrete Flat Work, Chemical Spraying, Snow Removal, Trash Pickup, Land reclamation

This Certification is intended to be used only for participation in city funded projects, and/or certain privately funded projects on city-owned property for contracts with construction, reconstruction, remodeling and professional design and construction services.

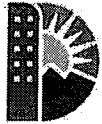
Certified companies are required to maintain accurate mailing address and telephone number information with DSBO and to notify this office immediately of any changes in ownership or control of the company. Failure to report any of these changes may result in removal from the Certification Directory and possible revocation of Certification.

Please be aware that **SBE Certifications are for a period of one (1) year, and must be renewed annually.** It is your responsibility to request and submit a SBE Eligibility Affidavit and the additional information requested within the affidavit to our office at least thirty (30) days prior to the annual expiration date of the SBE Certification of your business enterprise.

Sincerely,

Chris Martinez  
Director

CM/mg



**DENVER**  
THE MILE HIGH CITY

Office of Economic Development  
Division of Small Business Opportunity

NOV 9 2 2011

201 W. Colfax Ave, Dept 907  
Denver, CO 80202  
p: 720.913.1999  
f: 720.913.1809  
www.milehigh.com

Denver International Airport  
Airport Office Building, Suite 7810  
8500 Peña Boulevard  
Denver, CO 80249-6340  
p: 303.342.2180  
f: 303.342.2190  
www.flydenver.com

November 14, 2011

Shannon Willis  
CTM, Inc. DBA Colorado Total Maintenance  
PO Box 118  
Englewood, CO 80151

Dear Shannon Willis:

**SUBJECT: Minority/Women Business Enterprise Program Certification, Pursuant to Division 3 of Article III, Chapter 28 of the DRMC – Construction, Reconstruction, Remodelling and Professional Design and Construction Services.**

The City and County of Denver's Division of Small Business Opportunity (DSBO) has approved CTM, Inc. DBA Colorado Total Maintenance for certification as a **Minority/Women Business Enterprise (M/WBE)**. In addition, your business enterprise will be listed in the monthly-published Certification Directory with the Certification Dates of:

**November 3, 2011 to November 2, 2012**

The following is each Category, Subcategory and Work Specialty for which you are listed:

**CATEGORY:**

DENVER-101: ATHLETIC FIELD CONSTRUCTION  
DENVER-10204: CONCRETE FLATWORK AND CURB AND GUTTER (REMOVE AND INSTALL)  
DENVER-103: DEMOLITION/SITE CLEARING/ETC.  
DENVER-106: EXCAVATING/EARTHWORK/CLEARING AND GRUB/ETC.  
DENVER-10902: TRASH PICK-UP  
DENVER-10904: CONSTRUCTION/CLEANUP  
DENVER-10905: GROUND MAINTENANCE  
DENVER-205: CONCRETE FLATWORK  
DENVER-21003: GRADING  
DENVER-214: FENCING  
DENVER-23904: CONCRETE FLATWORK/PAVEMENT  
DENVER-241: RETAINING WALLS (OTHER THAN CAST IN PLACE CONCRETE)  
DENVER-24601: CONCRETE  
DENVER-248: SNOW REMOVAL-HIGHWAY  
DENVER-261: LAND RECLAMATION

**WORK SPECIALTY:**

Retaining Wall Installation, Tree Trimming and Removal, Concrete Flat Work, Chemical Spraying, Snow Removal, Trash Pickup, Land reclamation

This Certification is intended to be used only for participation on projects subject to the provisions of Division 3 of Article III, Chapter 28, DRMC (the "MBE/WBE Ordinance") and advertised as such in the solicitation for bids or proposals.

Your business enterprise is required to maintain accurate mailing address and telephone number information with the DSBO, and to notify this office immediately of any changes in ownership or control of your business enterprise. Failure to report any of these changes may result in removal of your business enterprise from the Certification Directory and possible revocation of certification of your business enterprise as an MBE/WBE.

Please be aware that **MBE/WBE Certifications are for a period of one (1) year, and must be renewed annually.** It is your responsibility to request and submit a MBE/WBE Eligibility Affidavit and the additional information requested within the affidavit to our office at least thirty (30) days prior to the annual expiration date of the MBE/WBE Certification of your business enterprise.

Sincerely,



Chris Martinez  
Director

GM/mg



**DENVER**  
THE MILE HIGH CITY

Office of Economic Development  
Division of Small Business Opportunity

NOV 9 2 2011

201 W. Colfax Ave, Dept 907  
Denver, CO 80202  
p: 720.913.1999  
f: 720.913.1809  
www.milehigh.com

Denver International Airport  
Airport Office Building, Suite 7810  
8500 Peña Boulevard  
Denver, CO 80249-6340  
p: 303.342.2180  
f: 303.342.2190  
www.flydenver.com

November 14, 2011

Shannon Willis  
CTM, Inc. DBA Colorado Total Maintenance  
PO Box 118  
Englewood, CO 80151

Dear Shannon Willis:

The Division of Small Business Opportunity is pleased to inform you that CTM, Inc. DBA Colorado Total Maintenance is certified as a Disadvantaged Business Enterprise (DBE) pursuant to the US Department of Transportation's Regulation 49 CFR Part 26. CTM, Inc. DBA Colorado Total Maintenance is eligible to participate as a DBE on US Department of Transportation financially-assisted projects in Colorado in the work categories listed on the enclosed attachment. Your firm will be included on the Colorado Unified Certification Program's (UCP) on-line directory of eligible DBE's. You can access the directory at [www.dot.state.co.us/app\\_ucp/](http://www.dot.state.co.us/app_ucp/).

Certification Number: 8429

Annual Update Due: November 3, 2012

This certification is valid through November 3, 2013 but must be updated annually prior to the anniversary of the certification date. A reminder with instructions will be sent the month prior to your annual due date. If you do not receive the reminder, it is your responsibility to request a Change Affidavit from this office. The annual updates are necessary to ensure no interruption in your firm's DBE eligibility. If any change occurs in the firm's legal structure, ownership, management, control, or work performed, you must notify the Division of Small Business Opportunity immediately.

The State of Colorado's UCP partners wish you great success in all your business endeavors.

Sincerely,

Chris Martinez  
Director  
CM/mg

Enclosure: Certificate

**CTM, INC.**  
**DBA COLORADO TOTAL MAINTENANCE**  
**Certification #8429**

*Is hereby certified as a Disadvantaged Business Enterprise pursuant to U.S. Department of Transportation DBE regulations found at 49 CFR, Parts 23 and 26 and administered by Colorado's UCP.*

**Work Codes**

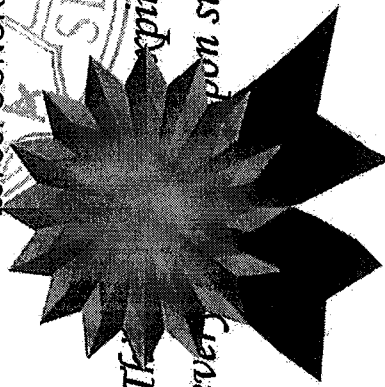
- 101: ATHLETIC FIELD CONSTRUCTION
- 10204: CONCRETE FLATWORK AND CURB AND GUTTER (REMOVE AND INSTALL)
- 103: DEMOLITION/SITE CLEARING/ETC. 106: EXCAVATING/EARTHWORK/CLEARING AND GRUB/ETC.
- 10902: TRASH PICK-UP 10904: CONSTRUCTION CLEANUP
- 10905: GROUND MAINTENANCE 205: CONCRETE FLATWORK
- 21003: GRADING 214: FENCING
- 23904: CONCRETE FLATWORK/PAVEMENT
- 241: RETAINING WALLS (OTHER THAN CAST IN PLACE CONCRETE)
- 24601: CONCRETE 248: SNOW REMOVAL-HIGHWAY
- 261: LAND RECLAMATION 26701: EROSION LOG 26702: SILT FENCE
- 26703: CONCRETE WASHOUT STRUCTURE 26704: STORM DRAIN INLET PROTECTION

Certification Date: September 16, 2010 to November 9, 2013

*The [redacted] expires on the aforementioned date. A new certificate will be issued ending every [redacted] upon successfully meeting annual renewal requirements.*

*Chris Martinez* November 14, 2011  
 Chris Martinez, Director Date

UCP Partner at City and County of Denver





# Certified Landscape Technician - Exterior

*The International Landscape Technician Council is proud to present to*

**R. Christopher Willis, CLT**

*this certificate recognizing professional status in the Landscape Industry as a fully qualified*

## Certified Landscape Technician of Installation

*The certificate holder has met the high standards dictated by the International Landscape Technician Council and is recognized and accepted by its members as having achieved Certified Landscape Technician status*

October 16, 2002



*Judd Brubaker, CLT*  
Certification Committee Chair



Associated Landscape Contractors of Colorado  
*Professionals Committed to Excellence*

CITY AND COUNTY OF DENVER

STATE OF COLORADO



DEPARTMENT OF PUBLIC WORKS/ PARKS AND RECREATION DIVISION

## **Addendums 1-2**

**Contract No. 201309801**

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**State Home-Harvard Gulch Irrigation**

**February 19, 2013**

**CITY AND COUNTY OF DENVER  
DEPARTMENT OF PUBLIC WORKS**

**CONTRACT NO. 201209801  
PROJECT NAME: STATE HOME-HARVARD GULCH IRRIGATION**

**ADDENDUM NO. 1 TO CONTRACT DOCUMENTS**

Bidders are hereby instructed that the drawings, specifications, and other contract documents are modified, corrected, supplemented and/or superseded for the above mentioned project as hereinafter described in the following attachments:

**BID FORM PACKAGE**

Revise BF-7. Use attached form in bid submittal package.

**BID DOCUMENT PACKAGE**

**TECHNICAL SPECS/DRAWING**

**QUESTIONS AND ANSWERS**

- 1. Question:** In Specification Section 02810 page 7 paragraph 1.9.A “one remote control device for each project” is required. Detail D on Plan Sheet IR26 calls for a total of 2 hand-held transceivers. Please clarify how many remotes will be required.  
**Response:** One hand held transceiver will be supplied as a turn over item.
- 2. Question:** In Specification Section 02810 page 8 paragraph 1.10 the maintenance responsibilities of the contractor is not clear. Please clarify exactly how much mowing, watering, weed control, etc will be necessary and for how long.  
**Response:** Assume for the purpose of bidding that the entire park will be maintained by the Owner during distribution loop installation. See Landscape Maintenance Note on sheet IR20 for a description of the contractor’s maintenance responsibilities in each tap service area actively under construction.
- 3. Question:** In Specification Section 02810 page 10 paragraph 2.3.B.2 the control valves being specified are not the same as called for in the Irrigation Equipment Legend on plan Sheet IR1. Please clarify.  
**Response:** Control valves are to be Rain Bird PESB series sized per the drawings and equipped with PRS pressure regulation pre the drawings.
- 4. Question:** In Specification Section 02810 page 10 paragraphs 2.3.E.1 the master valves being specified are not the same as the 6” master valves called for in the Irrigation Equipment Legend on plan Sheet IR1. Please clarify.  
**Response:** Submain master valves are to be equipped with pressure regulation as specified in the drawings.
- 5. Question:** In Specification Section 02810 page 11 paragraph 2.3.H.2 it’s implied that the contractor is to provide the enclosure for the backflow preventer. Detail A on plan Sheet IR22 states that the enclosure is to be provided by the Owner. Please verify that the enclosure is to be furnished by the Owner.  
**Response:** Hot box enclosure is to be supplied by Owner as per drawings.
- 6. Question:** In Specification Section 02810 page 11 paragraph 2.3.I.1 the air relief valves specified are not the same as called for in the Irrigation Equipment Legend on plan Sheet IR1. Please clarify.  
**Response:** Air relief valves (with new model numbers) are to be as specified in the drawings.
- 7. Question:** In Specification Section 02810 page 12 paragraph 2.5.D there is no mention of the 1402-RWS bubblers called out on the Irrigation Plans. Please clarify.  
**Response:** All tree bubblers are to be installed in the RWS root watering system as per drawings.
- 8. Question:** In Specification Section 02810 page 13 paragraph 2.6.B.1 the Low Voltage Wiring is described as a conventional control/ground system. The low voltage wiring system called for on the Irrigation plans is a “two-wire” system. Please clarify which wiring system is to be bid.  
**Response:** Low voltage valve control wiring is to be two wire cable as per the drawings.



9. **Question:** In Specification Section 02810 page 16 paragraph 3.2.3.a horizontal pipe clearance for piping 3" & larger is described as "5"... on both sides of the trench." Please clarify if that means 5" on each side of the pipe, or 5" total horizontal clearance.  
**Response:** It is the Owner's expectation that all piping, three inches and smaller, will be installed with chain type trenchers, and that all piping, six inches and larger will be installed with a backhoe. Assume that trenches will be wide enough to allow for 2" of clearance between outside face of pipe bells and or outside face of all pipe restraint on both sides of the pipe.
10. **Question:** In Specification Section 02810 page 16 paragraph 3.3.E.8 six spare wires (5+1) total all called for. The Irrigation Equipment Legend on plan Sheet IR1 calls for 2 extra #14 AWG single strand wires. Please clarify.  
**Response:** No additional wiring is required, please disregard both specifications for extra wire.
11. **Question:** In Specification Section 02810 page 20 paragraph 3.3.K.1 reference is made to "Sentinel Central Control". Please verify that a Central controller will not be required under this contract.  
**Response:** Controllers and enclosures are to be supplied and installed as per the drawings.
12. **Question:** In Specification Section 02935 page 3 paragraph 1.7.B.1 it is stated "The maintenance period shall begin immediately after each area is sodded and continue until acceptance of entire project or a minimum of 30 days, whichever is later." Does this refer to maintenance of the irrigation trenches only, or the entire 36 acres of the site? What does "each area" mean?  
**Response:** Assume for the purpose of bidding that the entire park will be maintained by the Owner during distribution loop installation. Assume for the purpose of bidding that the entire Park (with the exception of the tap service area actively under construction) will continue to be maintained by the Owner. See Landscape Maintenance Note on sheet IR20 for a description of the contractor's maintenance responsibilities in each tap service area actively under construction. It is the contractor's responsibility to insure the establishment of all seed and sod installed in the Park which includes minor repair of damage caused by the Owner's maintenance operations once the contractor has complied with the maintenance requirements of the Landscape Maintenance Note on Sheet IR20 referred to above and moved onto the next tap service area.
13. **Question:** On Sheet IR10 of the plans there is submain pipe apparently labeled as 3". The Irrigation Equipment Legend on plan Sheet IR1 states "All irrigation submain pipe is 6". Please clarify. Also, if the 3" labeling is correct, please provide where the transition from 6" to 3" pipe occurs.  
**Response:** The submain section of pipe, beginning at the discharge side of the tee fitting, upstream of the isolation valve, immediately upstream of control valve No.1, on the northwest submain loop, is to be 3" as per the drawings.
14. **Question:** On Sheet IR25 Detail D a 14 ga tracer wire is shown. On the same sheet, Detail C shows a 10 ga tracer wire. Please clarify.  
**Response:** All tracer wire is to be 10 ga.
15. **Question:** Please clarify Leemco and Harco joint stabilization  
**Response:** Leemco pipe to pipe, pipe to fitting and valve to pipe restraint is approved as an equal. Additionally assume that the length of restrained pipe, specified in Detail D on Plan Sheet IR24, will apply to both manufacturers.
16. **Question:** Please clarify 6' high chain link or orange fencing  
**Response:** Assume for the purpose of bidding, that 500 linear feet of 48" high orange plastic construction / pedestrian traffic control fencing and 1,500 linear feet of tree protection fencing (per specifications Section 02150) will be required during installation of the distribution loop. Additionally assume the orange plastic construction fence and tree protection fence (erected during installation of the distribution loop) will be removed, relocated and reinstalled in each tap service area actively under construction. Additionally assume that interior pathways can be closed with barricades and signage for a maximum of 6 (six) hours. All excavations not backfilled same day must be protected with fencing or plywood cover boards. Assume that all excavations, immediately adjacent to an existing pathway, must be backfilled same day. No excavations, immediately adjacent to an existing pathway, will be allowed to remain open overnight. Assume for the purpose of bidding that 6' high temporary chain link construction fence will be required around any mobilization or material storage area, as well as around all tap excavations.
17. **Question:** Provide Limited Landfill Evaluation Report  
**Response:** Please find attached Pinyon Environmental's Limited Landfill Evaluation for Harvard Gulch Park, dated 10/23/12
18. **Question:** Please clarify what wage rate to use.  
**Response:** Please use Heavy wage rates

19. **Question:** Detail B on Plan Sheet IR24 shows a concrete thrust block in addition to joint restraint for gate valve assemblies. Please verify that a thrust block will be required.

**Response:** Gate valves are to be installed per the standard Detail B on Plan Sheet IR24 including a 24" long by 12" wide by 8" deep concrete support block.


20. **Question:** Detail C on Plan Sheet IR25 shows warning tape and tracer wire for mainline, but the detail does not address the need for warning tape and tracer wire for submain pipe. Please clarify if the submain pipe installation is to be the same as detailed for mainline pipe.

**Response:** All distribution mainline pipe and submain mainline pipe is to be installed with tracer wire and warning tape as per Detail C on Plan Sheet IR25.

21. **Question:** The Measurement & Payment Section (01025) defines five bid items in the Bid Schedule. The Bid Form however has only one Bid Item for a Lump Sum Price to cover all the work. Please clarify.

**Response:** Please find the Revised Bid Form with five bid items to match the specifications.

This **ADDENDUM** shall be attached to, become a part of, and be returned with the Bid Proposal.

  
\_\_\_\_\_  
Lesley B. Thomas  
City Engineer

3.1.13

\_\_\_\_\_  
Date

The undersigned bidder acknowledges receipt of this Addendum. The Proposal submitted herewith is in accordance with the stipulations set forth herein.

\_\_\_\_\_  
Contractor

**ADDENDUM NO.**   1  

**DATE:** \_\_\_\_\_

**LUMP SUM BASE BID:** Bidder is to show the cost of materials and labor associated with installation of each of the following bid items as specified on the Drawings and in accordance with the Specifications as referenced:

**A. Mobilization (01010 through 01050 and 01600 through 01999):**

Lump Sum Price \$ \_\_\_\_\_

**B. Erosion Control (01565):**

Lump Sum Price \$ \_\_\_\_\_

**C. Tree Protection (02150):**

Lump Sum Price \$ \_\_\_\_\_

**D. Irrigation System (02810):**

Lump Sum Price \$ \_\_\_\_\_

**E. Sodding, Seeding, and Surfacing (02935):**

Lump Sum Price \$ \_\_\_\_\_

**TOTAL LUMP SUM BASE BID AMOUNT (Bid Items A thru E):** \_\_\_\_\_

**Dollars (\$ \_\_\_\_\_)**

If the Manager mails a written Notice of Apparent Low Bidder, addressed to the Bidder's business address stated on this Bid Form, the Undersigned Bidder shall, in accordance with the Contract Documents, be ready to, and shall, within five (5) days after the date of the Notice: (i) execute the attached form of Contract in conformity with this bid; (ii) furnish the required proofs of insurance; and (iii) furnish the required bond or bonds in the sum of the full amount of this bid, executed by a surety company acceptable to the Manager.

The \_\_\_\_\_, a corporation of the State of \_\_\_\_\_, is hereby offered as Surety on said bond. If such surety is not approved by the Manager, another and satisfactory surety company shall be furnished.

Enclosed with this bid is a bid guarantee, as defined in the attached Instructions to Bidders, in the amount of \_\_\_\_\_. The Undersigned Bidder agrees that the entire amount of this bid guarantee is to be paid to and become the property of the City as liquidated damages, and not as a penalty, if: (i) the bid is considered to be the best by the City; (ii) the City notifies the Undersigned Bidder that it is the Apparent Low Bidder; and (iii) the Undersigned Bidder fails to execute the Contract in the form prescribed or to furnish the required bond and proofs of insurance, within five (5) days after the date of such notification.

The following persons, firms or corporations are interested with the Undersigned Bidder in this bid:

Name: \_\_\_\_\_ Name: \_\_\_\_\_

Address: \_\_\_\_\_ Address: \_\_\_\_\_

If there are no such persons, firms, or corporations, please so state in the following space:

## **LIMITED LANDFILL EVALUATION**

**Harvard Gulch Park,  
550 East Iliff Avenue,  
City and County of Denver, Colorado**

**October 23, 2012**

**Prepared For:**

**City and County of Denver (Attn: Mr. Peter Kates)  
Department of Environmental Health  
Division of Environmental Quality  
200 West 14th Avenue, Suite 310  
Denver, Colorado 80204**

**Pinyon Project #1/12-007-55.2102**



# LIMITED LANDFILL EVALUATION

**Harvard Gulch Park,  
550 East Iliff Avenue,  
City and County of Denver, Colorado**

**October 23, 2012**

Prepared For:

City and County of Denver  
Department of Environmental Health  
Division of Environmental Quality  
200 West 14th Avenue, Suite 310  
Denver, CO 80204

Prepared By:

**Pinyon** Environmental, Inc.

Project #1/11-512-03.8003

Author:



---

Jillian K. Mauer  
Environmental Scientist

Reviewer:



---

Brian R. Partington  
Environmental Scientist



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(303) 980-5200 • (303) 980-0089 (fax) Colorado@Pinyon-Env.com • [www.pinyon-env.com](http://www.pinyon-env.com)

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Figure 2 – Site Plan

## Appendices

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Appendix A – Boring Logs

Appendix B – Reservoirs Laboratory Data

# **1.0 Introduction**

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Pinyon Environmental, Inc. (Pinyon), has completed this Limited Landfill Evaluation (Report) for Harvard Gulch Park, located at 550 East Iliff Avenue in Denver, Colorado. A United States Geological Survey (USGS) Site Location map is provided as Figure 1; an aerial photograph Site Plan is provided as Figure 2.

## **1.1 Purpose of Investigation**

Pinyon understands that the City and County of Denver (CCoD) Department of Parks and Recreation (Parks) intends to complete improvements at this park, specifically installation of a new irrigation system. The potential exists that the park, and the respective improvements, may be located over a historical landfill. Furthermore, a review of aerial photographs (dated 1933, 1962, and 1963) indicates that structures were formerly located on the northeastern portion of the park. The potential exists for proposed improvements to encounter remnant building debris and/or associated piping from the former structures.

The purpose of this investigation was to evaluate subsurface soils in key areas where construction may occur, based on information provided by Parks, and to characterize for waste disposal purposes through visual observation and possible analytical testing. In addition, soils and landfill material (if encountered) were evaluated for the presence of asbestos-containing materials (ACMs) through visual observation and laboratory testing.

## **1.2 Criteria for Waste Characterization**

For the purpose of this investigation, two scenarios are important to consider. The first is evaluating whether concentrations of contaminants could lead to a potential health and safety issue for workers completing construction activities during this project (e.g., chemical exposure). In the event that samples were collected for analysis, this evaluation was to be performed by comparing the sampling results to the Colorado Soil Evaluation Values (CSEVs) for Worker Protection (CDPHE, 2011a). Second, it is important to evaluate how to best manage the material if it is impacted. This would be completed by evaluating whether the material is

characteristically hazardous, and if it may be disposed at a permitted Subtitle D disposal facility. It is CCoD policy that soil disposal be completed at the Denver-Arapahoe Disposal Site (DADS). DADS can only accept material that is not characteristically hazardous.

There are four components that must be evaluated with regard to whether material is not characteristically hazardous. The material must meet the following conditions:

1. Ignitability – Must have a flash point greater than 140°F
2. Corrosivity – Liquid wastes must have a pH between 2.0 and 12.5 (DADS does not accept any liquid wastes)
3. Reactivity – Material must not be reactive
4. Toxicity – Material cannot contain concentrations exceeding the EPA Toxicity Characteristic Maximum Concentrations of any of 40 contaminants in the federal hazardous waste regulations [40 CFR 261.24]

To ensure that a toxic material does not leach from a landfill, permitted disposal facilities (including DADS) will accept solid material where the concentrations (when total analysis is completed) are less than 20 times the hazardous listing for characteristic waste (20 Times Rule), in accordance with the Federal Land Disposal Restrictions. As an example, the EPA Toxicity Characteristic Maximum Concentration for lead is 5.0 parts per million. Therefore, using the 20 Time Rule, the acceptable limit for disposal (by totals analysis) would then be less than 100 parts per million. If totals concentrations exceed the 20 Times Rule, then analysis by the Toxicity Characteristic Leaching Procedure (TCLP) is required. If the TCLP results for a compound exceed the toxicity characteristic maximum concentration (e.g., 5 parts per million by TCLP for lead), then the material would require disposal at a hazardous waste disposal site in accordance with CDPHE regulations. If the concentration is below, then the material may be disposed as a non-hazardous solid waste at a Subtitle D facility, such as DADS.

Additionally, polychlorinated biphenyls (PCBs) concentrations, either in soil or in equipment (e.g., light ballasts, transformers or other electrical equipment), must have concentrations below 50 parts per million.



### 1.3 Authorization and Scope of Services

The CCoD Department of Parks and Environmental Health (DEH) requested that Pinyon perform a limited investigation to evaluate the presence and extent of a reported historical landfill located at the above-referenced park. This Report was prepared in accordance with the scope of services outlined in the Pinyon proposal dated September 5, 2012, which was authorized in the Notice to Proceed issued on September 13, 2012. The following services were performed to complete this limited landfill evaluation:

- Utilizing a Trimble GeoXH 6000 global positioning system (GPS) unit, Pinyon field-marked the 34 preselected locations using data provided by CCoD.
- Pinyon contacted the Utility Notification Center of Colorado (UNCC) to mark public utilities in the dig area. Additionally, Parks marked the location of private utilities prior to intrusive activities. Pinyon attended a preliminary site visit with Parks, DEH, and utility providers to review access, investigation activities, sample locations, and site-specific protocols.
- Pinyon retained ET Technologies, Inc., of Parker, Colorado, to provide a rubber track-mounted excavator to complete "test-hole" (test pit) excavations at the 34 preselected locations in Harvard Gulch Park, in order to evaluate subsurface conditions. The test pits were excavated to a maximum depth of six feet below the ground surface (bgs), or until native soils were encountered.
- Grab soil samples were collected at each lithologic layer from the excavator bucket, beginning at the surface. The samples were visually described according to the Unified Soil Classification System. Information regarding subsurface conditions was recorded on a boring log. Additionally, excavated soils were visually evaluated for evidence of fill or other buried debris during excavation activities.
- Pinyon provided an EPA- and state-accredited Asbestos Building Inspector (Jillian Mauer) with at least six months of asbestos in soil experience to evaluate potential ACMs identified during investigation activities, if observed. Four samples of suspected ACM were collected and submitted to Reservoirs Environmental Inc. (Reservoirs), of Denver, for analysis by polarized light microscopy (PLM) techniques.
- Soil samples collected during drilling were field-screened for non-specific VOCs using a photoionization detector (PID) and the headspace technique. In the headspace technique, a portion of the soil sample was placed in a "zip-lock" bag, which was sealed and placed in a warm area to promote volatilization. After a period of time, the PID was inserted

into the headspace of the bag, and a reading was obtained. This reading was recorded on the boring log (provided as Appendix A).

- As indicated in the work plan, only samples that “look bad, smell bad” were to be collected for laboratory analysis. The focus of the laboratory analysis was to collect information necessary to develop a site-specific waste profile at DADS, so that excavated landfill materials may be disposed properly during construction of this project. None of the samples collected exhibited evidence of significant contamination (e.g., staining, odors); therefore, soil samples were not collected as a part of this investigation.
- After excavation activities, each test pit was backfilled with the excavated soil, and the surfaces returned to as close to the original condition as possible.

## **2.0 Soil Assessment Activities**

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Field investigation and sampling activities were conducted on October 1<sup>st</sup> through 3<sup>rd</sup>, 2012 by Pinyon personnel. A total of 34 test pits were proposed in order to evaluate areas within the anticipated area of improvements. However, given the presence of native soils throughout the southeastern portion of the park and the lack of landfilling materials encountered, only 27 of the 34 test pits were completed. The follow section summarizes investigative activities and observations made during the investigation; test pits locations are located on Figure 2.

A total of 27 test pits were excavated in Harvard Gulch Park. Test pits TP-1, TP-2, TP-3, TP-4, TP-5, TP-6, TP-7, TP-8, TP-9, and TP-10 were located in the northeastern portion of the park, in the vicinity of the former structures. Test pits TP-11, TP-14, and TP-16 were located on the southeastern portion of the park. Test pits TP-17, TP-19, TP-21, TP-23, TP-24, TP-27, TP-29, TP-30, and TP-31 were extended on the southern and southwestern portions of the park, in the vicinity of the on-site berms and water canal. Finally, test pits TP-25, TP-26, TP-32, TP-33, and TP-34 were extended in the west-central portion of the park. All test pits were excavated at locations selected by Parks based on the proposed construction activities.

During excavation activities, fill, generally composed of slightly clayey, silty sand with some gravels was identified throughout the entirety of the park to approximately 6 feet bgs. Native silty sands were also observed throughout the park at depths below the fill-like material.

The fill-like material in the northeastern portion of the park contained minimal non-soil components, including small fragments of brick, concrete, and asphalt, and occasional building materials including ceramic tile, glass, and metal. The non-soil components appeared minimally and sporadically in these areas, and were observed occasionally throughout the remainder of the park. The fill may have been the result of past grading activities, but did not appear to be the result of landfill operations. No evidence of municipal solid waste, demolition debris (other than fragments of brick, concrete, and asphalt) was observed at Harvard Gulch Park. No elevated PID readings were noted during field screening activities nor were any visible or olfactory evidence of contamination observed in any excavated soils. No soil samples were collected for laboratory

analysis. Non-soil components identified to be potential ACMs were noted, and four samples were collected for laboratory analysis.

## **3.0 Analytical Results**

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Of the 27 test pits that were completed, four potential ACMs were collected. None of the soil encountered exhibited evidence of chemical contamination; therefore, no soil samples were collected. Analysis and interpretation of the data generated during the field investigation and laboratory analyses is presented in the following sections. Where appropriate, the results are compared with regulatory limits for the parameters identified in the applicable media. Analytical results for ACMs are provided in Table 1. A copy of the laboratory analytical report for potential ACMs and chain-of-custody documentation are provided in Appendix B.

### **3.1 VOCs, SVOCs, PCBs, Metals, Reactivity, Corrosivity, Ignitability and Paint Filter**

Based on field observations which lacked any “looks bad, smells bad” criteria, no samples were collected for laboratory analysis from the test pits at Harvard Gulch Park.

### **3.2 Asbestos-Containing Materials**

Four potential materials were observed during the excavation of the test pits, including concrete/ceramic pipe with grout material; white coating on brick; white plaster/calcareous soil material; and white/light gray mixed grout/gravel (Table 1). Samples of each of these materials were submitted to Reservoirs and analyzed for asbestos content by PLM. None of the samples submitted were identified as ACMs. A summary of the material descriptions and laboratory results are provided in Table 1; the Reservoirs analytical Report is provided as Appendix B.

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## **4.0 Conclusions and Recommendations**

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Pinyon has performed limited landfill evaluation activities at Harvard Gulch Park, located in Denver, Colorado. Based on the results of this investigation, the following conclusions and recommendations have been developed.

### **4.1 Conclusions**

No evidence of municipal solid waste, demolition debris (other than fragments of brick, concrete and asphalt), or suspected ACM was observed at Harvard Gulch Park. No elevated PID readings were noted during field screening activities nor were any visible or olfactory evidence of contamination observed in any excavated soils. Based on these observations, no evidence of potential environmental conditions was noted.

### **4.2 Recommendations**

Based on the conclusions presented above, no further investigations are recommended. However, given the presence of former structures in the northeastern portion of the park, awareness should be made regarding the potential to encounter remnant building remains during the proposed activities that may have not been encountered during this limited investigation. Contractors performing the work should undergo suspect ACM awareness training, and be instructed to contact CCoD if any suspect materials are encountered.

## **5.0 Limitations**

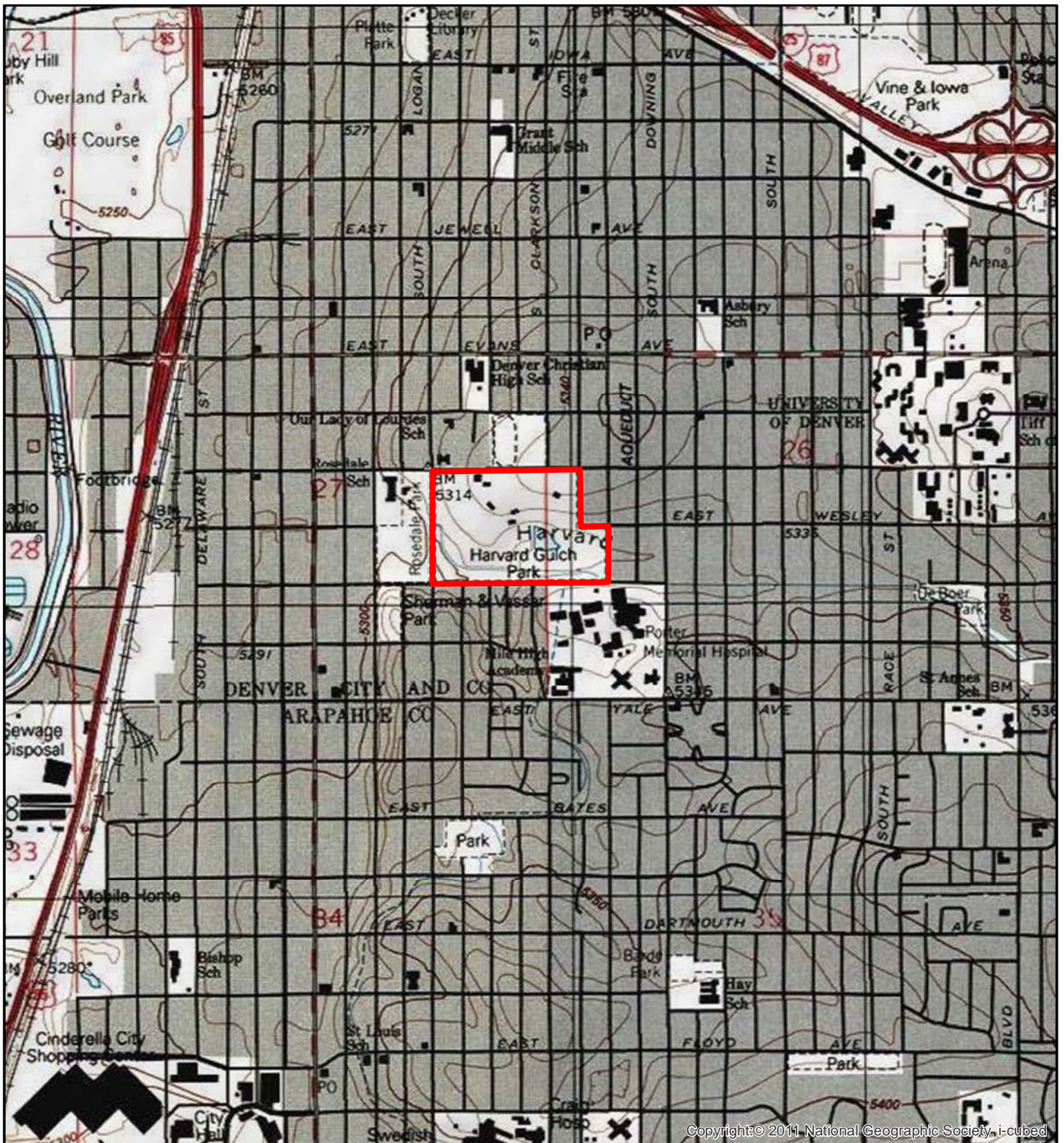
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This Report was prepared by Pinyon Environmental, Inc., at the request of and for the sole benefit of the City and County of Denver, or any entity controlling, controlled by, or under common control with the City and County of Denver. The conclusions and recommendations offered in this Report are based on the data obtained from a limited number of samples. Soil and ground-water conditions typically vary even over short distances. Thus, the nature and extent of variations outside the subsurface investigation may not become evident except through further investigation.

Conclusions stated herein refer only to the specific site at the time of the investigation, and to the limited number of test pits completed.



# Figures




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**Legend**

USGS 7.5' Topographic Map  
Englewood, CO 1965 (revised 1994)

 Site

0 750 1,500  
 Feet



**SITE LOCATION**  
Harvard Gulch Park  
550 East Iiff Avenue  
Denver, Colorado

Site Location: Sections 26 and 27, Township 4S, Range 68W, 6th Principal Meridian

Drawn By: MJS

Figure 1

Path: F:\Open Projects\Harvard Gulch\ArcMap (2)\ArcMap\MXD\Harvard\_Fig 1.mxd

Job No: 1/12-007-55.2102

Reviewed By: JKM

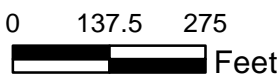
Revision: 10/12/2012





**Legend**

- Test Pit Sample Location
- Test pits were not completed at these locations given the lack of presence of landfill materials.



**SITE PLAN**  
 Harvard Gulch Park  
 550 East Iliff Avenue  
 Denver, Colorado

Site Location: Sections 26 and 27, Township 4S, Range 68W, 6th Principal Meridian

Drawn By: MJS

Figure 2

Path: F:\Open Projects\Harvard Gulch\ArcMap (2)\ArcMap\MXD\Harvard\_Fig 2.mxd

Job No: 1/12-007-55.2102

Reviewed By: JKM

Revision: 10/12/2012

# Table

**Table 1**  
**Asbestos in Soil Sample Analytical Results**  
**Limited Landfill Evaluation, Harvard Gulch Park, Denver, Colorado**

Sample ID	Material Description	Location	Asbestos Content (Mineral and Percentage)
OT-1-1	Concrete/ceramic pipe with grout	TP-6	ND
OT-2-1	White plaster/coating on brick	TP-9	ND
OT-3-1	White plaster/calcerous soil	TP-17	ND
OT-4-1	White/Light Gray Mixed Grout/Gravel	TP-19	ND

Notes:

ND - Non Detect

## Appendix A - Boring Logs



<b>Boring</b> TP-1	<b>City, State</b> Denver, CO
<b>Project</b> Harvard Gulch Park	<b>Date</b> 10/1/12
<b>Project No</b> 11200755.2102	<b>County</b> Denver
<b>Client</b> City and County of Denver	



**Field Geologist** Jillian Mauer

SUBSURFACE PROFILE			SAMPLE			PID (ppm)		Notes/ Lab Analysis (If Applicable)
Depth (ft)	Lithology	Lithologic Description	Type	Recovery	USCS	0	20	

0		Silty Sand: Medium dense, dark brown, silty sand with organics	Grab		SM	<input type="checkbox"/>		0	
-1		Silty Sand: Medium dense, medium reddish brown, slightly clayey silty sand with fine gravels							
-2		Silty Sand: Medium dense, light reddish brown silty sand	Grab		SM	<input type="checkbox"/>		0	
-3		Silty Sand: Medium dense, light reddish brown silty sand							Encountered lateral irrigation line at 1', Moved test pit 5' north
-4		Silty Sand: Medium dense, light reddish brown silty sand	Grab		SM	<input type="checkbox"/>		0	
-5									
-6									

<b>Boring</b>	TP-2	<b>City, State</b>	Denver, CO
<b>Project</b>	Harvard Gulch Park	<b>Date</b>	10/1/12
<b>Project No</b>	11200755.2102	<b>County</b>	Denver
<b>Client</b>	City and County of Denver		



**Field Geologist** Jillian Mauer

SUBSURFACE PROFILE			SAMPLE			PID (ppm)		Notes/ Lab Analysis (If Applicable)
Depth (ft)	Lithology	Lithologic Description	Type	Recovery	USCS	0	20	

0		Silty Sand: Medium dense, dark brown, silty sand with organics	Grab		SM	<input type="checkbox"/>		0	
-1		Silty Sand: Medium dense, medium reddish brown, slightly clayey silty sand with fine gravels							
-2			Grab		SM	<input type="checkbox"/>		0	
-3		Silty Sand: Medium dense, light reddish brown silty sand							Fluffy, soft textured soils
-4									
-5			Grab		SM	<input type="checkbox"/>		0	
-6		End of Boring							



<b>Boring</b>	TP-3	<b>City, State</b>	Denver, CO
<b>Project</b>	Harvard Gulch Park	<b>Date</b>	10/1/12
<b>Project No</b>	11200755.2102	<b>County</b>	Denver
<b>Client</b>	City and County of Denver		



**Field Geologist** Jillian Mauer

SUBSURFACE PROFILE			SAMPLE			PID (ppm)		Notes/ Lab Analysis (If Applicable)
Depth (ft)	Lithology	Lithologic Description	Type	Recovery	USCS	0	20	

0		Silty Sand: Medium dense, dark brown, slightly clayey, silty sand with organic inclusions	Grab		CL			0	
-1		Silty Sand: Medium dense, medium brown, slightly clayey, silty sand with brick, concrete fragments							
-2			Grab		CL			0	
-3									Encountered 2" black poly irrigation line, moved test pit 2' north
-4		Silty Sand: Dense, light brown, slightly clayey, silty sand							
-5			Grab		SM			0	
-6		End of Boring							

<b>Boring</b>	TP-4	<b>City, State</b>	Denver, CO
<b>Project</b>	Harvard Gulch Park	<b>Date</b>	10/2/12
<b>Project No</b>	11200755.2102	<b>County</b>	Denver
<b>Client</b>	City and County of Denver		



**Field Geologist** Jillian Mauer

SUBSURFACE PROFILE			SAMPLE			PID (ppm)		Notes/ Lab Analysis (If Applicable)
Depth (ft)	Lithology	Lithologic Description	Type	Recovery	USCS	0	20	

0		Silty Sand: Medium dense, dark brown, slightly clayey silty sand with organics	Grab		CL			0	
		Silty Sand: Medium dense, medium brown, slightly clayey silty sand	Grab		CL			0	
-1		Clay: Dense, medium brown, slightly silty, sandy clay							
-2			Grab		CL			0	
-3		Silty Sand: Medium dense, medium to light brown, silty sand							
-4			Grab		SM			0	
-5									
-6									
		End of boring							

<b>Boring</b>	TP-5	<b>City, State</b>	Denver, CO
<b>Project</b>	Harvard Gulch Park	<b>Date</b>	10/2/12
<b>Project No</b>	11200755.2102	<b>County</b>	Denver
<b>Client</b>	City and County of Denver		



**Field Geologist** Jillian Mauer

SUBSURFACE PROFILE			SAMPLE			PID (ppm)		Notes/ Lab Analysis (If Applicable)
Depth (ft)	Lithology	Lithologic Description	Type	Recovery	USCS	0	20	

0		Silty Sand: Medium dense, dark brown, clayey silty sand with organics and some gravels	Grab		CL			0	
-1		Silty Sand: Medium dense, medium brown, slightly clayey, silty sand							
-2									
-3									
-4			Grab		SM			1.4	
-5									
-6									

End of boring

<b>Boring</b>	TP-6	<b>City, State</b>	Denver, CO
<b>Project</b>	Harvard Gulch Park	<b>Date</b>	10/2/12
<b>Project No</b>	11200755.2102	<b>County</b>	Denver
<b>Client</b>	City and County of Denver		



**Field Geologist** Jillian Mauer

SUBSURFACE PROFILE			SAMPLE			PID (ppm)		Notes/ Lab Analysis (If Applicable)
Depth (ft)	Lithology	Lithologic Description	Type	Recovery	USCS	0	20	

0		Silty Sand: Medium dense, medium brown, slightly clayey silty sand with organics, landscpae fabric	Grab		CL			0	
-1		Silty Sand: Medium dense, light brown, clayey silty sand with birck inclusions and concrete fragments							
-2									
-3			Grab		SM			0	Metal piping in sidewall; ceramic pipe at 4', Asbestos sample OT-1 collected
-4									
-5									

End of boring

<b>Boring</b>	TP-7	<b>City, State</b>	Denver, CO
<b>Project</b>	Harvard Gulch Park	<b>Date</b>	10/2/12
<b>Project No</b>	11200755.2102	<b>County</b>	Denver
<b>Client</b>	City and County of Denver		



**Field Geologist** Jillian Mauer

SUBSURFACE PROFILE			SAMPLE			PID (ppm)		Notes/ Lab Analysis (If Applicable)
Depth (ft)	Lithology	Lithologic Description	Type	Recovery	USCS	0	20	

0		Sand: Medium dense, medium to dark brown, slightly clayey, silty sand with organics	Grab					0	
-1		Sand: Medium dense, medium brown, silty sand			CL				
-2									
-3			Grab						0.8
-4					SM				
-5									
-6									

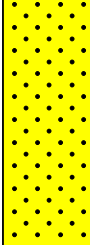

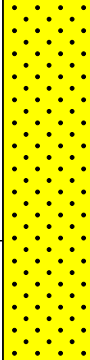
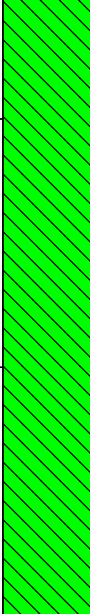

End of boring

<b>Boring</b>	TP-8	<b>City, State</b>	Denver, CO
<b>Project</b>	Harvard Gulch Park	<b>Date</b>	10/2/12
<b>Project No</b>	11200755.2102	<b>County</b>	Denver
<b>Client</b>	City and County of Denver		



**Field Geologist** Jillian Mauer

SUBSURFACE PROFILE			SAMPLE			PID (ppm)		Notes/ Lab Analysis (If Applicable)
Depth (ft)	Lithology	Lithologic Description	Type	Recovery	USCS	0	20	

0		Sand: Medium dense, medium brown, silty sand with organics, brick inclusions	Grab		SM			0	
-1		Sand: Dense, medium brown, clayey silty sand with some medium gravels							
-2		Clay: Very dense, grayish dark brown slightly sandy clay, sulfur odor	Grab		CL			0	Sand/Clay Stratified Layers
-3									
-4									
-5		End of boring							

<b>Boring</b>	TP-9	<b>City, State</b>	Denver, CO
<b>Project</b>	Harvard Gulch Park	<b>Date</b>	10/1/12
<b>Project No</b>	11200755.2102	<b>County</b>	Denver
<b>Client</b>	City and County of Denver		



**Field Geologist** Jillian Mauer

SUBSURFACE PROFILE			SAMPLE			PID (ppm)		Notes/ Lab Analysis (If Applicable)
Depth (ft)	Lithology	Lithologic Description	Type	Recovery	USCS	0	20	

0		Silty Sand: Medium dense, medium brown, silty sand with organic inclusions						
-1			Grab		SM			0
-2		Silty Sand: Dense, medium to light brown, clayey silty sand with gravels and cobbles. Some small brick, ceramic, plastic fragments, compact shale/sandstone						
-3			Grab		CL			0
-4		Sand: Medium dense, dark brown and black clayey silty sand with brick, fill, materials, ceramic, plastic						
-5			Grab		CL			0
-6		End of boring						Corrugated concrete pipe/possibly old septic tank encountered at 5'

<b>Boring</b>	TP-10	<b>City, State</b>	Denver, CO
<b>Project</b>	Harvard Gulch Park	<b>Date</b>	10/1/12
<b>Project No</b>	11200755.2102	<b>County</b>	Denver
<b>Client</b>	City and County of Denver		



**Field Geologist** Jillian Mauer

SUBSURFACE PROFILE			SAMPLE			PID (ppm)		Notes/ Lab Analysis (If Applicable)
Depth (ft)	Lithology	Lithologic Description	Type	Recovery	USCS	0	20	

0		Silty Sand: Medium dense, medium brown, silty sand with organic inclusions	Grab		SM	<input type="checkbox"/>		0	
-1		Silty Sand: Dense, medium to light brown, clayey silty sand with gravels and cobbles. Some small brick, ceramic, plastic fragments, compact shale/sandstone							
-2									
-3									
-4			Grab		CL	<input type="checkbox"/>		0	
-5									
-6									

End of boring



<b>Boring</b>	TP-11	<b>City, State</b>	Denver, CO
<b>Project</b>	Harvard Gulch Park	<b>Date</b>	10/3/12
<b>Project No</b>	11200755.2102	<b>County</b>	Denver
<b>Client</b>	City and County of Denver		



**Field Geologist** Jillian Mauer

SUBSURFACE PROFILE			SAMPLE			PID (ppm)		Notes/ Lab Analysis (If Applicable)
Depth (ft)	Lithology	Lithologic Description	Type	Recovery	USCS	0	20	

0		Sand: Medium dense, medium brown, clayey, silty sand; organic inclusions to 6". Some coarse gravels, few brick fragments	Grab		CL		0	
-1								
-2		Sand: Medium dense, medium brown, slightly clayey, silty sand. No apparent debris	Grab		SM		4.1	
-3								
-4	End of boring							

<b>Boring</b>	TP-14	<b>City, State</b>	Denver, CO
<b>Project</b>	Harvard Gulch Park	<b>Date</b>	10/3/12
<b>Project No</b>	11200755.2102	<b>County</b>	Denver
<b>Client</b>	City and County of Denver		



**Field Geologist** Jillian Mauer

SUBSURFACE PROFILE			SAMPLE			PID (ppm)		Notes/ Lab Analysis (If Applicable)
Depth (ft)	Lithology	Lithologic Description	Type	Recovery	USCS	0	20	

0		Sand: Medium dense, medium brown, slightly clayey silty sand; organic inclusions to 6". Concrete fragments. Coarse gravels at 1'-3'	Grab		CL	0	20	
-2						0		
-3								
-4								

End of boring

<b>Boring</b>	TP-16	<b>City, State</b>	Denver, CO
<b>Project</b>	Harvard Gulch Park	<b>Date</b>	10/3/12
<b>Project No</b>	11200755.2102	<b>County</b>	Denver
<b>Client</b>	City and County of Denver		



**Field Geologist** Jillian Mauer

SUBSURFACE PROFILE			SAMPLE			PID (ppm)		Notes/ Lab Analysis (If Applicable)
Depth (ft)	Lithology	Lithologic Description	Type	Recovery	USCS	0	20	

0	[Hatched Pattern]	Silty Sand: Medium dense, medium brown, slightly clayey silty sand; organic inclusions to 6", some small gravels						
-1	[Hatched Pattern]							
-2	[Hatched Pattern]		Grab		CL	□		1.5
-3	[Hatched Pattern]							
-4	[Hatched Pattern]							

End of boring

<b>Boring</b>	TP-17	<b>City, State</b>	Denver, CO
<b>Project</b>	Harvard Gulch Park	<b>Date</b>	10/3/12
<b>Project No</b>	11200755.2102	<b>County</b>	Denver
<b>Client</b>	City and County of Denver		



**Field Geologist** Jillian Mauer

SUBSURFACE PROFILE			SAMPLE			PID (ppm)		Notes/ Lab Analysis (If Applicable)
Depth (ft)	Lithology	Lithologic Description	Type	Recovery	USCS	0	20	

0		Silty Sand: Medium dense, medium brown, slightly clayey silty sand; organic inclusions to 6"	Grab		CL			0	
-1		Silty Sand: Medium dense, light brown, slightly clayey silty sand with some concrete fragments							
-2			Grab		SM			0	Apparent white calcerous soil. Asbestos sample OT-3 collected
-3									
-4		End of boring							

<b>Boring</b>	TP-19	<b>City, State</b>	Denver, CO
<b>Project</b>	Harvard Gulch Park	<b>Date</b>	10/3/12
<b>Project No</b>	11200755.2102	<b>County</b>	Denver
<b>Client</b>	City and County of Denver		



**Field Geologist** Jillian Mauer

SUBSURFACE PROFILE			SAMPLE			PID (ppm)		Notes/ Lab Analysis (If Applicable)
Depth (ft)	Lithology	Lithologic Description	Type	Recovery	USCS	0	20	

0	•••••	Sand: Medium dense, medium brown, slightly clayey, silty sand; organic inclusions to 6". Compacted clayish layer at 6'. Some concrete fragment inclusions.							
-1	•••••								
-2	•••••								
-3	•••••		Grab		CL	□		0	Hard, plaster-like fragment, concrete/grout. Asbestos sample OT-4 collected
-4	•••••								
-5	•••••								
-6	•••••								

End of boring

<b>Boring</b>	TP-21	<b>City, State</b>	Denver, CO
<b>Project</b>	Harvard Gulch Park	<b>Date</b>	10/3/12
<b>Project No</b>	11200755.2102	<b>County</b>	Denver
<b>Client</b>	City and County of Denver		



**Field Geologist** Jillian Mauer

SUBSURFACE PROFILE			SAMPLE			PID (ppm)		Notes/ Lab Analysis (If Applicable)
Depth (ft)	Lithology	Lithologic Description	Type	Recovery	USCS	0	20	

0		Silty Sand: Medium dense, medium brown, slightly clayey silty sand; organic inclusions to 6"	Grab		CL			0	
-1		Silty Sand: Medium dense, light brown, slightly clayey silty sand with some concrete fragments							
-2			Grab		SM			0	
-3									
-4		End of boring							

<b>Boring</b>	TP-23	<b>City, State</b>	Denver, CO
<b>Project</b>	Harvard Gulch Park	<b>Date</b>	10/2/12
<b>Project No</b>	11200755.2102	<b>County</b>	Denver
<b>Client</b>	City and County of Denver		



**Field Geologist** Jillian Mauer

SUBSURFACE PROFILE			SAMPLE			PID (ppm)		Notes/ Lab Analysis (If Applicable)
Depth (ft)	Lithology	Lithologic Description	Type	Recovery	USCS	0	20	

0		Sand: Medium dense to dense, medium to dark brown, clayey, silty sand. Organics to 6", plastic fragments to 3'	Grab		CL			
-1								
-2		Sand: Medium dense, medium brown, slightly clayey, silty sand. (no apparent debris) with coarse grains and gravels	Grab		SM			0.8
-3								
-4								
-5								
-6								

End of Boring

<b>Boring</b>	TP-24	<b>City, State</b>	Denver, CO
<b>Project</b>	Harvard Gulch Park	<b>Date</b>	10/3/12
<b>Project No</b>	11200755.2102	<b>County</b>	Denver
<b>Client</b>	City and County of Denver		



**Field Geologist** Jillian Mauer

SUBSURFACE PROFILE			SAMPLE			PID (ppm)		Notes/ Lab Analysis (If Applicable)
Depth (ft)	Lithology	Lithologic Description	Type	Recovery	USCS	0	20	

0		Silty Sand: Medium dense, medium to dark brown, silty sand with fine gravels; organic inclusions to 6"	Grab		CL			0	
-1		Silty Sand: Medium dense, medium brown, slightly clayey, silty sand (fine sands)							
-2			Grab		SM			0	
-3									
-4		End of boring							



<b>Boring</b>	TP-25	<b>City, State</b>	Denver, CO
<b>Project</b>	Harvard Gulch Park	<b>Date</b>	10/2/12
<b>Project No</b>	11200755.2102	<b>County</b>	Denver
<b>Client</b>	City and County of Denver		



**Field Geologist** Jillian Mauer

SUBSURFACE PROFILE			SAMPLE			PID (ppm)		Notes/ Lab Analysis (If Applicable)
Depth (ft)	Lithology	Lithologic Description	Type	Recovery	USCS	0	20	

0		Sand: Medium dense, medium to dark brown, slightly clayey, silty sand with organics up to 1' and some fine gravels	Grab		CL		0	
-1		Sand: Medium dense, medium brown, slightly clayey, silty sand						
-2								
-3			Grab		SM		2.4	
-4								
-5								
-6								

End of boring

<b>Boring</b>	TP-26	<b>City, State</b>	Denver, CO
<b>Project</b>	Harvard Gulch Park	<b>Date</b>	10/2/12
<b>Project No</b>	11200755.2102	<b>County</b>	Denver
<b>Client</b>	City and County of Denver		



**Field Geologist** Jillian Mauer

SUBSURFACE PROFILE			SAMPLE			PID (ppm)		Notes/ Lab Analysis (If Applicable)
Depth (ft)	Lithology	Lithologic Description	Type	Recovery	USCS	0	20	

0		Sand: Medium dense, medium to dark brown, slightly clayey, silty sand with organics and fine gravels	Grab		CL	<input type="checkbox"/>		0	
-1		Sand: Medium dense, medium to light brown, silty sand.							
-2			Grab		SM	<input type="checkbox"/>		0.1	
-3									
-4		Clay: Dense, medium to dark brown, slightly gravelly, fine to medium silty and sandy clay with cobbles	Grab		CL	<input type="checkbox"/>		0	
		End of Boring							

<b>Boring</b>	TP-27	<b>City, State</b>	Denver, CO
<b>Project</b>	Harvard Gulch Park	<b>Date</b>	10/2/12
<b>Project No</b>	11200755.2102	<b>County</b>	Denver
<b>Client</b>	City and County of Denver		



**Field Geologist** Jillian Mauer

SUBSURFACE PROFILE			SAMPLE			PID (ppm)		Notes/ Lab Analysis (If Applicable)
Depth (ft)	Lithology	Lithologic Description	Type	Recovery	USCS	0	20	

0		Sand: Medium dense, dark to medium brown, slightly clayey, silty sand. Organics to 6"; brick/asphalt/plastic fragments and gravels	Grab		CL			
-1								
-2		Sand: Dense, medium to dark brown, silty, clayey sand. Compacted clay stratification	Grab		CL			0.3
-3								
-4	End of Boring							

<b>Boring</b>	TP-29	<b>City, State</b>	Denver, CO
<b>Project</b>	Harvard Gulch Park	<b>Date</b>	10/1/12
<b>Project No</b>	11200755.2102	<b>County</b>	Denver
<b>Client</b>	City and County of Denver		



**Field Geologist** Jillian Mauer

SUBSURFACE PROFILE			SAMPLE			PID (ppm)		Notes/ Lab Analysis (If Applicable)
Depth (ft)	Lithology	Lithologic Description	Type	Recovery	USCS	0	20	

0	Sand: Medium dense, medium brown, silty, clayey sand with asphalt chunks, medium gravels and compacted clay chunks		Grab		CL			
-2						0		
-3								
-4								

End of Boring

<b>Boring</b>	TP-30	<b>City, State</b>	Denver, CO
<b>Project</b>	Harvard Gulch Park	<b>Date</b>	10/2/12
<b>Project No</b>	11200755.2102	<b>County</b>	Denver
<b>Client</b>	City and County of Denver		



**Field Geologist** Jillian Mauer

SUBSURFACE PROFILE			SAMPLE			PID (ppm)		Notes/ Lab Analysis (If Applicable)
Depth (ft)	Lithology	Lithologic Description	Type	Recovery	USCS	0	20	

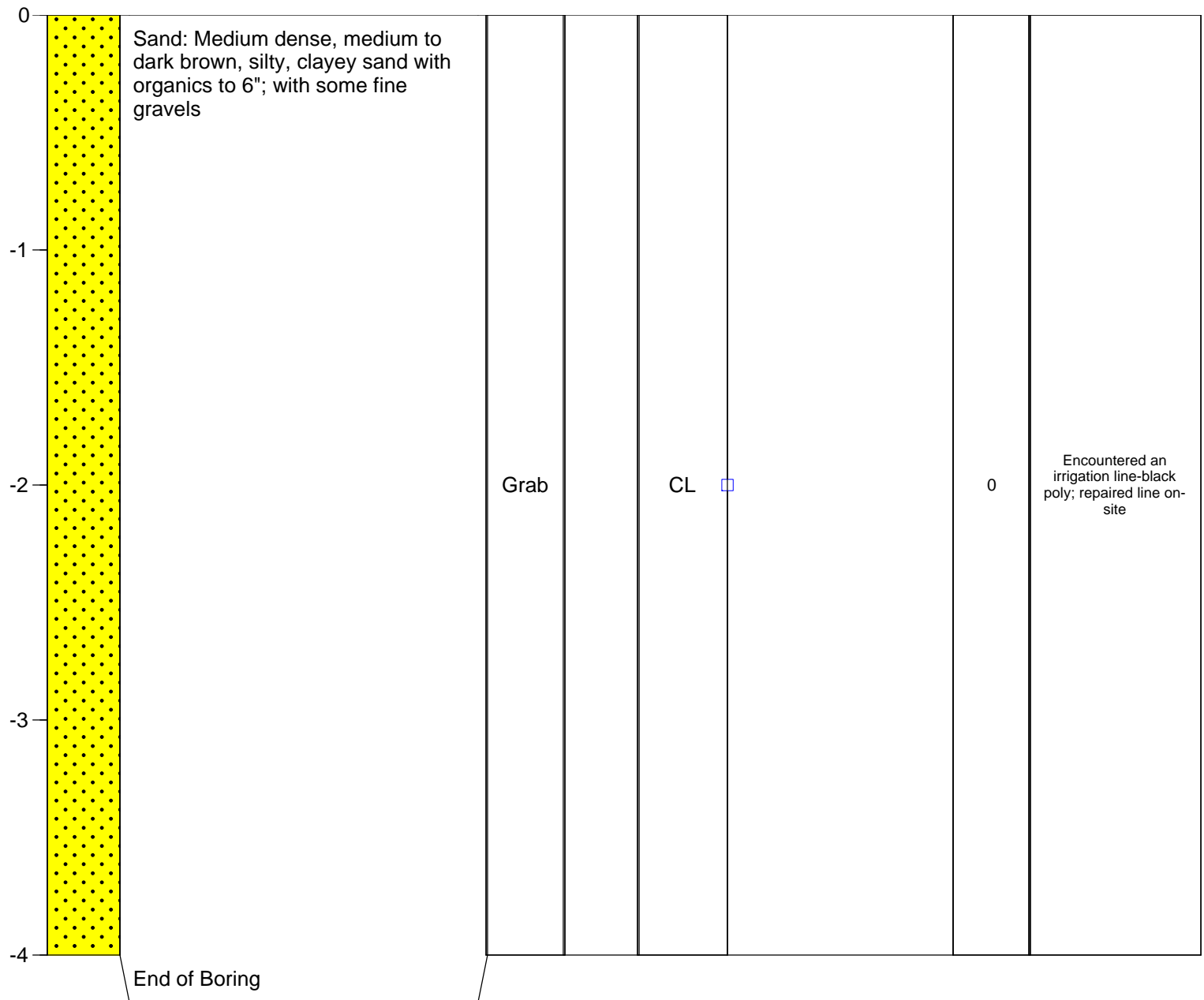
0		Sand: Medium dense, dark to medium brown, slightly clayey, silty sand. Organics to 6", few plastic fragment inclusions	Grab		CL		0	
-1								
-2		Sand: Dense, medium to dark brown, silty, clayey sand. Compacted clay stratification	Grab		CL		0.3	
-3								
-4	End of Boring							

<b>Boring</b>	TP-31	<b>City, State</b>	Denver, CO
<b>Project</b>	Harvard Gulch Park	<b>Date</b>	10/1/12
<b>Project No</b>	11200755.2102	<b>County</b>	Denver
<b>Client</b>	City and County of Denver		



**Field Geologist** Jillian Mauer

SUBSURFACE PROFILE			SAMPLE			PID (ppm)		PID (ppm)	Notes/ Lab Analysis (If Applicable)
Depth (ft)	Lithology	Lithologic Description	Type	Recovery	USCS	0	20		

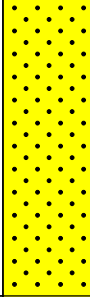

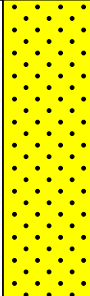
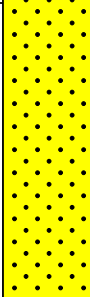

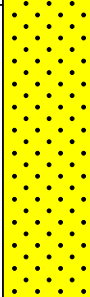


<b>Boring</b>	TP-32	<b>City, State</b>	Denver, CO
<b>Project</b>	Harvard Gulch Park	<b>Date</b>	10/2/12
<b>Project No</b>	11200755.2102	<b>County</b>	Denver
<b>Client</b>	City and County of Denver		



**Field Geologist** Jillian Mauer

SUBSURFACE PROFILE			SAMPLE			PID (ppm)		Notes/ Lab Analysis (If Applicable)
Depth (ft)	Lithology	Lithologic Description	Type	Recovery	USCS	0	20	

0		Sand: Medium dense, medium to dark brown, slightly clayey, silty sand with organics and fine gravels	Grab		CL			0	
-1		Sand: Medium dense, medium to light brown, silty sand (some slightly clayey stratification)							
-2			Grab		SM			0	
-3									
-4	End of boring								

<b>Boring</b>	TP-33	<b>City, State</b>	Denver, CO
<b>Project</b>	Harvard Gulch Park	<b>Date</b>	10/2/12
<b>Project No</b>	11200755.2102	<b>County</b>	Denver
<b>Client</b>	City and County of Denver		



**Field Geologist** Jillian Mauer

SUBSURFACE PROFILE			SAMPLE			PID (ppm)		Notes/ Lab Analysis (If Applicable)
Depth (ft)	Lithology	Lithologic Description	Type	Recovery	USCS	0	20	

0								
-1		Sand: Medium dense to dense, medium to dark brown, silty, clayey sand with organics to 6" and fine gravels	Grab		CL			0
-2								
-3		Sand: Medium dense, light brown, silty, fine grained sand						
-4			Grab		SM			0
-5								
-6								

End of boring



<b>Boring</b>	TP-34	<b>City, State</b>	Denver, CO
<b>Project</b>	Harvard Gulch Park	<b>Date</b>	10/2/12
<b>Project No</b>	11200755.2102	<b>County</b>	Denver
<b>Client</b>	City and County of Denver		



**Field Geologist** Jillian Mauer

SUBSURFACE PROFILE			SAMPLE			PID (ppm)		Notes/ Lab Analysis (If Applicable)
Depth (ft)	Lithology	Lithologic Description	Type	Recovery	USCS	0	20	

0		Sand: Medium dense, medium to dark brown, slightly clayey, silty sand with organics up to 1' and some fine gravels	Grab					0.3	
-1		Sand: Medium dense, medium brown, slightly clayey, silty sand			CL				
-2									
-3			Grab						0.2
-4					SM				
-5									
-6									

End of boring

## **Appendix B – Reservoirs Laboratory Data**



October 8, 2012

Laboratory Code: RES  
Subcontract Number: NA  
Laboratory Report: RES 245378-1  
Project # / P.O. #: 11270055.2101  
Project Description: Harvard Gulch

Pinyon Environmental Engineering  
9100 West Jewell Ave. Suite 200  
Lakewood CO 80232-6357

Dear Customer,

Reservoirs Environmental, Inc. is an analytical laboratory accredited for the analysis of Industrial Hygiene and Environmental matrices by the National Voluntary Laboratory Accreditation Program (NVLAP), Lab Code 101896-0 for Transmission Electron Microscopy (TEM) and Polarized Light Microscopy (PLM) analysis and the American Industrial Hygiene Association (AIHA), Lab ID 101533 - Accreditation Certificate #480 for Phase Contrast Microscopy (PCM) analysis. This laboratory is currently proficient in both Proficiency Testing and PAT programs respectively.

Reservoirs Environmental, Inc. has analyzed the following samples for asbestos content as per your request. The analysis has been completed in general accordance with the appropriate methodology as stated in the attached analysis table. The results have been submitted to your office.

**RES 245378-1** is the job number assigned to this study. This report is considered highly confidential and the sole property of the customer. Reservoirs Environmental, Inc. will not discuss any part of this study with personnel other than those of the client. The results described in this report only apply to the samples analyzed. This report must not be used to claim endorsement of products or analytical results by NVLAP or any agency of the U.S. Government. This report shall not be reproduced except in full, without written approval from Reservoirs Environmental, Inc. Samples will be disposed of after sixty days unless longer storage is requested. If you have any questions about this report, please feel free to call 303-964-1986.

Sincerely,

A handwritten signature in blue ink that reads "Jeanne Spencer".

Jeanne Spencer  
President

Analyst(s): Melissa Hylton  
Paul D. LoScalzo      Wenlong Liu  
Michael Scales      Adam Humphreys  
Anita Grigg      Robert R. Workman Jr.  
Melissa Hylton      Anya Angst  
Brett S. Colbert      Jillian A. Doherty

## RESERVOIRS ENVIRONMENTAL, INC.

NVLAP Lab Code 101896-0  
TDH Licensed Laboratory # 30-0136

**TABLE PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME**

RES Job Number: **RES 245378-1**  
 Client: **Pinyon Environmental Engineering**  
 Client Project Number / P.O.: **11270055.2101**  
 Client Project Description: **Harvard Gulch**  
 Date Samples Received: **October 4, 2012**  
 Analysis Type: **PLM, Short Report**  
 Turnaround: **3-5 Day**  
 Date Analyzed: **October 4, 2012**

ND=None Detected TR=Trace, <1% Visual Estimate Trem-Act=Tremolite-Actinolite
--

Client Sample Number	Lab ID Number	L A Y E R	Physical Description	Sub Part (%)	Asbestos Content		Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
					Mineral	Visual Estimate (%)		
OT-1	EM 174761	A	Tan granular plaster w/ gray ceramic debris	100		ND	TR	100
OT-2	EM 174762	A	White/tan perlitic plaster	100		ND	TR	100
OT-3	EM 174763	A	Beige granular plaster	100		ND	0	100
OT-4	EM 174764	A	Tan granular plaster	100		ND	0	100

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

Due Date: 10.11.12  
 Due Time: 8:20am

**REILAB RESEVOIRS Environmental, Inc.**  
 5801 Logan St, Denver, CO 80216 • Ph: 303.964-1986 • Fax 303-477-4275 • Toll Free: 866-RES-ENV

After Hours Cell Phone: 720-339-9228

**INVOICE TO: (IF DIFFERENT)**

Company: Pinyon Environmental  
 Address: 9100 W. Jewell Ave  
Lakewood, CO  
 Project Number and/or P.O. #: 11270055.2101  
 Project Description/Location: Harvard Gulch

Company: City of Denver  
 Address: Denver Environmental Health  
 Contact: Peter Kates  
 Phone: 720.865-5443

Company: Jillian Mauev  
 Address: mauev@pinyon-env.com  
 Contact: mauev@pinyon-env.com  
 Phone: 303.980.5200  
 Fax:   
 Cellpager:

Client sample ID number	SAMPLERS INITIALS OR OTHER NOTES	REQUESTED ANALYSIS		VALID MATRIX CODES		LAB NOTES:
		METALS - Analytes) DST - Total, Respirable PCM - 7400A, 7400B, OSHA SEM - AHERA, Level II, 7402, ISO, +/-, Quant, Semi-quant, Micro-vec, ISO-Indirect Preps	MICROBIOLOGY E.coli O157:H7 +/- Listeria +/- Aerobic Plate Count +/- or Quantification E.coli +/- or Quantification Coliforms +/- or Quantification S.aureus +/- or Quantification Y & M +/- or Quantification Mold +/-, Identification, Quantification	Air = A Dust = D Soil = S Swab = SW Drinking Water = DW Waste Water = WW	Bulk = B Paint = P Wipe = W F = Food Waste Water = WW	
1 OT-1		TEM - Short report, Long report, Point Count	Salmonella +/-			
2 OT-2						
3 OT-3						
4 OT-4						
5						
6						
7						
8						
9						
10						

Number of samples received: 4 (Additional samples shall be listed on attached log form.)  
 NOTE: REI will analyze incoming samples based upon information received and will not be responsible for errors or omissions in calculations resulting from the inaccuracy of original data. By signing client/company representative agrees that submission of the following samples for requested analysis as indicated on this Chain of Custody shall constitute an analytical services agreement with payment terms of NET 30 days, failure to comply with payment terms may result in a 1.5% monthly interest surcharge.

Relinquished By: Jillian Mauev Date/Time: 8:20a 10/4/12  
 Laboratory Use Only: Jillian Mauev Date/Time: 10.4.12  
 Received By: Jillian Mauev Date/Time: 8:20a 10/4/12  
 Results: Contact Phone Email Fax Date Time Initials Contact Phone Email Fax Date Time Initials



**DENVER**  
THE MILE HIGH CITY

**Career Service Authority**  
Denver's Human Resource Agency

201 W. Colfax, Department 412  
Denver, CO 80202  
p: 720.913.5751  
f: 720.913.5720  
[www.denvergov.org/csa](http://www.denvergov.org/csa)

TO: All Users of the City of Denver Prevailing Wage Schedules  
FROM: Seth Duhon-Thornton, Staff Human Resource Professional  
DATE: Friday January 18, 2013  
SUBJECT: Latest Change to Prevailing Wage Schedules

Please be advised, prevailing wage rates for some building, heavy, and highway construction trades have not been updated by the United States Department of Labor (DOL) since March 1, 2002. The Career Service Authority Board, in their meeting held on April 21, 2011, approved the use of the attached supplemental wage rates until prevailing wage rates for these classifications of work are again published by the United States Department of Labor in accordance with the Davis-Bacon Act. The rates will be provided as a supplemental to the Davis-Bacon Heavy rates issued by CSA.

The effective date for this publication will be **Friday January 18, 2013** and applies to the City and County of Denver for **HEAVY CONSTRUCTION PROJECTS** in accordance with the Denver Revised Municipal Code, Section 20-76(c).

General Wage Decision No. CO130012  
Superseded General Decision No. CO20120012  
Modification No. 0  
Publication Date: 01/04/2013  
(8 pages)

Unless otherwise specified in this document, apprentices shall be permitted only if they are employed pursuant to, and individually registered in, a bona fide apprenticeship program registered with the U.S. Department of Labor (DOL). The employer and the individual apprentice must be registered in a program, which has received prior approval, by the DOL. Any employer, who employs an apprentice and is found to be in violation of this provision, shall be required to pay said apprentice the full journeyman scale.

For questions please call (720) 913-5018

Attachments as listed above.



JEFFERSON, LARIMER, AND WELD COUNTIES

	Rates	Fringes
ELECTRICIAN.....	\$ 32.10	12.53

-----  
 ELEC0111-001 09/01/2012

	Rates	Fringes
Line Construction:		
Cable Splicer.....	\$ 28.65	13.75%+4.75
Equipment Operator- Underground.....	\$ 25.06	12.75%+4.75
Groundman.....	\$ 22.31	9.78
Line Equipment Operator.....	\$ 27.24	10.80
Lineman and Welder.....	\$ 39.03	14.42

-----  
 ELEC0113-002 06/01/2012

EL PASO COUNTY

	Rates	Fringes
ELECTRICIAN.....	\$ 29.05	14.47

-----  
 ELEC0969-002 06/01/2010

MESA COUNTY

	Rates	Fringes
ELECTRICIAN.....	\$ 20.75	5.66

-----  
 ENGI0009-001 06/25/2012

	Rates	Fringes
Power equipment operators:		
Blade: Finish.....	\$ 24.57	8.62
Blade: Rough.....	\$ 24.27	8.62
Bulldozer.....	\$ 24.27	8.62
Cranes: 50 tons and under..	\$ 24.42	8.62
Cranes: 51 to 90 tons.....	\$ 24.57	8.62
Cranes: 91 to 140 tons.....	\$ 24.72	8.62
Cranes: 141 tons and over...	\$ 25.48	8.62
Forklift.....	\$ 23.92	8.62
Mechanic.....	\$ 24.42	8.62
Oiler.....	\$ 23.57	8.62
Scraper: Single bowl under 40 cubic yards.....	\$ 24.42	8.62
Scraper: Single bowl, including pups 40 cubic yards and over and tandem bowls.....	\$ 24.57	8.62
Trackhoe.....	\$ 24.42	8.62

-----  
 IRON0024-003 07/01/2011

	Rates	Fringes
Ironworkers:.....	\$ 23.80	18.07



Structural

LABO0086-001 05/01/2009

	Rates	Fringes
Laborers:		
Pipelayer.....	\$ 18.68	6.78

PLUM0003-005 07/01/2012

ADAMS, ARAPAHOE, BOULDER, BROOMFIELD, DENVER, DOUGLAS,  
JEFFERSON, LARIMER AND WELD COUNTIES

	Rates	Fringes
PLUMBER.....	\$ 33.43	11.44

PLUM0058-002 07/01/2012

EL PASO COUNTY

	Rates	Fringes
Plumbers and Pipefitters.....	\$ 32.55	12.95

PLUM0058-008 07/01/2012

PUEBLO COUNTY

	Rates	Fringes
Plumbers and Pipefitters.....	\$ 32.55	12.95

PLUM0145-002 07/01/2011

MESA COUNTY

	Rates	Fringes
Plumbers and Pipefitters.....	\$ 35.17	11.05

PLUM0208-004 07/12/2012

ADAMS, ARAPAHOE, BOULDER, BROOMFIELD, DENVER, DOUGLAS,  
JEFFERSON, LARIMER AND WELD COUNTIES

	Rates	Fringes
PIPEFITTER.....	\$ 30.10	11.52

SHEE0009-002 01/01/2011

	Rates	Fringes
Sheet metal worker.....	\$ 31.66	10.98

SUCO2001-006 12/20/2001

Rates Fringes

BOILERMAKER.....	\$ 17.60	
Carpenters:		
Form Building and Setting...	\$ 16.97	2.74
All Other Work.....	\$ 15.14	3.37
Cement Mason/Concrete Finisher...	\$ 17.31	2.85
IRONWORKER, REINFORCING.....	\$ 18.83	3.90
Laborers:		
Common.....	\$ 11.22	2.92
Flagger.....	\$ 8.91	3.80
Landscape.....	\$ 12.56	3.21
Painters:		
Brush, Roller & Spray.....	\$ 15.81	3.26
Power equipment operators:		
Backhoe.....	\$ 16.36	2.48
Front End Loader.....	\$ 17.24	3.23
Skid Loader.....	\$ 15.37	4.41

-----  
TEAM0455-002 07/01/2011

	Rates	Fringes
Truck drivers:		
Pickup.....	\$ 18.41	3.87
Tandem/Semi and Water.....	\$ 19.04	3.87

-----

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

**Career Service Authority**  
**Supplemental to the Davis-Bacon HEAVY Construction Projects rates**  
**(Specific to the Denver Projects)**  
**(Supp #74, Date: 02-03-2012)**

<b>Classification</b>		<b>Base</b>	<b>Fringe</b>
Millwrights		\$28.00	\$10.00
Line Construction:			
	Lineman, Gas Fitter/Welder	\$36.88	\$9.55
	Line Eq Operator/Line Truck Crew	\$25.74	\$8.09
Power Equipment Operators (Tunnels Above and Below Ground, shafts and raises):			
	GROUP 1	\$25.12	\$10.81
	GROUP 2	\$25.47	\$10.85
	GROUP 3	\$25.57	\$10.86
	GROUP 4	\$25.82	\$10.88
	GROUP 5	\$25.97	\$10.90
	GROUP 6	\$26.12	\$10.91
	GROUP 7	\$26.37	\$10.94
Power Equipment Operators:			
	GROUP 1	\$22.97	\$10.60
	GROUP 2	\$23.32	\$10.63
	GROUP 3	\$23.67	\$10.67
	GROUP 4	\$23.82	\$10.68
	GROUP 5	\$23.97	\$10.70
	GROUP 6	\$24.12	\$10.71
	GROUP 7	\$24.88	\$10.79
Ironworkers (Ornamental)		\$24.80	\$10.03
Laborers:			
	GROUP 1	\$17.68	\$8.22
	GROUP 2	\$18.18	\$8.27
	GROUP 3	\$21.59	\$8.61
Laborers: (Tunnel)			
	GROUP 1	\$18.53	\$8.30
	GROUP 2	\$18.63	\$8.31
	GROUP 3	\$19.73	\$8.42
	GROUP 4	\$21.59	\$8.61
	GROUP 5	\$19.68	\$8.42
Laborers (Removal of Asbestos)		\$21.03	\$8.55
Truck Drivers:			
	GROUP 1	\$18.42	\$10.00
	GROUP 2	\$19.14	\$10.07
	GROUP 3	\$19.48	\$10.11
	GROUP 4	\$20.01	\$10.16
	GROUP 5	\$20.66	\$10.23
	GROUP 6	\$21.46	\$10.31

POWER EQUIPMENT OPERATOR CLASSIFICATIONS  
(TUNNELS ABOVE AND BELOW GROUND, SHAFTS, AND RAISES):

GROUP 1 - Brakeman

GROUP 2 - Motorman

GROUP 3 - Compressor

GROUP 4 - Air Tractors; Grout Machine; Gunnite Machine; Jumbo Form

GROUP 5 - Concrete Placement Pumps; Mucking Machines and Front End Loaders, Underground, Slusher; Mine Hoist Operator; Mechanic

GROUP 6 - Mechanic Welder

GROUP 7 - Mole

*NOTE: Any equipment listed below being used in tunnel work, below or above ground shall be paid not less than \$2.00 per hour above the listed wage rates.*

POWER EQUIPMENT OPERATOR CLASSIFICATIONS:

GROUP 1 - Air compressor, brakeman, drill operator - smaller than Watson 2500 and similar, operators of 5 or more light plants, welding machines, generators, single unit conveyor, pumps, vacuum well point system, tractor, under 70 hp with or without attachments compressors, 360 C.F.M. or less.

GROUP 2 - Conveyor, handling **building** materials, ditch witch and similar trenching machine, haulage motor man, pugmill, portable screening plant with or without a spray bar, screening plants, with classifier.

GROUP 3 - Asphalt screed, asphalt plant, backfiller, bituminous spreader or laydown machine; cableway signalman, caisson drill, William MF, similar or larger; C.M.I. and similar, concrete batching plants, concrete finish machine, concrete gang saw on concrete paving, concrete mixer, less than 1 yd., concrete placement pumps, under 8 inches, distributors, bituminous surfaces dozer, drill, diamond or core, drill rigs, rotary, churn, or cable tool, elevating graders, elevator operator, equipment, lubricating and service engineer, grout machine, gunnite machine, hoist, 1 drum, horizontal directional drill operator, sandblasting machine, single unit portable crusher, with or without washer, tie tamper, wheel mounted, tractor, 70 hp and over with or without attachments, trenching machine operator, winch on truck.

GROUP 4 - Cable operated power shovels, draglines, clamshells, and backhoes, 5 cubic yards and under, concrete mixer over 1 cubic yard, concrete paver 34E or similar, concrete placement pumps, 8 inches and over, grade checker, hoist, 2 drums, hydraulic backhoe, 3/4 yds and over, loader, over 6 cubic yards, mechanic, mixer mobile, multiple unit portable crusher, with or without washer; piledriver, tractor with sideboom, roto- mill and similar, welder.

GROUP 5 - Cable operated power shovels, draglines, clamshells and backhoes over 5 cubic yards, caisson drill Watson 2500 similar or larger, hoist 3 drum or more, mechanic – welder (heavy-duty).

GROUP 6 - Cableway, derrick, quad nine push unit, wheel excavator, belt or elevating loader

GROUP 7 - tower cranes all types

LABORER CLASSIFICATIONS:

GROUP 1 - Janitors; Yardmen

GROUP 2 –Erosion Control, Dowel Bars; Fence Erectors; Gabion Basket and Reno mattresses; Signaling, Metal Mesh; Stake Caser; Traffic Control Devices; Tie Bars and Chairs in Concrete; Paving; Waterproofing Concrete; Air, Gas, Hydraulic Tools and Electrical Tool Operators; Barco Hammers; Cutting Torches; drill; diamond and core drills; Core, diamond, air track including but not limited to; Joy, Mustang, PR-143, 220 Gardner-**Denver**, Hydrosonic, and water blaster operator;

Chuck Tender; Electric hammers; Jackhammers; Hydraulic Jacks; Tampers; Air Tampers; Automatic Concrete Power Curbing Machines; Concrete Processing Material; Operators of concrete saws on pavement (other than gangsaws); Power operated Concrete Buggies; Hot Asphalt Labor; Asphalt Curb Machines; Paving Breakers; Transverse Concrete Conveyor Operator; Cofferdams; Boxtenders; Caisson 8' to 12'; Caisson Over 12'; Jackhammer Operators in Caissons over 12'; Labor applicable to Pipe coating or Wrapping; Pipe Wrappers, Plant and Yard; Relining Pipe; Hydroliner (a plastic may be used to waterproof); Pipelayer on Underground Bores; Sewer, Water, Gas, Oil Conduit; Enamalers on Pipe, inside and out, Mechanical Grouters; Monitors; Jeep Holiday Detector Men; Pump Operators; Rakers; Vibrators; Hydro- broom, Mixer Man; Guniting Nozzlemen; Shotcrete Operator; and chain saws, gas and electric; Sand Blaster; Licensed Powdermen; Powdermen and Blaster; Siphons; Signalmen; Dumpman/spotter; Grade Checker.

GROUP 3 - Plug and galleys in dams; Scalars; any work on or off Bridges 40' above the ground performed by Laborers working from a Bos'n Chair, Swing Stage, Life Belt, or Block and Tackle as a safety requirement.

#### TUNNEL LABORER CLASSIFICATIONS:

GROUP 1 - Outside Laborer - Above ground

GROUP 2 - Minimum Tunnel Laborer, Dry Houseman

GROUP 3 - Cable or Hose Tenders, Chuck Tenders, Concrete Laborers, Dumpmen, Whirley Pump Operators

GROUP 4 - Tenders on Shotcrete, Guniting and Sand Blasting; Tenders, core and Diamond Drills; Pot Tenders

GROUP 5 - Collapsible Form Movers and Setters; Miners; Machine Men and Bit Grinders; Nippers; Powdermen and Blasters; Reinforcing Steel Setters; Timbermen (steel or wood tunnel support, including the placement of sheeting when required); and all Cutting and Welding that is incidental to the Miner's work; Tunnel Liner Plate Setters; Vibrator Men, Internal and External; Unloading, stopping and starting of Moran Agitator Cars; Diamond and Core Drill Operators; Shotcrete operator; Guniting Nozzlemen; Sand Blaster; Pump Concrete Placement Men.

#### TRUCK DRIVER CLASSIFICATIONS:

GROUP 1 - Sweeper Truck, Flat Rack Single Axle and Manhaul, Shuttle Truck or Bus.

GROUP 2 - Dump Truck Driver to and including 6 cubic yards, Dump Truck Driver over 6 cubic yards to and including 14 cubic yards, Straddle Truck Driver, Liquid and Bulk Tankers Single Axle, Euclid Electric or Similar, Multipurpose Truck Specialty and Hoisting.

GROUP 3 - Truck Driver Snow Plow.

GROUP 4 - Cement Mixer Agitator Truck over 10 cubic yards to and including 15 cubic yards.

WELDERS: Receive rate prescribed for craft performing operation to which welding is incidental.

CITY AND COUNTY OF DENVER  
DEPARTMENT OF PUBLIC WORKS

CONTRACT NO. 201209801  
PROJECT NAME: STATE HOME-HARVARD GULCH IRRIGATION

ADDENDUM NO. 2 TO CONTRACT DOCUMENTS

Bidders are hereby instructed that the drawings, specifications, and other contract documents are modified, corrected, supplemented and/or superseded for the above mentioned project as hereinafter described in the following attachments:

BID FORM PACKAGE

BID DOCUMENT PACKAGE

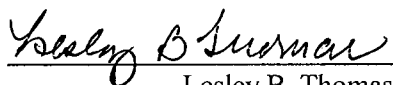
TECHNICAL SPECS/DRAWING

QUESTIONS AND ANSWERS

1. **Question:** I was inquiring if the Precision Pumping System pump station, "See Attached Documentation" can be approved as an equal to the Rainbird pump station listed in the bid documents.

**Response:** No, the Precision Pumping System would not be an approved equal.

This **ADDENDUM** shall be attached to, become a part of, and be returned with the Bid Proposal.

  
\_\_\_\_\_  
Lesley B. Thomas  
City Engineer

3.7.13  
\_\_\_\_\_  
Date

The undersigned bidder acknowledges receipt of this Addendum. The Proposal submitted herewith is in accordance with the stipulations set forth herein.

\_\_\_\_\_  
Contractor

ADDENDUM NO. 2

DATE: \_\_\_\_\_

**CITY AND COUNTY OF DENVER**  
**DEPARTMENT OF PUBLIC WORKS**

**TABLE OF CONTENTS FOR CONTRACT DOCUMENTS**

<b>BID FORM AND SUBMITTAL PACKAGE</b>	<b><u>PAGE</u></b>
Bid Form and Submittal Package (bound separately and attached as part of these Bid Documents)	
Table of Contents	BF-1
Bidder's Checklist	BF-2 through BF-3
Bid Form and Submittal Package Acknowledgment Form	BF-4 through BF-5
Bid Form	BF-6 through BF-8
List of Proposed Minority and Woman Business Enterprise(s)	BF-9 through BF-12
Commitment to Minority and Woman Business Enterprise Participation	BF-13
Minority and Woman Business Enterprise Letter(s) of Intent & Checklist	BF-14 through BF-15
Joint Venture Affidavit	BF-16
Joint Venture Eligibility Form	BF-17 through BF-19
Bid Bond	BF-20
Bidder / Contractor / Vendor / Proposer Disclosure Form	BF-21 through BF-23
<b>BID DOCUMENTS</b>	
Table of Contents	BDP-1
Notice of Invitation for Bids	BDP-2 through BDP-3
Instructions to Bidders	BDP-4 through BDP-15
Equal Employment Opportunity Provisions	BDP-16 through BDP-25
Appendix A	
Appendix F	
Contract Form	BDP-26 through BDP-30
Index of the General Contract Conditions	BDP-31 through BDP-35
Special Contract Conditions	BDP-36 through BDP-46
Final/Partial Release and Certificate of Payment Forms (Samples)	BDP-39 through BDP-41
Performance and Payment Bond Form	BDP-45 through BDP-46
Performance and Payment Bond Surety Authorization letter (Sample)	BDP - 47
Notice to Apparent Low Bidder (Sample)	BDP-48 through BDP-49
Notice To Proceed (Sample)	BDP-50
Certificate of Contract Release (Sample)	BDP-51
Prevailing Wage Rate Schedule	5 pages
Index to Technical Specifications	1page
Technical Specifications	132 pages
Contract Drawings	43 pages

**CITY AND COUNTY OF DENVER  
DEPARTMENT OF PUBLIC WORKS**

**NOTICE FOR INVITATION FOR BIDS  
FOR CONTRACT NO. 201309801**

**STATE HOME-HARVARD GULCH IRRIGATION**

**BID SCHEDULE:  
11:00 AM, Local Time  
MARCH 14, 2013**

Sealed bids will be received at the Development Permits Counter Station #22, located on the 2<sup>nd</sup> floor at 201 West Colfax, Denver, CO 80202, beginning at 10:30 a.m., no later than 11:00 a.m., on bid day.

Bids submitted prior to 10:30 a.m. on the specified bid opening date/time shall be presented at the Office of Contract Administration, Attention: Public Works Contract Administration, 201 West Colfax Avenue, Department 614, Denver, Colorado 80202. All properly delivered bids will then be publicly opened and read aloud in Room 1.D.1 on the first floor at 201 West Colfax, Denver, Colorado 80202.

Prior to submitting a bid, the bidder shall consult the Contractor's Bulletin Board located at 201 W. Colfax, 2<sup>nd</sup> Floor, Denver, Colorado, 80202 and/or [www.work4denver.com](http://www.work4denver.com).

**GENERAL STATEMENT OF WORK:**

Park Irrigation Project: Thirty-six acre urban park irrigation renovation construction project. Existing irrigation system will be replaced with non-potable, automatic control irrigation system. Items of work include; water tap improvements, service line extensions, booster pump, 12"-6" diameter distribution loop, rotor and spray irrigation system replacement, and install storm water best management practices. Construction will be phased to avoid conflicts with permitted athletic fields.

**ESTIMATED CONSTRUCTION COST:**

The estimated cost of construction for this project is between \$1,125,629.00 and \$1,375,768.00.

**TEXTURA CONSTRUCTION PAYMENT MANAGEMENT:**

Bidders are urged, when preparing a bid, to contact the Textura® Corporation 866-TEXTURA [www.texturacorp.com](http://www.texturacorp.com) for pricing schedule and fees, as all fees associated with the CPM System are to be paid by the Contractor and subcontractors for billings for work performed.

**DOCUMENTS AND BID INFORMATION AVAILABLE:**

Contract Documents complete with Technical Specifications and, if applicable, construction drawings will be available on the first day of publication at: [www.work4denver.com](http://www.work4denver.com). To download digital Contract Documents at a cost of \$10.00 per download, reference eBid Document Number #2457675. Contact QuestCDN at 952-233-1632 or [info@questcdn.com](mailto:info@questcdn.com) for assistance.

**PRE-BID CONFERENCE:**

A pre-bid conference will be held for this Project at 9:00 AM, local time, on **February 27, 2013**. This meeting will take place at: Harvard Gulch Golf Clubhouse, 660 E. Iliff Ave. Denver, CO.

**DEADLINE TO SUBMIT QUESTIONS: March 6, 2013 by 2:00 P.M.** local time.

**PREQUALIFICATION REQUIREMENTS:**

Each bidder must be prequalified in the category of **2(a) Landscape Improvement** at the \$1,500,000.00 monetary level in accordance with the City's Rules and Regulations Governing Prequalification of Contractors. Each bidder must have submitted a prequalification application a minimum of ten (10) calendar days prior to the bid opening date. Applications must be submitted to the Department of Public Works, Prequalification Section, 201 West Colfax Avenue, Department 506, Denver, Colorado 80202. To view the Rules and Regulations and to obtain a pre-



qualification application, please visit our website at [www.denvergov.org/prequalification](http://www.denvergov.org/prequalification) or call 720-865-2539 for prequalification information ONLY.

**LANDSCAPE/IRRIGATION CERTIFICATION REQUIREMENTS:** Each bidder or the subcontractor doing the work must have a member of their installation staff certified as one of the following and proof of certification must be included with your bid:

- **Landscape Industry Certified Technician (formerly CLT-E)  
(Certified by PLANET – the Professional Landcare Network)**
- **Certified Landscape Irrigation Auditor (CLIA)  
(Certified by IA – the Irrigation Association)**
- **Certified Irrigation Contractor (CIC)  
(Certified by IA – the Irrigation Association)**

**MINORITY AND WOMAN BUSINESS ENTERPRISE PARTICIPATION:**

Construction, reconstruction and remodeling contracts made and entered into by the City and County of Denver are subject to Article III, Divisions 1 and 3 of Chapter 28 of the Denver Revised Municipal Code, (Sections 28-31 to 29-36 and 28-52 to 28-90 D.R.M.C) and all Minority and Woman Business Enterprise and Equal Employment Opportunity Rules and Regulations adopted by the Director of the Division of Small Business Opportunity.

Article III, Division 3 of Chapter 28 of the D.R.M.C. directs the Director of the Division of Small Business Opportunity to establish a project goal for expenditures on construction, reconstruction, and remodeling work contracted by the City and County of Denver. The specific goal for this project is:

**2% Minority and Woman Business Enterprise (M/WBE) Participation**

Project goals must be met with certified participants as set forth in Section 28-60, D.R.M.C. or through the demonstration of a sufficient good faith effort under Section 28-62 D.R.M.C. For compliance with good faith requirements under Section 28-62(b), **the M/WBE percentage solicitation level required for this project is 100%.**

The Director of the Division of Small Business Opportunity urges all participants in City construction, reconstruction and remodeling projects to assist in achieving these goals.

**MISCELLANEOUS:**

Contracts for construction, reconstruction, and remodeling are subject to the City prevailing wage rate requirements established pursuant to Section 20-76, D.R.M.C.

As its best interest may appear, the City and County of Denver reserves the right to reject any or all bids and to waive informalities in bids.

If applicable, a shortened version of this Notice of Invitation for Bids and the Statement of Quantities can be viewed on the City and County of Denver website at: [www.work4denver.com](http://www.work4denver.com)

Publication Dates: February 19, 20, 21, 2013  
Published In: The Daily Journal

**CITY AND COUNTY OF DENVER  
DEPARTMENT OF PUBLIC WORKS**

**INSTRUCTIONS TO BIDDERS**

**IB-1 INSTRUCTION TO BIDDERS**

These Instructions to Bidders are a part of the Contract Documents and are intended to serve as a guide to bidders. They are general in nature and may be amended or supplemented as needed to support any one specific invitation to bid. Each bidder shall prepare its bid in strict compliance with all requirements of the Contract Documents and by careful application of these instructions.

**IB-2 BIDDING**

The copy of the Contract Documents contains the Bid Form and Submittal Package for this Project, which must be used to submit a bid hereunder. The bidder must fully complete, execute and submit this Bid Form and Submittal Package, along with any other specified components of the Contract Documents, as its bid for the referenced Project.

A bidder is not required to submit as part of its bid the entire set of Contract Documents distributed by the City pursuant to the Notice of Invitation for Bids, if the bidder executes and submits the Bidder Acknowledgment Form included with the Bid Form and Submittal Package as part of its bid. However, each bidder, by submitting its bid, shall be conclusively presumed to have received and reviewed all of the information contained in the Contract Documents as this term is further defined herein.

Each bid must be enclosed in a sealed envelope, must be addressed to the Manager and must show on the face of the envelope the full name of the bidder, the City Project number, and descriptive title of the Project for which the bid is made.

The advertisement for Notice of Invitation for Bids will identify where and when the bid must be delivered.

**IB-3 CONTRACT DOCUMENTS AS PUBLISHED BY CITY**

Each bidder shall be responsible for, and shall be deemed to have received, all the information contained in the Contract Documents as distributed by the City pursuant to the Notice of Invitation for Bids, including addenda, whether or not such bidder has reviewed all or part of the Contract Documents in either its hard copy form or in any other format. If organizations or companies other than the City or its design professional distribute the City's Contract Documents for review by prospective bidders, whether in hard copy or via electronic or other media, neither the City nor its design professional shall be responsible for the content, completeness or accuracy of any information distributed or transmitted by any such organization or company.

**IB-4 COMPLETING AND SIGNING THE BID FORMS**

The bidder must complete the Bid Form by legibly writing or printing in ink, in words and figures as required, all the bidder's prices offered for the Work to be performed. All blank spaces, which require a response of the bidder, must be properly completed in full. If in the process of evaluating a bid, words and figures, as written on the Bid Form by the bidder, do not agree, the written words will govern.

For Bid Forms requiring unit price bids, the bidder shall write in the Bid Form spaces provided a unit price for each item for which a quantity is given and shall also write the product of each unit price and the quantity specified in the "Amount" or "Total" space provided.

Each bidder must sign the Bid Form and give the bidder's current business address. If an individual, the signature must be of the individual offering the bid; if a partnership, the signature must be that of a general partner; and if a corporation, both the president and the secretary must sign and the seal of the corporation must be affixed. Signatures of other persons may be acceptable if the bid contains sufficient evidence, satisfactory to the City in its sole discretion, to indicate that the other persons are authorized to bind the bidder.

**IB-5 UNACCEPTABLE BIDS**

The City will not accept bids from Bidders not prequalified with the Department of Public Works (if prequalification is required for this project), in arrears to the City upon debt or contract, or which are defaulters (as surety or otherwise) upon any obligation to the City.

**IB-6 INFORMAL AND UNBALANCED BIDS**

Any alteration, interlineations, erasure, omission, deletion or addition by the bidder to the Bid Form and Submittal Package or other parts of the Contract Documents submitted with the Bid Form and Submittal Package, as originally issued to the bidder, shall render the accompanying bid informal and may constitute cause for rejection.

Any unauthorized addition, conditional or alternate bids, failure to provide a unit price, lump sum amount or authorized alternate item specified or other irregularities of any kind which tend to render the bid incomplete, indefinite or ambiguous shall render the bid informal and may constitute cause for rejection.

Bids that are unbalanced so that each item does not reasonably carry its own proportion of cost or that contain inadequate or unreasonable prices for any item may be rejected. Bids, which have not acknowledged all addenda to the Contract Documents issued for this bid, may also be rejected.

The right is reserved by the City to reject any or all bids and to waive any informalities where it is deemed by the City to be in the best interests of the City to do so.

**IB-7 ONLY ONE BID ACCEPTED**

The City will accept only one bid for the same work from any one bidder. This includes bids that may be submitted under different names by one business enterprise.

**IB-8 BID GUARANTEE**

As a guarantee of good faith on the part of the bidder, each bid must be accompanied by a bid guarantee, consisting of either a certified or cashier's check made payable without condition to the order of the City and County of Denver or a bid bond written by an approved corporate surety in favor of the City and County of Denver. If the bid of a bidder is acceptable and the bidder is notified by the Manager that it is considered to be the Apparent Low Bidder and said bidder fails to execute a contract in the form prescribed or to furnish a performance and payment bond with a legally responsible and approved surety or to furnish the required evidence of insurance or satisfy all conditions precedent to contract execution within five (5) days after such notice is made by the City, said bid guarantee shall be forfeited to the City as liquidated damages and not as a penalty.

The bid guarantee shall be in the amount of five percent (5%) of the total bid unless otherwise specified in the Notice of Invitation for Bids and on the form appearing in the Contract Documents in the Bid Form and Submittal Package. Failure to submit a proper bid guarantee, satisfying all of the requirements specified herein and on the form provided herein shall render the bid nonresponsive and may constitute cause for rejection.

Following award and execution of the Contract by the Apparent Low Bidder, or earlier in the sole discretion of the City, bid guarantees of all but the Apparent Low Bidder will be returned. When the Apparent Low Bidder executes the Contract and delivers to the City satisfactory performance and payment bonds, required insurance documentation, and has satisfied all conditions precedent to contract execution by the City, and after approval, if any, by the Council of the City of the proposed Contract with the Apparent Low Bidder, the bid guarantee of the Apparent Low Bidder shall be returned. Such return shall be made within one hundred twenty (120) days from date bids are opened unless otherwise specified in the Special Contract Conditions.

**IB-9 SITE INSPECTION AND INVESTIGATIONS**

Prior to submitting a bid, the bidder is invited to inspect the work site and its surroundings. Although the bidder is not required to make such an inspection before bidding, for purposes of the Contract it shall be conclusively presumed that by failing to make such an inspection, the bidder has waived the right to later

claim additional compensation or time extensions for conditions which would have been evident had the site been inspected.

Drawings and Technical Specifications, defining the Work to be done, were prepared on the basis of interpretation by the design professionals of information derived from investigations of the work site. Such information and data are subject to sampling errors, and the interpretation of the information and data depends to a degree on the judgment of the design professional. In view of this, the bidder is invited to make such additional investigations as the bidder's judgment dictates the need for such investigations. Information about the degree of difficulty of the Work to be done cannot totally be derived from either the Drawings or Technical Specifications or from the Manager or his representatives.

Since the bid information cannot be guaranteed, the Contractor shall have assumed the risks attendant to successful performance of the Work and shall never make claim for additional compensation or time extensions on the grounds that the nature or amount of work to be done was not understood by the bidder at the time of the bidding.

**IB-10 INCONSISTENCIES**

Any seeming inconsistencies or ambiguities between different provisions of the Contract Documents or any point which the bidder believes requires a decision or interpretation by the City must be inquired into by the bidder by addressing a formal written communication to the Manager of Public Works and sending or delivering it to the offices of the Division of Public Works advertising this Project for bid at least forty-eight (48) hours, excluding Saturdays, Sundays, and holidays, before the time set for the opening of bids.

Information about the decision or interpretation made in response to any inquiry will be posted on the Contractor's Bulletin Board (refer to IB-12 CONTRACTOR'S BULLETIN BOARD, for the location of the Contractor's Bulletin Board). If the matter raised requires, in the sole discretion of the Manager, that an addendum to the bid documents be issued, such addendum will be published and each bidder shall be required to acknowledge the addendum by signing and identifying it in the Bid Form when submitting the bid.

After bids are opened, all bidders must abide by the formal response of the Manager, as to any interpretation. The City shall not be bound and the bidder shall not rely on any oral communication, interpretation clarification or determination of the Contract Documents prior to bid opening.

**IB-11 WITHDRAWAL OF BID**

A bidder may withdraw its bid at any time prior to the time for receipt of bids set forth in the Notice of Invitation for Bids by making written request upon the Manager of Public Works. After such time, no bid may be withdrawn or modified.

Such request must be signed by the persons authorized to bind the bidder as defined in IB-3, COMPLETING AND SIGNING BID FORMS.

**IB-12 CONTRACTOR'S BULLETIN BOARD**

It shall be conclusively presumed that the bidder has, before submitting any bid, read and shall take full responsibility for all addenda, posted decisions, and other information relevant to the bid posted by the City on the Contractor's Bulletin Board. The Contractor's Bulletin Board is located at 201 W. Colfax, 2<sup>nd</sup> Floor, Denver, CO 80202, in the Wellington E. Webb Municipal Office Building.

**IB-13 PRE-BID MEETING**

Bidders are urged to attend the pre-bid meeting(s) scheduled for this Project. Attendance is not mandatory; however, bidders will be held responsible for all information presented at such meeting(s).

**IB-14 ADDENDA**

As its best interests may require, the City may issue addenda to the Contract Documents. Such addenda shall be posted on the Contractor's Bulletin Board and made available to all persons having purchased a set of Contract Documents as set forth in the Notice of Invitation for Bids contained herein. All bidders must acknowledge receipt of all addenda on the Bid Form at the time of submission of the bid.

**IB-15 BID OPENING**

Bidders are invited to be present at the bid opening. Unless otherwise suspended, delayed or canceled by posted notice from the Manager, bid opening will occur at the time and place designated in the Notice of Invitation for Bid.

**IB-16 EVALUATION OF BIDS AND BASIS OF BID SELECTION**

Bids will be evaluated after being read in open meeting at the place designated for such bid opening. All low bidders' bids will be reviewed for responsiveness to the requirements of the Contract Documents and whether or not the bids contain irregularities which could give any bidder an unfair advantage.

Selection will be made on the basis of the lowest, total, responsive, qualified bid, which bid shall include the total base bid set forth on the Bid Form, plus the total of any alternates set forth on the Bid Form and selected by the City during evaluation. Alternates, if any are included in the bid, will be selected in the priority shown on the Bid Form, subject to the limits of available funds. Bid selection will be subject to all requirements and special bidder qualifications contained herein and subject to approval of such resulting Contract in accordance with the Charter and Revised Municipal Code of the City and County of Denver. In addition to all other specified requirements, the City will correct arithmetical errors in all bids and corrected totals only will be considered as the basis of selection.

Upon concluding that the bid is, in fact, the lowest, total, responsive bid to the bidding conditions and that of a responsible, qualified bidder, the City will notify the Apparent Low Bidder.

As its best interests may appear, the City and County of Denver reserves the right to waive informalities in bids, to reject any and all bids and to rebid the Project.

**IB-17 NOTICE TO APPARENT LOW BIDDER**

The Notice to Apparent Low Bidder, a form of which is included in the Contract Special Conditions Section of the Contract Documents, is issued by the City directly to the selected bidder and informs the bidder that the Manager intends to seek approval of the execution of the Contract by the City in accordance with the Charter and Revised Municipal Code of the City and County of Denver. Specifically, it informs the bidder of its obligations with respect to execution of the Contract and instructs the bidder on how to proceed toward execution of the Contract. The City reserves the right to notify the Apparent Low Bidder, at any time within one hundred twenty (120) days from the date of the opening of the bids, that approval to contract with the Apparent Low Bidder shall be sought in accordance with the Charter and Revised Municipal Code of the City and County of Denver.

In accordance with the terms and conditions contained in the Bid Form and Submittal Package and any additional requirements set forth in the Notice to Apparent Low Bidder or elsewhere in the Contract Documents, the Apparent Low Bidder shall execute the Contract Form contained in the Contract Documents made available by the City for execution in the appropriate number of counterparts. The Apparent Low Bidder shall return the fully executed Contract Document sets, along with any supplemental documents required herein, to the City and shall comply with all other conditions precedent to Contract execution within five (5) days of the date of issuance of the Notice to Apparent Low Bidder by the City. Failure to comply with each of these requirements within five (5) days of the date of issuance of the Notice to Apparent Low Bidder by the City shall render the bid nonresponsive and may constitute cause for rejection.

Issuance of such Notice shall not, however, constitute a commitment on the part of the City or create any rights in the Apparent Low Bidder to any contract with the City.

**IB-18 EXECUTION OF CONTRACT**

The process of executing a contract requires action by both the apparent low bidder and the City. After it notifies the Apparent Low Bidder, the City will prepare the Contract Documents by incorporating all of the documents submitted by the Apparent Low Bidder into one or more executable copies. Upon notification that contracts documents are ready for execution the Apparent Low Bidder shall execute the contract documents. At this time, the successful bidder shall also provide certain supplemental documents for

incorporation into the Contract Documents. These supplemental documents shall include: the properly executed Certificate of Insurance Forms evidencing the apparent low bidder's satisfactory compliance with the insurance requirements set forth in the Contract Documents; a properly executed Payment and Performance Bond Form and appropriate Power of Attorney evidencing the Apparent Low Bidder's satisfactory compliance with the bonding requirements set forth in the Contract Documents; and documentation of compliance with any other conditions precedent to execution of the Contract by the City set forth in the Contract Documents. The insurance and bond forms contained in the Contract Special Conditions Section of the Contract Documents must be used in satisfying these supplemental document requirements.

These documents are then delivered to the City within the prescribed time period for examination of the documents to determine whether or not the Contractor has correctly executed the Contract and has correctly provided the required supplemental documents and that these documents are satisfactorily and properly completed. From here, all of the documents are forwarded to the City Attorney who will, if the insurance and bonding offered is acceptable and if all other elements of the Contract Documents are in order, recommend that the Manager and the Mayor approve the documents and, when required by the City Charter, prepare an ordinance for submittal to City Council authorizing the execution of the Contract. The City Attorney shall in all applicable instances submit the proposed contract and ordinance to City Council. After City Council approval, the Contract shall be reviewed by the City Attorney and routed for execution by the Mayor, the Clerk for attestation and the Auditor for countersignature and registration. When the total process of contract execution is complete, a Notice to Proceed will be issued and a single executed copy of the Contract will be delivered to the Contractor. Any work performed or a material purchased prior to the issuance of Notice to Proceed is at the Contractor's risk.

#### **IB-19 BONDING REQUIREMENTS**

In accordance with the provisions of General Contract Conditions, Title 15, PERFORMANCE AND PAYMENT BONDS, the minimum bonding requirements for this Contract are set forth in the form **CITY AND COUNTY OF DENVER PERFORMANCE AND PAYMENT BOND** contained in the Special Conditions Section of the Contract Documents. Upon receipt of Notice to Apparent Low Bidder, the apparent low bidder must cause this form bond to be purchased, executed and furnished, along with appropriate Powers of Attorney and a surety authorization letter (in form similar to the one attached), to the City in accordance with the instructions contained herein.

#### **IB-20 INSURANCE REQUIREMENTS**

The minimum insurance requirements for this Contract are set forth in the Special Conditions Section of the Contract Documents. Bidders are urged to consider, in preparing a bid hereunder, that each condition, requirement or specification set forth in the form certificate must be complied with by the Contractor and all subcontractors performing Work on the Project, unless such requirements are specifically accepted in writing by the City's Risk Management Office. The Contractor must either include all subcontractors performing work hereunder as insureds under each required policy or furnish a separate certificate for each subcontractor. In either case, the Contractor shall insure that each subcontractor complies with all of the coverage requirements.

#### **IB-21 PERMITS AND LICENSES**

All permits, licenses and approvals required in the prosecution of the work shall be obtained and paid for by the Contractor.

#### **IB-22 WAGE RATE REQUIREMENTS**

In preparing any bid hereunder, the Contractor must comply with and should carefully consider all requirements and conditions of the City's Payment of Prevailing Wages Ordinance, Sections 20-76 through 20-79, D.R.M.C. and any determinations made by the City pursuant thereto.

At the time of the preparation of the Contract Documents, the then-current prevailing wage rates applicable to this Project shall be bound within the Contract Documents made available to potential bidders for the Project. If, more than ten (10) days prior to the actual date of bid opening, the Career Service Board determines that prevailing wages rates different from those bound in the Contract Documents are applicable to one or more of the various classes of laborers, mechanics and workers encompassed by this Project, such

different prevailing wage rates shall be provided in an addendum. If different prevailing wage rates are determined by the Career Service Board ten (10) or less days prior to the actual date of bid opening, the City will determine on a case by case basis in its sole discretion whether such different prevailing wage rates are to be included in an addendum. In conjunction with such determination, the City may elect, in its sole discretion, to postpone the date of bid opening on the Project. In any event, the bidder will be held, at the actual date of bid opening, to those prevailing wage rates incorporated into the Contract Documents and as modified by any such addenda.

These prevailing wage rates shall be considered the **minimum** City prevailing wage rates to be paid by all contractors or subcontractors for a period not to exceed one (1) year from the date of the Contract. Increases in prevailing wages subsequent to the date of the Contract for a period not to exceed one (1) year shall not be mandatory on either the contractor or subcontractors. Future increases in prevailing wages on contracts whose period of performance exceeds one (1) year shall be mandatory for the contractor and subcontractors only on the yearly anniversary date of the Contract. The **minimum** City prevailing wage rate for any such subsequent yearly period or portion thereof shall be the wage rates in effect on the yearly anniversary date of the contract which begins such subsequent period. In no event shall any increases in prevailing wages over the amounts thereof as stated in such Technical Specifications and addenda thereto result in any increased liability on the part of the City and the possibility and risk of any such increase is assumed by all contractors entering into any such contract with the City. Decreases in prevailing wages subsequent to the date of the contract for a period not to exceed one year (1) shall not be permitted. Decreases in prevailing wages on contracts whose period of performance exceeds one (1) year shall not be effective except on the yearly anniversary date of the contract.

### **IB-23 TAX REQUIREMENTS**

General. Bidders are referred to the General Contract Condition 323, TAXES, as to taxes to which they may be subject in performing the Work under this Contract, including but not limited to sales and use taxes and the Denver Occupational Privilege Tax. The following instructions are to be considered along with the General Contract Conditions and not in lieu of them.

Sales and Use Tax. Construction and building materials sold to contractors and subcontractors for use on structures, roads, streets, highways, and other public works owned by the City and County of Denver are exempt from state, RTD, and Cultural Facilities District sales and use taxes. However, such materials will be subject to sales and use taxes imposed by the City and County of Denver.

It is the responsibility of the Contractor and its subcontractors to apply to the Colorado Department of Revenue (“CDOR”) for a certificate, or certificates, of exemption indicating that their purchase of construction or building materials is for a public project, and to deliver to the City copies of such applications as soon as possible after approval by the CDOR. Bidders shall not include in their bid amounts the exempt state, RTD, and Cultural Facilities District Sales and Use Taxes.

Denver Occupational Privilege Tax. Any employee working for a contractor, or a subcontractor, who earns over \$500 working in Denver during a calendar month, is subject to the payment of the Employee Occupational Privilege Tax. The Contractor and any subcontractor must pay the Business Occupational Privilege Tax for each of its employees who are subject to such tax.

### **IB-24 DISCLOSURE OF PRINCIPALS**

Pursuant to D.R.M.C. 20-69, any bid in excess of \$100,000.00 must be accompanied by a separate detachable page setting forth the following information:

- (1) The name of any officer, director, owner or principal of the business entity, including identity of any shareholder who owns or controls 5% or more of the business entity, and either 1) the names of his or her spouse, and children under eighteen years of age; or 2) a statement that he or she or his or her spouse, or children, if any, under the age of eighteen have or have not made a contribution, as defined in D.R.M.C. 15-32, or contribution in kind, as defined in D.R.M.C. 15-32, to any candidate, as defined in D.R.M.C. 15-32, during the last five years and identifying by name himself or herself or any spouse or child under the age of eighteen who has made such a contribution or contribution in-kind to a candidate.

(2) The names of any subcontractors or suppliers whose share of the bid exceeds \$100,000.00 of the contract or formal bid amount.

(3) The names of any unions with which the bidder has a collective bargaining agreement.

**If the total bid amount is in excess of \$500,000.00, the information required in (1) above must be provided at the time of bid submittal.** and the information required in (2) and (3) must be submitted in a timely fashion prior to award. The list of subcontractors required by this instrument is different and separate from the bidding list required on BF-4.

**If the total bid amount is less than \$500,000.00 but more than \$100,000.00, such information must be provided prior to award of the contract.** Failure to provide the required information in a timely fashion shall render any bid to which D.R.M.C. 20-69 applies non-responsive.

While a bidder or supplier who has already disclosed such information need not provide such information with a second or subsequent bid or proposal unless such information has changed, it shall be the responsibility of each such bidder or proposer to verify that such information is still current as of the date of such subsequent bid or proposal and is in fact on file with the City Clerk.

A form, which may be used for such disclosure, is contained in the Special Conditions Section of the Contract Documents. The form is entitled: Bidder/Contractor/Vendor/Proposer Disclosure. Failure to provide or update the required information in a timely fashion shall render any bid to which D.R.M.C. 20-69 applies non-responsive.

#### **IB-25 MINORITY AND WOMAN BUSINESS ENTERPRISE (M/WBE) REQUIREMENTS**

Article III, Divisions 1 and 3 of Chapter 28, Denver Revised Municipal Code (D.R.M.C.), designated as Sections 28-31 – 29-36 and 28-52 – 28-90 D.R.M.C. and referred to in these Bid Documents as the “M/WBE Ordinance” and any Rules or Regulations promulgated pursuant thereto apply to this Project and are incorporated into these Bid Documents by reference. Generally, the M/WBE Ordinance provides for the adoption of a good faith goals program, to be administered by the Division of Small Business Opportunity (DSBO), devised to provide increased bidding opportunities for Minority and Woman Business Enterprises (M/WBEs). As such, each bidder must comply with the terms and conditions of the M/WBE Ordinance in making its bid and, if awarded the Contract, in performing all Work thereunder. A bidder’s failure to comply with the M/WBE Ordinance, any Rules or Regulations promulgated pursuant thereto, or any additional requirement contained herein shall render the bid non-responsive and shall constitute cause for rejection. Failure by the contractor awarded the contract to comply with M/WBE Ordinance requirements during the performance of the contract is a material breach of the contract, which may result in the imposition of sanctions on the Contractor, as deemed appropriate by DSBO. Copies of the M/WBE Ordinance and its accompanying Rules and Regulations are available for the use and review of bidders from DSBO. In order to comply with the bid requirements of the M/WBE Ordinance, a bidder shall either meet the established project goal or, in the alternative, demonstrate that the bidder has made sufficient good faith efforts to meet the goal in accordance with the M/WBE Ordinance.

#### **Meeting Established Goal**

In preparing a bid to meet the established Project goal, bidders should consider the following instructions relating to compliance with the M/WBE Ordinance:

1. Under the M/WBE Ordinance, the Director of DSBO (“Director”) is directed to establish project goals for expenditures on construction, reconstruction, and remodeling work performed for the City and County of Denver. The specific goal for this project is stated in the Notice of Invitation for Bids bound herein.
2. In preparing its bid, each bidder shall list on the Bid Form pages entitled "List of Proposed MWBE or DBE Bidders, Subcontractors, Suppliers, Manufacturers, Manufacturers' Representatives or Brokers" the name, address, work description/supply, committed level of participation and other required information for each M/WBE of any tier which the bidder intends



to use in performing the work on this Project. **Only the M/WBEs identified and the precise levels of participation listed for each on the Bid Form page, at the time of bid opening, will be considered in determining whether the bidder has met the designated participation goal. Additional, revised or corrected participation submitted after bid opening will not be considered.** M/WBE bidders may count self-performance or joint venture activity in meeting the M/WBE project goal, but only for the scope of work performed as a commercially useful function and at a percentage level the M/WBE will be performing itself.

3. If a bidder/proposer is participating in a joint venture with a certified M/WBE firm, complete the Joint Venture Eligibility Form and Joint Venture Affidavit contained in this bid document/RFP. Submit the aforementioned forms with the firm's Joint Venture Agreement, to the DSBO Director, **at least 10 working days prior to the proposal submittal.** The Joint Venture must be approved prior to the bid opening or proposal submittal by the DSBO Director. Approval by the DSBO Director includes determining the amount the Joint Venture will count towards meeting the project goal.
4. All M/WBEs listed on the Bid Form must be properly certified by the City on or before the date bids are opened in order to count towards meeting the designated goal. DSBO maintains an M/WBE Directory ("Directory"), which is a current listing of M/WBEs that have been certified by the City. A copy of the DSBO Directory is located at DSBO web site at [DSBO](#) Compliance. Bidders are encouraged to use the Directory to assist in locating M/WBEs for the work and supplies required on the Project. Bidders are reminded that changes may be made to the Directory at anytime in accordance with the City's M/WBE Ordinance and procedures established to administer this program and a current copy of the Directory must always be used in preparing a bid. M/WBE certification or listing in the Directory is not a representation or warranty by the City as to the qualifications of any listed M/WBE.
5. In accordance with the provisions of the M/WBE Ordinance, DSBO will evaluate each bid to determine the responsiveness of the bid to the requirements of the M/WBE Ordinance. In determining whether a bidder's committed level of participation meets or exceeds the stated M/WBE goal, DSBO shall base its calculation of applicable amounts and percentages on the total base bid amount, not including any listed alternates, of each bid as follows:
  - a. The bid information provided by the agency will be used to determine the total base bid amount of each bid. Each bidder's total base bid amount will be multiplied by the M/WBE percentage established for the project to determine the exact dollar amount of required M/WBE participation for the Project. This amount will then be compared against the exact dollar amounts for the M/WBE committed for participation by the bidder. If the total dollar amount of participation listed meets or exceeds the established M/WBE dollar amount goal listed, then DSBO will determine that the goal has been met.
  - b. In addition, DSBO will determine the exact commitment percentage for each listed M/WBE by dividing the dollar amount listed for each M/WBE by the total base bid dollar amount submitted by the bidder. These individual percentages, when totaled for all listed M/WBE, will establish the total committed percentage level of M/WBE participation that the bidder must comply with during the life of the contract. In all cases, the committed percentage level of M/WBE participation must equal or exceed the assigned M/WBE goal for the Project.
  - c. In providing the exact dollar amount of participation for each listed M/WBE, a bidder should take care never to round up in determining whether or not the total of these amounts meets or exceeds the established percentage goal. The goal must be met or exceeded by dollar amounts and percentages in order for DSBO to determine that the bidder has met or exceeded the applicable M/WBE goal.
  - d. As previously mentioned, compliance with the M/WBE goal will be determined on the base bid alone. If a bid contains alternates, participation contained in any alternate will

not count towards satisfaction of the Project goal. However, should any designated alternate be selected by the City for inclusion in the contract ultimately awarded, the M/WBE goal percentage level submitted at bid time, on the base bid, will also apply to the selected alternates and must be maintained for the life of the contract on the total contract amount, including any alternate work. Thus, even though such participation will not be considered in evaluating bids, bidders are urged to consider participation in preparing bids for designated alternates.

- e. On projects where force account or allowance bid items have been included, bidders must meet the M/WBE goal percentage based upon the total base bid, including all such items that are submitted to the City. However, when a force account or allowance is designated by the City to be either performed or purchased from a specific company, the bidder may back out the dollar amount of the force account or allowance from the total base bid and meet the M/WBE goal on the remaining reduced amount.
  - f. On bids which, at the time of bid opening, are equal to or exceed Five Million Dollars (\$5,000,000.00), including any alternates which may be selected, only sixty percent (60%) of the value of the commercially useful function performed by M/WBE suppliers shall count toward satisfaction of the Project goal. On Projects under Five Million (\$5,000,000.00) the value of the commercially useful function of M/WBE supplier(s) will count at a one hundred percent (100%) level. Manufacturer's representatives and packagers shall be counted in the same manner as brokers.
  - g. In utilizing the M/WBE participation of a Broker only the bona fide commissions earned by such Broker for its performance of a commercially useful function will count toward meeting the Project goals. The bidder must separate the bona fide brokerage commissions from the actual cost of the supplies or materials provided to determine the actual dollar amount of participation that can be counted towards meeting the goal.
6. On or before the third (3<sup>rd</sup>) working day after bid opening, all of the Bidders are required to submit an executed "Letter of Intent" for each M/WBE listed on the Bid Form as a joint venture member, subcontractor, supplier, manufacturer, manufacturers' representative or broker of any tier. **An MBE or WBE Prime Bidder needs to submit a Letter of Intent for itself for self performed work**, and must identify their level of participation on the designated M/WBE participation page bound herein. A Letter of Intent shall be submitted only for the M/WBEs listed at the time of bid opening, since this is the only participation that will be counted toward satisfaction of the project goal. A form for the M/WBE Letter of Intent is included with the Bid Form. The M/WBE Letter of Intent is a written communication from the Bidder to the City evidencing an understanding that the Bidder has or will enter into a contractual relationship with the M/WBE or that its subcontractor(s) and supplier(s), manufacturer(s), manufacturers' representative(s) and broker(s) will do so. Each M/WBE Letter of Intent shall be accompanied by a copy of the City and County of Denver's M/WBE certification letter for each proposed M/WBE identified at bid time. Bidders are urged to carefully review these Letters before submission to the City to ensure that they are properly completed and executed by the appropriate parties.

#### **Good Faith Effort.**

In preparing a bid to demonstrate a good faith effort, bidders should consider the following instructions relating to compliance with the M/WBE Ordinance:

1. If the bidder or proposer has not fully met the project goal as provided in section 28-60, then it shall demonstrate that it has made good faith efforts to meet such goal. The bidder or proposer shall furnish to the director, within three (3) working days after bid opening by the City or on or before the time of the final project-specific proposal submitted to and authorized by the City pursuant to a competitive selection process, or bid selection by a private owner, a detailed statement of its good faith efforts to meet the project goal set by the director. This statement shall address each of the items in subsection (b) and any additional criteria that the director may establish by rule or regulation consistent with the purposes of this division 3. Good faith efforts must be demonstrated to be meaningful and not merely for formalistic compliance with this

Division 3. The scope and intensity of the efforts will be considered in determining whether the bidder or proposer has achieved a good faith effort.

2. The statement of good faith efforts shall include a specific response and verification with respect to each of the following good faith effort categories, which may be further defined by rule or regulation. A bidder or proposer may include any additional information it believes may be relevant. Failure of a bidder or proposer to show good faith efforts as to any one (1) of the following categories shall render its overall good faith effort showing insufficient and its bid or proposal non-responsive:
  - a. If prebid or preselection meetings are scheduled by the City at which MBEs and WBEs may be informed of subcontracting or joint venture opportunities under a proposed contract to be bid, or procured pursuant to the competitive selection process, attendance at such prebid or preselection meetings is not mandatory; however, bidders and proposers are responsible for the information provided at these meetings.
  - b. The bidder or proposer must solicit through all reasonable and available means, the interest of all MBEs and WBEs certified in the scopes of work of the contract. The bidder or proposer must solicit the interest of such MBEs and WBEs within sufficient time, prior to the bid opening or date of final project-specific proposal in the case of a competitive selection process, to allow such MBEs and WBEs to respond to the solicitation. The bidder or proposer must determine with certainty if the MBEs and WBEs are interested by demonstrating appropriate steps to follow up initial solicitations.
  - c. The bidder or proposer must select portions of the work of the contract to be performed by MBEs and WBEs in order to increase the likelihood that the project goal will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate MBE and WBE participation as subcontractors or joint venturers, and for bidder or proposer self-performed work, as suppliers, manufacturers, manufacturer's representatives and brokers, all reasonably consistent with industry practice, even when the bidder or proposer would otherwise prefer to perform these work items with its own forces. The bidder or proposer must identify what portions of the contract will be self-performed and what portions of the contract will be opened to solicitation of bids, proposals and quotes from MBE and WBEs. All portions of the contract not self-performed must be solicited for MBE and WBE participation. The ability or desire of a bidder or proposer to perform the work of a contract with its own forces does not relieve the bidder or proposer of the responsibility to meet the project goal or demonstrate good faith efforts to do so.
  - d. The bidder or proposer, consistent with industry practice, must provide MBEs and WBEs at a clearly stated location with timely, adequate access to and information about the plans, specifications, and requirements of the contract, including bonding and insurance requirements, if any, to assist them in responding to a solicitation.
  - e. The bidder or proposer must negotiate in good faith with interested MBEs and WBEs and provide written documentation of such negotiation with each such MBE or WBE.
  - f. For each MBE or WBE which contacted the bidder or proposer or which the bidder or proposer contacted or attempted to subcontract or joint venture with, consistent with industry practice, the bidder or proposer must supply a statement giving the reasons why the bidder or proposer and the MBE or WBE did not succeed in negotiating a subcontracting, supplier, manufacturer, manufacturer's representative, broker or joint venture agreement, as applicable.
3. The bidder or proposer must provide verification that it rejected each non-utilized MBE and WBE because the MBE or WBE did not submit the lowest bid or it was not qualified. Such verification shall include a verified statement of the amounts of all bids received from potential or utilized subcontractors, suppliers, manufacturers, manufacturer's representatives, brokers or joint venturers

on the contract, whether or not they are MBEs or WBEs. In making such a determination of not being qualified, the bidder or proposer shall be guided by the definition of qualified in section 28-54(42), but evidence of lack of qualification must be based on factors other than solely the amount of the MBE's or WBE's bid. For each MBE or WBE found not to be qualified by the bidder or proposer, the verification shall include a statement giving the bidder's or proposer's reasons for its conclusion. A bidder's or proposer's industry standing or group memberships may not be the cause of rejection of an MBE or WBE. A bidder or proposer may not reject an MBE or WBE as being unqualified without sound reasons based on a reasonably thorough investigation and assessment of the MBE's or WBE's capabilities and expertise.

4. If requested by a solicited MBE or WBE, the bidder or proposer must make reasonable efforts to assist interested MBEs and WBEs in obtaining bonding, lines of credit, or insurance as required by the City or by the bidder or proposer, provided that the bidder or proposer need not provide financial assistance toward this effort.
5. If requested by a solicited MBE or WBE, the bidder or proposer must make reasonable efforts to assist interested MBEs and WBEs in obtaining necessary and competitively priced equipment, supplies, materials, or related assistance or services for performance under the contract, provided that the bidder or proposer need not provide financial assistance toward this effort.
6. The bidder or proposer must use the DSBO MBE/WBE directories to identify, recruit, and place MBEs and WBEs.
7. In determining whether a bidder or proposer has satisfied good faith efforts as to a project goal, the success or failure of other bidders or proposers on the contract in meeting such project goal may be considered.

#### **Continuing Commitments.**

In accordance with the provisions of the M/WBE Ordinance, the bidder agrees that it is committed to meeting either the M/WBE participation goal or the M/WBE participation set forth in its statement of good faith. This commitment must be expressly indicated on the "Commitment to MWBE SBE Participation" form included with the Bid Form. This commitment includes the following understandings:

1. The bidder understands it must maintain M/WBE goals throughout the performance of the Contract pursuant to the requirements set out in D.R.M.C. 28-72.
2. The bidder understands that it must establish and maintain records and submit regular reports, as required, which will allow the City to assess progress in achieving the M/WBE participation goal.
3. The bidder understands that if change orders or any other contract modifications are issued under the contract, the bidder shall have a continuing obligation to immediately inform DSBO in writing of any agreed upon increase or decrease in the scope of work of such contract, upon any of the bases discussed in Section 28-73 of the M/WBE Ordinance, regardless of whether such increase or decrease in scope of work has been reduced to writing at the time of notification.
4. The bidder understands that if change orders or other contract modifications are issued under the contract, that include an increase in scope of work of a contract for construction, reconstruction, or remodeling, whether by amendment, change order, force account or otherwise which increases the dollar value of the contract, whether or not such change is within the scope of work designated for performance by an M/WBE at the time of contract award, such change orders or contract modification shall be immediately submitted to DSBO for notification purposes. Those amendments, change orders, force accounts or other contract modifications that involve a changed scope of work that cannot be performed by existing project subcontractors or by the contractor shall be subject to a goal for M/WBEs equal to the original goal on the contract which was included in the bid. The contractor shall satisfy such goal with respect to such changed scope of work by soliciting new M/WBEs in accordance with Section 28-73 of the M/WBE Ordinance as applicable, or the contractor must show each element of modified good faith set out in Section 28-

75(c) of the M/WBE Ordinance. The contractor shall supply to the director the documentation described in Section 28-75(c) of the M/WBE Ordinance with respect to the increased dollar value of the contract.

All bidders are charged with knowledge of and are solely responsible for complying with each and every provision of the M/WBE Ordinance in making a bid and, if awarded, in performing the work described in the Contract Documents. Failure to comply with these provisions could constitute cause for rejection of a bid or subject the selected contractor to sanctions set forth in the M/WBE Ordinance. These instructions are intended only to generally assist the bidder in preparing and submitting a compliant bid. Should any questions arise regarding specific circumstances, bidders must consult the M/WBE Ordinance or contact the Project's designated DSBO representative at (720) 913-1999.

**IB- 26 DISCLOSURE OF INFORMATION**

All submissions and other materials provided or produced pursuant to this Invitation for Bids may be subject to the Colorado Open Records Law, C.R.S. 24-72-201, et seq. As such, bidders are urged to review these disclosure requirements and any exceptions to disclosure of information furnished by another party and, prior to submission of a bid to the City, appropriately identify materials that are not subject to disclosure. In the event of a request to the City for disclosure of such information, the City shall advise the bidder of such request to give the bidder an opportunity to object to the disclosure of designated confidential materials furnished to the City. In the event of the filing of a lawsuit to compel such disclosure, the City will tender all such material to the court for judicial determination of the issue of disclosure and each bidder agrees to intervene in such lawsuit to protect and assert its claims of privilege against disclosure of such material. Each bidder further agrees to defend, indemnify and save and hold harmless the City, its officers, agents and employees, from any claim, damages, expense, loss or costs arising out of the bidder's intervention to protect and assert its claims of privilege against disclosure under the Open Records Law including, but not limited to, prompt reimbursement to the City of all reasonable attorney fees, costs and damages that the City may incur directly or may be ordered to pay by such court.

**IB-27 GENERAL BIDDING INFORMATION**

Bidders are instructed to contact the Contract Administrator designated below for this Project for pre-bid, post-bid and general City bidding information. Bidders can also visit [DenverGov.com](http://DenverGov.com) for information, both general and project specific. The Contract Administrator assigned to this project is Debby Gibson who can be reached via email at [debby.gibson@denvergov.org](mailto:debby.gibson@denvergov.org).

**IB-28 PAYMENT PROCEDURE REQUIREMENTS**

Contractor recognizes and agrees that it shall be required to use the Textura® Construction Payment Management System (CPM System) for this Project. Bidders are urged, when preparing a bid, to contact the Textura® Corporation for pricing schedule and fees, as all fees associated with the CPM System are to be paid by the Contractor and subcontractor for billings for work performed.

**RULES AND REGULATIONS  
REGARDING  
EQUAL EMPLOYMENT OPPORTUNITY**

Promulgated and adopted by the Manager of Public Works pursuant to and by authority of Article III, Division 2, Chapter 28 of the Revised Municipal Code of the City and County of Denver, and for the purpose of insuring that contractors, subcontractors and suppliers soliciting and receiving compensation for contract work from or through the City and County of Denver provide equal opportunity in employment without regard to race, color, creed, sex, national origin, age, religion, marital status, political opinion or affiliation or mental or physical handicap and meet certain requirements for the hiring, training, promotion, and treatment during employment of members of ethnic groups subject to differential treatment, including persons of African descent (Black), Spanish-surnamed (Hispanic), Asian-American and American Indian Groups.

**RULE I - DEFINITIONS**

- A. "City" means the City and County of Denver.
- B. "Manager" shall mean the Manager of Public Works for the City and County of Denver.
- C. "Contract" means a contract entered into with the City and County of Denver, financed in whole or in part by local resources or funds of the City and County of Denver, for the construction of any public building or prosecution or completion of any public work.
- D. "Contractor" means the original party to a contract with the City and County of Denver, also referred to as the "general" or "prime" contractor.
- E. "Director" means the Director of the Division of Small Business Opportunity.
- F. "Subcontractor" means any person, company, association, partnership, corporation, or other entity, which assumes by subordinate agreement some or all of the obligations of the general or prime contractor.
- G. The phrase "Bidding Specifications" as used in Article III, Division 2 of Chapter 28 of the Revised Municipal Code shall include BID CONDITION, INVITATION TO BID, and NOTICE OF PROPOSAL.
- H. "Affirmative Action Program" means a set of specific and result-oriented procedures or steps to which a contractor commits himself to apply every good faith effort to employ members of ethnic minority groups, to include persons of African descent (Black), Spanish surnamed (Hispanic), Asian-American, American Indians, and persons with mental or physical handicap.
- I. "Division of Small Business Opportunity" means the City agency established pursuant to Article III, Division 1 of Chapter 28 of the Denver Revised Municipal Code.

**RULE II - NOTICE OF HEARING**

When results of conciliation efforts are unsatisfactory to the Manager and he is informed in accordance with Article III, Division 2 of Chapter 28 of the Revised Municipal code that a contractor or subcontractor has apparently failed to meet affirmative action and equal employment opportunity requirements after a reasonable period of notice to correct deficiencies, the Manager will, prior to imposition of any sanctions, afford the general contractor a hearing in order to determine whether the contractor or his subcontractors have failed to comply with the affirmative action and equal employment opportunity requirements of Article III, Division 2 of Chapter 28 of the Revised Municipal Code or of the contract. Written notice of such hearing shall be delivered personally or sent by certified mail, return receipt requested, to the contractor and to any subcontractor involved, at least ten (10) days prior to the date scheduled for the hearing.

### **RULE III - HEARING**

- A. Contractors will appear at hearings and may be represented by counsel, and may present testimony orally and other evidence.
- B. Hearings shall be conducted by one or more hearing examiners designated as such by the Manager.
- C. The Director of the Division of Small Business Opportunity may participate in hearings as a witness.
- D. Hearings shall be held at the place specified in the notice of hearing.
- E. All oral testimony shall be given under oath or affirmation and a record of such proceedings shall be made.
- F. All hearings shall be open to the public.
- G. The hearing officer shall make recommendations to the Manager who shall make a final decision.

### **REGULATIONS**

#### **REGULATION NO. 1 - ORDINANCE:**

The Rules and Regulations of the Manager shall be inserted in the bidding specifications for every contract for which bidding is required.

#### **REGULATION NO. 2 - EXEMPTIONS:**

Each contract and subcontract, regardless of the dollar amount, shall be subject to affirmative action requirements unless specifically exempted in writing individually by the Manager. Exemptions apply only to "affirmative action" in equal employment opportunity, and are not to be construed as condonation in any manner of "discrimination" or "discriminatory practices" in employment because of race, color, creed, sex, age, national origin, religion, marital status, political opinion or mental or physical handicap.

#### **REGULATION NO. 3 - DIRECTOR OF CONTRACT COMPLIANCE:**

The Director of the Division of Small Business Opportunity shall perform the duties assigned to such official by Article III, Division 2 Chapter 28 of the Revised Municipal Code and by the Manager. (1) The Director of the Division of Small Business Opportunity or designated representatives shall inform bidders and contractors of affirmative action procedures, programs, and goals in accordance with the Ordinance at pre-bid and pre-construction conference; (2) make regular on-site inspections; (3) supply contractors and subcontractors with report forms to be completed by them when requested, and furnished to the Director of the Division of Small Business Opportunity; and (4) review payroll records, employment records and practices of general contractors and their subcontractors and suppliers during the performance of any contract. The Director of the Division of Small Business Opportunity shall promptly report apparent affirmative action deficiencies to the Manager.

#### **REGULATION NO. 4 - GOALS AND TIMETABLES:**

In general, goals and timetables should take into account anticipated vacancies and the availability of skills in the market place from which employees should be drawn. In addition, where discrimination in employment by a general contractor or any of his subcontractors is indicated, a corrective action program will take into account the need by the general contractor and his subcontractors to correct past discriminatory practices and reach goals of minority manpower utilization on a timely basis through such recruiting and advertising efforts as are necessary and appropriate.

#### **REGULATION NO. 5 - AWARD OF CONTRACTS:**

It shall be the responsibility of the Director of the Division of Small Business Opportunity to determine the affirmative action capability of bidders, contractors and subcontractors and to recommend to the Manager the award of contracts to those bidders, contractors and subcontractors and suppliers who demonstrate the ability and willingness to comply with the terms of their contract.

**REGULATION NO. 6 - PUBLICATION AND DUPLICATION:**

Copies of these Rules and Regulations as amended by the Manager from time to time, shall as soon as practicable and after Notice being published will be made a part of all City Contracts.

**REGULATION NO. 7 - NOTICE TO PROCEED:**

Prior to issuance of the Notice to Proceed, a sign-off will be required of the Director of the Division of Small Business Opportunity or his designee.

**REGULATION NO. 8 - CONTRACTS WITH SUBCONTRACTORS:**

To the greatest extent possible, the contractor shall make a good faith effort to contract with minority contractors, subcontractors and suppliers for services and supplies by taking affirmative actions, which include but are not limited to the following:

1. Advertise invitations for subcontractor bids in minority community news media.
2. Contact minority contractor organizations for referral of prospective subcontractors.
3. Purchase materials and supplies from minority material suppliers.

**REGULATION NO. 9 - AGENCY REFERRALS:**

It shall be no excuse that the union with which the contractor or subcontractor has an agreement providing for referral, exclusive or otherwise, failed to refer minority employees.

**REGULATION NO. 10 - CLAUSES:**

The Manager shall include the appropriate clauses in every contract and the contractor shall cause to be inserted in every subcontract the appropriate clauses:

1. APPENDIX A: City and County of Denver Equal Opportunity Clause - ALL CONTRACTS funded only with City and County of Denver monies.
2. APPENDIX B: Equal Opportunity Clause (11246) - ALL FEDERAL ASSISTED.
3. APPENDIX C: Section 3 - Assurance of Compliance - HUD ASSISTED PROJECTS.
4. APPENDIX D: Section 3 - Clause - HUD ASSISTED PROJECTS.

All amendments to the appendices shall be included by reference.

**REGULATION NO. 11 - SHOW CAUSE NOTICES:**

When the Manager has reasonable cause to believe that a contractor has violated Article III, Division 2 of Chapter 28 of the Denver Revised Municipal Code, he may issue a notice requiring the contractor to show cause, within fifteen (15) days why enforcement procedures, or other appropriate action to insure compliance, should not be instituted.

**REGULATION NO. 12 - BID CONDITIONS - AFFIRMATIVE ACTION REQUIREMENTS - EQUAL EMPLOYMENT OPPORTUNITY:**

1. APPENDIX E: The Bid Conditions - Affirmative Action Requirements - Equal Employment Opportunity as amended and published by the U.S. Department of Labor Employment Standards Administration, Office of Federal Contract Compliance, shall be inserted verbatim for bidding specification for every non-exempt contract involving the use of Federal funds.
2. APPENDIX F: The Bid Conditions - Affirmative Action Requirements - Equal Employment Opportunity as published by the Department of Public Works, City and County of Denver, shall be inserted verbatim as bidding specifications for every non-exempt contract using City funds.



**CITY AND COUNTY OF DENVER  
DEPARTMENT OF PUBLIC WORKS**

**APPENDIX A**

**CITY AND COUNTY OF DENVER EQUAL OPPORTUNITY CLAUSE -  
ALL CONTRACTS**

1. The Contractor will not discriminate against any employee or applicant for employment because of race, creed, color, sex, age, national origin, religion, marital status, political opinion or affiliation, or mental or physical handicap. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, creed, color, sex, age, national origin, religion, marital status, political opinion or affiliation, or mental or physical handicap. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.
2. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, creed, color, sex, age, national origin, religion, marital status, political opinion or affiliation, or mental or physical handicap.
3. The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided, advising the said labor union or workers' representatives of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
4. Each Contractor will comply with all provisions of Article III, Division 2 of Chapter 28 of the Revised Municipal Code, and the rules, regulations, and relevant orders of the Manager and the Director.
5. The Contractor will furnish all information and reports required by Article III, Division 2 of Chapter 28 of the Revised Municipal Code, and by rules, regulations and orders of the Manager and Director or pursuant thereto, and will permit access to his books, records, and accounts by the Manager, Director, or their designee for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
6. In the event of the Contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations or orders, this contract may be canceled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further City contracts in accordance with procedures authorized in Article III, Division 2, Chapter 28 of the Revised Municipal Code, or by rules, regulations, or order of the Manager.
7. The Contractor will include Regulation 12, Paragraph 2 and the provisions of paragraphs (1) through (6) in every subcontract of purchase order unless exempted by rules, regulations, or orders of the Manager issued pursuant to Article III, Division 2, Chapter 28 of the Revised Municipal Code, so that such provisions will be binding on each subcontractor or supplier. The Contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance.

The applicant further agrees to be bound by the above equal opportunity clauses with respect to its own employment practices when it participates in City contracts. The Contractor agrees to assist and cooperate actively with the Manager and the Director in obtaining compliance of subcontractors and suppliers with the equal opportunity clause and the rules, regulations and relevant orders of the Manager, and will furnish the Manager and the Director such information as they may require for the supervision of compliance, and will otherwise assist the Manager and Director in the discharge of the City's primary responsibility for securing compliance. The Contractor further agrees to refrain from entering into any contract or contract

modification subject to Article III, Division 2 of Chapter 28 of the Revised Municipal Code with a contractor debarred from, or who has not demonstrated eligibility for, City contracts.

The Contractor will carry out such sanctions and penalties for violation of the equal opportunity clause as may be imposed upon contractors and subcontractors by the Manager and Director. In addition, the Contractor agrees that failure or refusal to comply with these undertakings the Manager may take any or all of the following actions:

- A. Cancellation, termination, or suspension in whole or in part of this contract.
- B. Refrain from extending any further assistance to the applicant under the program with respect to which the failure occurred until satisfactory assurance of future compliance has been received from such applicant.
- C. Refer the case to the City Attorney for appropriate legal proceedings.

**SUBCONTRACTS:** Each prime Contractor or Subcontractor shall include the equal opportunity clause in each of its subcontracts.

**CITY AND COUNTY OF DENVER  
DEPARTMENT OF PUBLIC WORKS**

**APPENDIX F**

**AFFIRMATIVE ACTION REQUIREMENTS**

**EQUAL EMPLOYMENT OPPORTUNITY**

For All Non-Exempt Construction Contracts to Be Awarded by the  
City and County of Denver, Department of Public Works.

**NOTICE**

EACH BIDDER, CONTRACTOR OR SUBCONTRACTOR (HEREINAFTER THE CONTRACTOR) MUST FULLY COMPLY WITH THE REQUIREMENTS OF THESE BID CONDITIONS AS TO EACH CONSTRUCTION TRADE IT INTENDS TO USE ON THIS CONSTRUCTION CONTRACT, AND ALL OTHER CONSTRUCTION WORK (BOTH CITY AND NON-CITY) IN THE DENVER AREA DURING THE PERFORMANCE OF THIS CONTRACT OR SUBCONTRACT. THE CONTRACTOR COMMITS ITSELF TO THE GOALS FOR MINORITY MANPOWER UTILIZATION, AS APPLICABLE, AND ALL OTHER REQUIREMENTS, TERMS AND CONDITION OF THESE BID CONDITIONS BY SUBMITTING A PROPERLY SIGNED BID.

THE CONTRACTOR SHALL APPOINT A COMPANY EXECUTIVE TO ASSUME THE RESPONSIBILITY FOR THE IMPLEMENTATION OF THE REQUIREMENTS, TERMS AND CONDITIONS OF THESE BID CONDITIONS.

*/s/* \_\_\_\_\_

Manager of Public Works  
City and County of Denver

**A. REQUIREMENTS - AN AFFIRMATIVE ACTION PLAN:**

Contractors shall be subject to the provisions and requirements of these bid conditions including the goals and timetables for minority\* and female utilization, and specific affirmative action steps set forth by the Division of Small Business Opportunity (DSBO). The contractor's commitment to the goals for minority, and female utilization as required constitutes a commitment that it will make every good faith effort to meet such goals.

**1. GOALS AND TIMETABLES:**

The goals and timetables for minority and female participation, expressed in percentage terms for the contractor's aggregate workforce in each trade are as follows:

GOALS FOR MINORITY PARTICIPATION FOR EACH TRADE	GOALS FOR FEMALE PARTICIPATION FOR EACH TRADE
From January 1, 1982 to Until Further Notice	From January 1, 1982 to Until Further Notice
<b>21.7% - 23.5%</b>	<b>6.9%</b>

The goals for minority and female utilization above are expressed in terms of hours of training and employment as a proportion of the total number of hours to be worked by the contractor's aggregate workforce, which includes all supervisory personnel, in each trade, on all projects for the City and County of Denver during the performance of its contract (i.e., The period beginning with the first day of work on the City and County of Denver funded construction contract and ending with the last day of work).

The hours of minority and female employment and training must be substantially uniform throughout the length of the contract in each trade and minorities and females must be employed evenly on each of a contractor's projects. Therefore, the transfer of minority or female employees from contractor to contractor or from project to project for the purpose of meeting the contractor's goals shall be a violation of these Bid Conditions.

If the Contractor counts the nonworking hours of apprentices they must be employed by the Contractor during the training period; the Contractor must have made a commitment to employ apprentices at the completion of their training subject to the availability of employment opportunities; and the apprentices must be trained pursuant to training programs approved by the Bureau of Apprenticeship and Training.

\* "Minority" is defined as including, Blacks, Spanish Surname Americans, Asian Americans, and American Indians, and includes both men and minority women.

**2. SPECIFIC AFFIRMATIVE ACTION STEPS:**

No contractor shall be found to be in noncompliance solely on account of its failure to meet its goals, but will be given an opportunity to demonstrate that the contractor has instituted all the specific affirmative action steps specified and has made every good faith effort to make these steps work toward the attainment of its goals within the timetables, all to the purpose of expanding minority and female utilization in its aggregate workforce. A contractor, who fails to comply with its obligation under the Equal Opportunity Clause of its contract and fails to achieve its commitments to the goals for minority and female utilization has the burden of proving that it has engaged in an Affirmative Action Program directed at increasing minority and female utilization and that such efforts were at least as extensive and as specific as the following:

- a. The Contractor should have notified minority and female organizations when employment opportunities were available and should have maintained records of the organization's response.

- b. The Contractor should have maintained a file of the names and addresses of each minority and female referred to it by any individual or organization and what action was taken with respect to each such referred individual, and if the individual was not employed by the Contractor, the reasons. If such individual was sent to the union hiring hall for referral and not referred back by the union or if referred, not employed by the Contractor, the file should have documented this and their reasons.
- c. The Contractor should have promptly notified the Department of Public Works, and the Division of Small Business Opportunity when the union or unions with which the Contractor has collective bargaining agreements did not refer to the contractor a minority or female sent by the contractor, or when the Contractor has other information that the union referral process has impeded efforts to meet its goals.
- d. The Contractor should have disseminated its EEO policy within its organization by including it in any employee handbook or policy manual; by publicizing it in company newspapers and annual reports and by advertising such policy at reasonable intervals in union publications. The EEO policy should be further disseminated by conducting staff meetings to explain and discuss the policy; by posting of the policy; and by review of the policy with minority and female employees.
- e. The Contractor should have disseminated its EEO policy externally by informing and discussing it with all recruitment sources; by advertising in news media, specifically including minority and female news media; and by notifying and discussing it with all subcontractors.
- f. The Contractor should have made both specific and reasonably recurrent written and oral recruitment efforts. Such efforts should have been directed at minority and female organizations, schools with substantial minority and female enrollment, and minority and female recruitment and training organizations within the Contractor's recruitment area.
- g. The Contractor should have evidence available for inspection that all tests and other selection techniques used to select from among candidates for hire, transfer, promotion, training, or retention are being used in a manner that does not violate the OFCCP Testing Guidelines in 41 CFR Part 60-3.
- h. The Contractor should have made sure that seniority practices and job classifications do not have a discriminatory effect.
- i. The Contractor should have made certain that all facilities are not segregated by race.
- j. The Contractor should have continually monitored all personnel activities to ensure that its EEO policy was being carried out including the evaluation of minority and female employees for promotional opportunities on a quarterly basis and the encouragement of such employees to seek those opportunities.
- k. The Contractor should have solicited bids for subcontracts from available minority and female subcontractors engaged in the trades covered by these Bid Conditions, including circulation of minority and female contractor associations.

NOTE: The Director and the Division of Small Business Opportunity will provide technical assistance on questions pertaining to minority and female recruitment sources, minority and female community organizations, and minority and female news media upon receipt of a request for assistance from a contractor.

**3. NON - DISCRIMINATION:**

In no event may a contractor utilize the goals and affirmative action steps required in such a manner as to cause or result in discrimination against any person on account of race, color, religion, sex, marital status, national origin, age, mental or physical handicap, political opinion or affiliation.

**4. COMPLIANCE AND ENFORCEMENT:**

In all cases, the compliance of a contractor will be determined in accordance with its obligations under the terms of these Bid Conditions. All contractors performing or to perform work on projects subject to these Bid Conditions hereby agree to inform their subcontractors in writing of their respective obligations under the terms and requirements of these Bid Conditions, including the provisions relating to goals of minority and female employment and training.

**B. CONTRACTORS SUBJECT TO THESE BID CONDITIONS:**

In regard to these Bid Conditions, if the Contractor meets the goals set forth therein or can demonstrate that it has made every good faith effort to meet these goals, the Contractor shall be presumed to be in compliance with Article III, Division 2 of Chapter 28 of the Revised Municipal Code, the implementing regulations and its obligations under these Bid Conditions. In the event, no formal sanctions or proceedings leading toward sanctions shall be instituted unless the contracting or administering agency otherwise determines that the contractor is violating the Equal Opportunity Clause.

1. Where the Office of Contract Compliance finds that a contractor failed to comply with the requirements of Article III, Division 2 of Chapter 28 of the Revised Municipal Code or the implementing regulations and the obligations under these Bid Conditions, and so informs the Manager, the Manager shall take such action and impose such sanctions, which include suspension, termination, cancellation, and debarment, as may be appropriate under the Ordinance and its regulations. When the Manager proceeds with such formal action it has the burden of proving that the Contractor has not met the goals contained in these Bid Conditions. The Contractor's failure to meet its goals shall shift to it the requirement to come forward with evidence to show that it has met the good faith requirements of these Bid Conditions.
2. The pendency of such proceedings shall be taken into consideration by the Department of Public Works in determining whether such contractor can comply with the requirements of Article III, Division 2 of Chapter 28 of the Revised Municipal Code, and is therefore a "responsible prospective contractor".
3. The Division of Small Business Opportunity shall review the Contractor's employment practices during the performance of the contract. If the Division of Small Business Opportunity determines that the Contractor's Affirmative Action Plan is no longer an acceptable program, the Director shall notify the Manager.

**C. OBLIGATIONS APPLICABLE TO CONTRACTORS:**

It shall be no excuse that the union with which the Contractor has a collective bargaining agreement providing for exclusive referral failed to refer minority or female employees. Discrimination in referral for employment, even if pursuant to provisions of a collective bargaining agreement, is prohibited by the National Labor Relations Act, as amended, Title VI of the Civil Rights Act of 1964, as amended, and Article III, Division 2 of Chapter 28 of the Revised Municipal Code. It is the policy of the Department of Public Works that contractors have a responsibility to provide equal employment opportunity, if they wish to participate in City and County of Denver contracts. To the extent they have delegated the responsibility for some of their employment practices to a labor organization and, as a result, are prevented from meeting their obligations pursuant to Article III, Division 2, Chapter 28 of the Revised Municipal Code, such Contractors cannot be considered to be in compliance with Article III, Division 2, Chapter 28 of the Revised Municipal Code, or its implementing rules and regulations.

**D. GENERAL REQUIREMENTS:**

Contractors are responsible for informing their subcontractors in writing regardless of tier, as to their respective obligations. Whenever a Contractor subcontracts a portion of work in any trade covered by

these Bid Conditions, **it shall include these Bid Conditions in such subcontracts and each subcontractor shall be bound by these Bid Conditions to the full extent as if it were the prime contractor.** The Contractor shall not, however, be held accountable for the failure of its subcontractors to fulfill their obligations under these Bid Conditions. However, the prime contractor shall give notice to the Director of any refusal or failure of any subcontractor to fulfill the obligations under these Bid Conditions. A subcontractor's failure to comply will be treated in the same manner as such failure by a prime contractor.

1. Contractors hereby agree to refrain from entering into any contract or contract modification subject to Article III, Division 2, Chapter 28 of the Revised Municipal Code with a contractor debarred from, or who is determined not to be a "responsive" bidder for the City and County of Denver contracts pursuant to the Ordinance.
2. The Contractor shall carry out such sanctions and penalties for violation of these Bid Conditions and the Equal Opportunity Clause including suspension, termination and cancellation of existing subcontracts and debarment from future contracts as may be ordered by the Manager pursuant to Article III, Division 2, Chapter 28 of the Revised Municipal Code and its implementing regulations.
3. Nothing herein is intended to relieve any contractor during the term of its contract from compliance with Article III, Division 2, Chapter 28 of the Revised Municipal Code, and the Equal Opportunity Clause of its contract with respect to matters not covered in these Bid Conditions.
4. Contractors must keep such records and file such reports relating to the provisions of these Bid Conditions as shall be required by the Office of Contract Compliance.
5. Requests for exemptions from these Bid Conditions must be made in writing, with justification, to the Manager of Public Works, 201 W. Colfax, Dept. 608, Denver, Colorado 80202, and shall be forwarded through and with the endorsement of the Director.

**CITY AND COUNTY OF DENVER  
DEPARTMENT OF PUBLIC WORKS**

**CONTRACT NO. 201309801**

**State Home-Harvard Gulch Irrigation**

**CONTRACT**

**THIS CONTRACT AND AGREEMENT**, made and entered into by and between the City and County of Denver, a municipal corporation of the State of Colorado, hereinafter referred to as the "City," party of the first part, and , hereinafter referred to as the "Contractor," party of the second part,

CTM, Inc.  
P. O. Box 118  
Englewood, CO 80151

**WITNESSETH**, Commencing on **February 19, 2013**, and for at least three (3) days the City advertised that sealed bids would be received for furnishing all labor, tools, supplies, equipment, materials, and everything necessary and required for the following:

**CONTRACT NO. 201309801**

**State Home-Harvard Gulch Irrigation**

**WHEREAS**, bids pursuant to said advertisement have been received by the Manager of Public Works, who has recommended that a Contract for said work be made and entered into with the above named Contractor who was the lowest, responsive, qualified bidder therefore, and

**WHEREAS**, said Contractor is now willing and able to perform all of said work in accordance with said advertisement and its bid.

**NOW THEREFORE**, in consideration of the compensation to be paid the Contractor, the mutual agreements hereinafter contained, and subject to the terms hereinafter stated, it is mutually agreed as follows:

**1. CONTRACT DOCUMENTS**

It is agreed by the parties hereto that the following list of documents, instruments, technical specifications, plans, drawings and other materials which are attached hereto and bound herewith, incorporated herein by reference or otherwise referenced in these documents constitute and shall be referred to either as the "Contract Documents" or the "Contract," and all of said documents, instruments, technical specifications, Plans, Drawings and other materials taken together as a whole constitute the Contract between the parties hereto, and they are as fully a part of this agreement as if they were set out verbatim and in full herein:

*Advertisement of Notice of Invitation for Bids*  
*Instructions to Bidders*  
*Commitment to M/WBE Participation*  
*Article III, Divisions 1, 2, and 3 of Chapter 28, D.R.M.C.*  
*Bid Bond*  
*Addenda (as applicable)*



*Equal Employment Opportunity Provisions (Appendix A and Appendix F)*  
*Bid Form*  
*Contract Form*  
*General Contract Conditions*  
*Special Contract Conditions*  
*Performance and Payment Bond*  
*Notice to Apparent Low Bidder*  
*Notice to Proceed*  
*Contractor's Certification of Payment Form*  
*Final/Partial Lien Release Form*  
*Certificate of Contract Release*  
*Change Orders (as applicable)*  
*Federal Requirements (as applicable)*  
*Prevailing Wage Rate Schedule(s)*  
*Technical Specifications*  
*Contract Drawings*  
*Accepted Shop Drawings*

**2. SCOPE OF WORK**

The Contractor agrees to and shall furnish all labor, tools, supplies, equipment, materials and everything necessary for and required to do, perform and complete all of the Work described, drawn, set forth, shown and included in said Contract Documents.

**3. TERMS OF PERFORMANCE**

The Contractor agrees to undertake the performance of the Work under this Contract within ten (10) days after being notified to commence work by issuance of a Notice to Proceed in substantially the form contained herein from the Manager and agrees to fully complete said Work within **250** (Two Hundred Fifty Days) consecutive calendar days from the effective date of said Notice, plus such extension or extensions of time as may be granted in accordance with the provisions of the General Contract Conditions and any applicable Special Contract Conditions.

**4. TERMS OF PAYMENT**

The City agrees to pay the Contractor for the performance of all of the Work required under this Contract, and the Contractor agrees to accept as the Contractor's full and only compensation therefore, such sum or sums of money as may be proper in accordance with the price or prices set forth in the Contractor's Bid Form hereto attached and made a part hereof for **Total Lump Sum**, the total estimated cost thereof being **One Million Fifty Eight Thousand and Three Hundred Seventy Five Dollars and No Cents (\$1,058,375.00)**. Adjustments to said Contract Amount and payment of amounts due hereunder shall be made in accordance with the provisions of the General Contract Conditions and any applicable Special Contract Conditions.

**5. NO DISCRIMINATION IN EMPLOYMENT**

In connection with the performance of the Work under this Contract, the Contractor agrees not to refuse to hire, discharge, promote or demote, or to discriminate in matters of compensation against any person otherwise qualified, solely because of race, color, religion, national origin, gender, age, military status, sexual orientation, marital status, or physical or mental disability; and the Contractor further agrees to insert the foregoing provision in all subcontracts hereunder.

**6. COMPLIANCE WITH M/WBE REQUIREMENT**

This Contract is subject to all applicable provisions of Divisions 1 and 3 of Article III, of Chapter 28, Denver Revised Municipal Code (D.R.M.C.), designated as Sections 28-31 – 28-36 and 28-52 – 28-90 D.R.M.C. and referred to in this Contract as the "M/WBE Ordinance". Without limiting the general applicability of the foregoing, the Contractor acknowledges its continuing duty, pursuant to Sections 28-72, 28-73 and 28-75 of the D.R.M.C., to maintain throughout the duration of this Contract, compliance with the level of minority and Woman business enterprise participation, upon which the City approved the award of this Contract to the Contractor and the Contractor further acknowledges that failure to maintain such participation commitments or otherwise comply with the requirements of the M/WBE Ordinance shall

subject the Contractor to sanctions in accordance with Section 28-77 of the D.R.M.C. Nothing contained in this provision or in the M/WBE Ordinance shall negate the City's right to prior approval of subcontractors, or substitutes therefore, under this Contract

**7. WAGE RATE REQUIREMENTS**

In performance of all Work hereunder, the Contractor agrees to comply with and be bound by all requirements and conditions of the City's Payment of Prevailing Wages Ordinance, Sections 20-76 through 20-79, D.R.M.C. and any determinations made by the City pursuant thereto.

**8. APPLICABILITY OF LAWS**

The Agreement between the Contractor and the City shall be deemed to have been made in the City and County of Denver, State of Colorado and shall be subject to, governed by, and interpreted and construed by or in accordance with the laws of the State of Colorado and the Charter, Revised Municipal Code, Rules, Regulations, Executive Orders and fiscal rules of the City. As such, the Contractor shall at all times comply with the provisions of the Charter, Revised Municipal Code, Rules, Regulations, Executive Orders and fiscal rules of the City, and those State of Colorado and Federal Laws, Rules and Regulations, which in any manner limit, control or apply to the actions or operations of the Contractor, any subcontractors, employees, agents or servants of the Contractor engaged in the Work or affecting the materials and equipment used in the performance of the Work, as the same may be, from time to time, promulgated, revised or amended. The Charter and Revised Municipal Code of the City and County of Denver, as the same may be amended from time to time, are hereby expressly incorporated into this Agreement as if fully set out herein by this reference.

**9. APPROPRIATION**

The amount of money, which has been appropriated and encumbered for the purpose of this contract, to date, is equal to or in excess of the Contract Amount. The Manager, upon reasonable written request, will advise the Contractor in writing of the total amount of appropriated and encumbered funds, which remain available for payment for all Work under the Contract.

The issuance of any change order or other form or order or directive by the City which would cause the aggregate payable under the contract to exceed the amount appropriated for the contract is expressly prohibited. In no event shall the issuance of any change order or other form of order or directive by the City be considered valid or binding if it requires additional compensable work to be performed, which work will cause the aggregate amount available under the Contract to exceed the amount appropriated and encumbered for this Contract, unless and until such time as the Contractor has been advised in writing by the Manager that a lawful appropriation, sufficient to cover the entire cost of such additional work, has been made.

It shall be the responsibility of the Contractor to verify that the amounts already appropriated for this Contract are sufficient to cover the entire cost of such work, and any work undertaken or performed in excess of the amount appropriated is undertaken or performed in violation of the terms of this contract, without the proper authorization for such work, and at the Contractor's own risk.

**10. APPROVALS**

In the event this Contract calls for the payment by the City of five hundred thousand dollars (\$500,000.00) or more, approval by the Board of Councilmen of the City and County of Denver, acting by ordinance, in accordance with Section 3.2.6 of the Charter of the City and County of Denver, is and shall be an express condition precedent to the lawful and binding execution and effect and performance of this contract.

**11. ASSIGNMENT**

The Contractor shall not assign any of its rights, benefits, obligations or duties under this Contract except upon the prior written consent and approval of the Manager to such assignment.

**12. DISPUTES RESOLUTION PROCESS**

It is the express intention of the parties to this Contract that all disputes of any nature whatsoever regarding the Contract including, but not limited to, any claims for compensation or damages arising out of breach or default under this Contract, shall be resolved by administrative hearing pursuant to the provisions of

Section 56-106, D.R.M.C., or, as applicable, Section 28-33 D.R.M.C. for Minority and Woman Business Enterprise disputes. The Contractor expressly agrees that this dispute resolution process is the only dispute resolution mechanism that will be recognized by the parties for any claims put forward by the Contractor, notwithstanding any other claimed theory of entitlement on the part of the Contractor or its subcontractors or suppliers.

**13. CONTRACT BINDING**

It is agreed that this Contract shall be binding on and inure to the benefit of the parties hereto, their heirs, executors, administrators, assigns and successors.

**14. PARAGRAPH HEADINGS**

The captions and headings set forth herein are for convenience of reference only and shall not be construed so as to define or limit the terms and provisions hereof.

**15. SEVERABILITY**

It is understood and agreed by the parties hereto that, if any part, term, or provision of this Contract, except for the provisions of this Contract requiring prior appropriation and limiting the total amount to be paid by the City, is by the courts held to be illegal or in conflict with any law of the State of Colorado, the validity of the remaining portions or provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the Contract did not contain the particular part, term or provision held to be invalid.

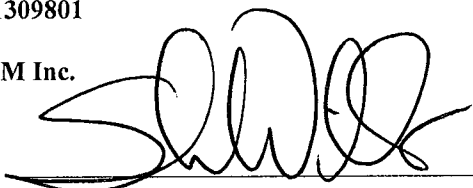
**16. ELECTRONIC SIGNATURES AND ELECTRONIC RECORDS:**

Contractor consents to the use of electronic signatures by the City. The Agreement, and any other documents requiring a signature hereunder, may be signed electronically by the City in the manner specified by the City. The Parties agree not to deny the legal effect or enforceability of the Agreement solely because it is in electronic form or because an electronic record was used in its formation. The Parties agree not to object to the admissibility of the Agreement in the form of an electronic record, or a paper copy of an electronic document, or a paper copy of a document bearing an electronic signature, on the ground that it is an electronic record or electronic signature or that it is not in its original form or is not an original.

IN WITNESS WHEREOF, the parties have executed this agreement and affixed their seals at Denver, Colorado as of the day first above written.

Contract Control Number: 201309801

Vendor Name: CTM Inc.

By: 

Name: Shannon Willis  
(please print)

Title: CEO  
(please print)

ATTEST: [if required]

By: \_\_\_\_\_

Name: \_\_\_\_\_  
(please print)

Title: \_\_\_\_\_  
(please print)



**Contract Control Number:**

IN WITNESS WHEREOF, the parties have set their hands and affixed their seals at Denver, Colorado as of

SEAL

**CITY AND COUNTY OF DENVER**

ATTEST:

By \_\_\_\_\_

\_\_\_\_\_

APPROVED AS TO FORM:

REGISTERED AND COUNTERSIGNED:

By \_\_\_\_\_

By \_\_\_\_\_

By \_\_\_\_\_



**CITY AND COUNTY OF DENVER  
DEPARTMENT OF PUBLIC WORKS**

**General Contract Conditions**

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**CITY AND COUNTY OF DENVER**  
**DEPARTMENT OF PUBLIC WORKS**

**SPECIAL CONTRACT CONDITIONS**

**SC-1 CONSTRUCTION SPECIFICATIONS**

Except as amended herein or in the attached Technical Specifications, all Work performed under the terms of this Contract shall be governed by the applicable provisions of the following latest editions:

City and County of Denver:

*Standard Specifications for Construction, GENERAL CONTRACT CONDITIONS,*  
2011 Edition.

*Transportation Standards and Details for the Engineering Division*

*City and County of Denver Traffic Standard Drawings*

Wastewater Management Division  
– *Standard Detail Drawings*

– *Storm Drainage and Sanitary Sewer Construction Detail and Technical Specifications*

Colorado Department of Transportation:

*Standard Specifications for Road and Bridge Construction*  
(Sections 200 through 700 of the 2011 Edition)

Federal Highway Administration:

*Manual on Uniform Traffic Control Devices for Streets & Highways (MUTCD)*

Building & Fire Codes:

*Building Code of the City and County of Denver*  
(International Building Code 2009 Series, City and County of Denver Amendments 2011)

*National Fire Protection Association Standards*  
(As referenced in the Building Code of the City and County of Denver)

The aforementioned City and County of Denver documents are available for review at the Capital Projects Management Office, 201 W. Colfax Ave., Dept. 506, (5<sup>th</sup> floor), Denver, CO 80202. The *Standard Specifications for Construction, GENERAL CONTRACT CONDITIONS* is available at: [http://www.denvergov.org/dpw\\_contract\\_admin/ContractAdministration/ContractorReferenceDocuments/t\\_abid/440535/Default.aspx](http://www.denvergov.org/dpw_contract_admin/ContractAdministration/ContractorReferenceDocuments/t_abid/440535/Default.aspx). *Transportation Standards and Details for the Engineering Division* and the *Wastewater Management Division – Standard Detail Drawings*, are available at <http://www.denvergov.org>.

The “*Colorado Department of Transportation Standard Specifications for Road and Bridge Construction*” is available for review on CDOT’s website at <http://www.coloradodot.info/> and can be purchased from the Colorado Department of Transportation.

The *Manual on Uniform Traffic Control Devices for Streets & Highways* is available for review at the Federal Highway Administration Website at: [www.fhwa.dot.gov](http://www.fhwa.dot.gov), The FHWA website also contains purchasing information.

**SC-2 DEPUTY MANAGER / CITY ENGINEER**

General condition 109 DEPUTY MANAGER is hereby deleted in its entirety and replaced with the following:

The “Deputy Manager” means the official who reports directly to the Manager and exercises supervisory responsibility in the City agency defined in Title 2 herein that is responsible for the Project. The Manager hereby designates the City Engineer as the Deputy Manager for purposes of this Contract. The City Engineer shall have responsibility for this Project and shall undertake all duties, responsibilities, rights and authority, including specific actions and decisions, delegated to the Deputy Manager under the various terms and conditions of this Contract.

**SC-3 ENGINEERING DIVISION / CITY ENGINEER**

The Engineering Division is a unit of the Department of Public Works and is supervised by the City Engineer, who is subordinate to the Manager of Public Works. This Division is responsible for the planning, design, construction, operation and maintenance of all of the City's transportation facilities and the planning, design and construction of all of the City’s wastewater facilities, except for the City's Municipal Airport System. All other references to the Transportation Division or the Deputy Manager of Public Works for Transportation are deleted and replaced with references to the Engineering Division and City Engineer, respectively.

**SC-4 WASTEWATER MANAGEMENT DIVISION**

The Wastewater Management Division is a unit of the Department of Public Works and is supervised by the Deputy Manager of Public Works for Wastewater Management, who is subordinate to the Manager of Public Works. This Division is responsible for the operation and maintenance of the City's wastewater facilities.

**SC-5 CITY DELEGATION OF AUTHORITY**

With reference to General Contract Condition 109, DEPUTY MANAGER and General Contract Condition 212, CITY’S CONTRACT ADMINISTRATION LINE OF AUTHORITY, the Manager hereby designates the City Engineer as the City official responsible for those certain actions and decisions designated as the responsibility of the Deputy Manager under the General Conditions and delegates to the City Engineer the authority necessary to undertake those responsibilities under this Contract. The Director shall have supervisory responsibility over the Project Manager. Additionally, Contractor questions concerning the Plans and Technical Specifications shall be directed to:

**Denver Department of Public Works / Engineering Division,**

<u>Project Manager</u>	<u>Name</u>	<u>Telephone</u>
City Project Manager	Greg Kaiser	(720) 913-0621
<u>Consultant</u>	<u>Name</u>	<u>Telephone</u>
Design Consultant Applied Design Services	Consultant Contact Michael Holweger	(303) 841-7077

**SC-6 LIQUIDATED DAMAGES**

Should the Contractor fail to complete all Work within the Contract Time allocated under the Contract Form at Paragraph 3, TERMS OF PERFORMANCE, the Contractor shall become liable to the City and County of Denver for liquidated damages, and not as a penalty, at the rate of \$500.00 for each Day that the Contractor exceeds the time limits herein specified, all in accordance with provisions of General Contract Condition 602, LIQUIDATED DAMAGES; ADMINISTRATIVE COSTS; ACTUAL DAMAGES.

Representative hourly rates for the City administrative costs described in General Contract Condition 602.2 shall be as follows for this Project:

Project Manager	\$69 per hour
Project Engineer	\$63 per hour
Inspector	\$49 per hour
Surveying, if necessary	\$100 per hour

**SC-7 SUBCONTRACTS**

In accordance with General Contract Condition 501, SUBCONTRACTS, no limit shall apply to that percentage of the Work, which may be sublet providing that the subcontractors receive prior approval in accordance with General Contract Condition 502, SUBCONTRACTOR ACCEPTANCE.

**SC-8 RESERVED**

**SC-9 PAYMENTS TO CONTRACTORS**

The application for payment shall be submitted through Textura® Corporations Construction Management Website. Contractor recognizes and agrees that it shall be required to use the Textura Construction Payment Management System for this Project. Contractor further agrees that, to the fullest extent possible within the CPM System, the City shall be entitled to all non-Confidential records, reports, data and other information related to the project that are available to Contractor through the CPM System, including, but not limited to, information related to Contractor and subcontractor billings. To that end, Contractor agrees that it will activate any available settings within the CPM System that are necessary to grant the City access to such non-Confidential information related to the contract and the project. Applications for payment shall be based on the Contract Unit Prices or the approved Schedule of Values described in GC 903.1

In accordance with General Contract Condition 902, PAYMENT PROCEDURE, the party(ies) responsible for review of all Pay Applications shall be:

<u>Agency/Firm</u>	<u>Name</u>	<u>Telephone</u>
Public Works/Engineering Division	Marco Cabanillas	(720) 865-3149

In accordance with General Contract Condition 906, APPLICATIONS FOR PAYMENT, each Application submitted shall include the following:

1. The estimate of Work completed shall be based on the approved schedule of values or unit prices, as applicable, and the percent of the Work complete.
2. Each Application for Payment shall include each and every independent subcontractor's payroll information including pay dates and pay amounts.
3. The Contractor shall also submit to the Auditor and other appropriate officials of the City in a timely fashion, information required by General Contract Condition 1004, REPORTING WAGES PAID.

In accordance with General Contract condition 907, RELEASES AND CONTRACTORS CERTIFICATION OF PAYMENT, Applications for Payment must be accompanied by completed Partial or Final Claim Release Form, as appropriate, from EACH subcontractor and supplier, **AND/OR** the Contractors' Certification of Payment Form. The forms, Final/Partial Release and Certificate of Payment (Subcontractor/Supplier) and the Contractor's Certification of Payment, both of which must be used are as follows:

**DEPARTMENT OF PUBLIC WORKS  
Engineering Division**

**FINAL/PARTIAL RELEASE AND CERTIFICATE OF PAYMENT  
(SUBCONTRACTOR/SUPPLIER)**

(PROJECT NO. and NAME)	Date: _____, 20__.
(NAME OF CONTRACTOR)	Subcontract #: _____.
(NAME OF SUBCONTRACTOR/SUPPLIER)	Subcontract Value: \$ _____.
Check Applicable Box:	Last Progress Payment: \$ _____.
<input type="checkbox"/> MBE <input type="checkbox"/> WBE	Date: _____.
	Total Paid to Date: \$ _____.
	Date of Last Work: _____.

The Undersigned hereby certifies that all costs, charges or expenses incurred by the undersigned or on behalf of the undersigned for any work, labor or services performed and for any materials, supplies or equipment provided on the above referenced Project or used in connection with the above referenced Subcontract (the "Work Effort") have been duly paid in full.

The Undersigned further certifies that each of the undersigned's subcontractors and suppliers that incurred or caused to be incurred, on their behalf, costs, charges or expenses in connection with the undersigned's Work Effort on the above referenced Project have been duly paid in full.

In consideration of \$\_\_\_\_\_ representing the Last Progress Payment referenced above and in further consideration of the Total Paid to Date, also referenced above, and other good and valuable consideration received and accepted by the undersigned this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_, the Undersigned hereby releases and discharges the City and County of Denver (the "City"), the above referenced City Project, the City's premises and property and the above referenced Contractor from all claims, liens, rights, liabilities, demands and obligations, whether known or unknown, of every nature arising out of or in connection with the performance of the work effort.

As additional consideration for the payments referenced above, the undersigned agrees to defend, indemnify and save and hold harmless the City, its officers, employees, agents and assigns and the above-referenced Contractor from and against all costs, losses, damages, causes of action, judgments under the subcontract and expenses arising out of or in connection with any claim or claims against the City or the Contractor which arise out of the Undersigned's performance of the Work Effort and which may be asserted by the Undersigned or any of its suppliers or subcontractors of any tier or any of their representatives, officers, agents, or employees.

It is acknowledged that this release is for the benefit of and may be relied upon by the City and the referenced Contractor.

The foregoing shall not relieve the undersigned of any obligation under the provisions of the Undersigned's subcontract, as the subcontract may have been amended, which by their nature survive completion of the Undersigned's work effort including, without limitation, warranties, guarantees, insurance requirements and indemnities.

STATE OF COLORADO    ) ss. CITY OF _____)	(Name of Subcontractor)
Signed and sworn before me this day of _____, 20__.	By: _____
_____ Notary Public/Commissioner of Oaths My Commission Expires _____	Title: _____





## Instructions for Completing the Contractor/Consultant Certification of Payment Form

Office of Economic Development  
Division of Small Business Opportunity  
**Compliance Unit**  
201 W. Colfax Ave., Dept. 907  
Denver, CO 80202  
Phone: 720-913-1999  
Fax: 720-913-1803  
[dsbo@denvergov.org](mailto:dsbo@denvergov.org)

**Note:** The attached Contractor/Consultant Certification of Payment form must be completed by the Contractor/Subconsultant and all subcontractors/subconsultant or suppliers used on the project at any tier and submitted with each pay application. The Contractor/Consultant is responsible for the accuracy of all information provided and is required to have each subcontractor/subconsultant or supplier fill out the appropriate forms. Please be sure to complete all information requested at the top of the form, including the name of the person who prepared this form.

If you reproduce this form, you must continue to list each of the originally listed firms, as well as any additional firms used during the performance period of the contract.

If you have any questions, please call the Compliance Unit of DSBO at 720.913.1999.

### Instructions for Completing the Contractor/Consultant Certification of Payment Form, per Column

**Contractor/Subcontractor or Subconsultant/Supplier Name:** In the space provided, list all subcontractors/subconsultants and suppliers used on the project. For all M/W/S/DBEs use the exact name listed in the DSBO Directory.

**M/W/S/DBE/NON:** For each name listed, indicate whether the entity is a certified M/W/S/DBE.

**Column A:** Provide the contract amount, as listed at bid time, for the Contractor/Consultant and each subcontractor/subconsultant or supplier.

**Column B:** Provide the percentage portion of each listed subcontractor/subconsultant or supplier contract amount (Column A) compared to the total original contract amount in (I).

**Column C:** Provide the original contract amount (Column A) for each subcontractor/subconsultant or supplier plus any awarded alternate and/or change order amounts applicable. If an alternate/change order does not apply to the listed firm, re-enter the original contract amount (Column A).

**Column D:** Provide the percent portion of each listed subcontractor/subconsultant or supplier contract amount (Column C) compare to the current total contract amount in (II).

**Column E:** Provide the amount requested for work performed or materials supplied by each listed subcontractor/subconsultant or supplier for this pay application. The sum of the items in this column should equal the estimated amount requested for this pay application.

**Column F:** Provide the amount paid to each subcontractor/subconsultant or supplier on the previous pay application. Enter the previous pay application number in the column heading. The sum of the items listed in this column should equal the warrant amount paid to the Contractor/Consultant on the previous pay application. The amounts paid to the subcontractor/subcontractor or suppliers should be the actual amount of each check issued.

**Column G:** Provide the net paid to date for the Contractor/Subconsultant and each listed subcontractor/subconsultant or supplier.

**Column H:** Provide the percent portion of the net paid to date (Column G) for the Contractor/Subconsultant and each listed subcontractor/subconsultant or supplier of the current total contract amount in (II).

COMP-REF-031

Rev 032211 JG



## **SC-10 CONTRACT FORMS**

In accordance with the terms and conditions of the Contract Documents, the City requires the use of certain form documents in complying with or satisfying various obligations, notifications and conditions in contracting with the City or performing Work hereunder. These form documents are referenced by title throughout the Contract Documents for mandatory use as directed. The following are the forms that shall be detached and utilized in accordance with the Contract Documents:

1. Performance and Payment Bond
2. Performance and Payment Bond Surety Authorization Letter (Sample)
3. Final/Partial Lien Release.

The following are forms that will be issued by the City during construction:

1. Notice to Apparent Low Bidder (Sample)
2. Notice To Proceed (Sample)
3. Certificate of Contract Release (Sample)

## **SC-11 CONSTRUCTION INSPECTION BY THE CITY**

General Condition 1701, CONSTRUCTION INSPECTION BY THE CITY, is modified as follows:

**1701** Persons who are employees of the City or who are under contract to the City or the City as lessee will be assigned to inspect and test the Work. These persons may perform any tests and observe the Work to determine whether or not designs, materials used, manufacturing and construction processes and methods applied, and equipment installed satisfy the requirements of the drawings and specifications, accepted Shop Drawings, Product Data and Samples, and the General Contractor's warranties and guarantees. The General Contractor shall permit these inspectors unlimited access to the Work and provide means of safe access to the Work, which cost shall be included as a Cost of the Work without any increase to the Guaranteed Maximum Price. In addition, General Contractor shall provide whatever access and means of access are needed to off-site facilities used to store or manufacture materials and equipment to be incorporated into the Work and shall respond to any other reasonable request to further the inspector's ability to observe or complete any tests. Such inspections shall not relieve the General Contractor of any of its quality control responsibilities or any other obligations under the Contract. All inspections and all tests conducted by the City are for the convenience and benefit of the City. These inspections and tests do not constitute acceptance of the materials or Work tested or inspected, and the City may reject or accept any Work or materials at any time prior to the inspections pursuant to G.C. 2002, whether or not previous inspections or tests were conducted by the inspector or a City representative.

**.2** Building Inspection will perform building code compliance inspections for structures designed for human occupancy. It is the General Contractor's responsibility to schedule and obtain these inspections. If a code compliance inspection results in identification of a condition which will be at variance to the Contract Documents, the General Contractor shall immediately notify the Project Manager and confirm such notification with formal correspondence no later than forty-eight (48) hours after the occurrence.

**.3** When any unit of government or political subdivision, utility or railroad corporation is to pay a portion of the cost of the Work, its respective representatives shall have the right to inspect the Work. This inspection shall not make any unit of government or political subdivision, utility or railroad corporation a party to the Contract, and shall not interfere with the rights of either party.

## **SC-12 DISPOSAL OF NON-HAZARDOUS WASTE AT DADS**

In accordance with the Landfill Agreement made between the City and Waste Management of Colorado, Inc., bidders will be required to haul dedicated loads (non-hazardous entire loads of waste) to the Denver-Arapahoe Disposal Site ("DADS") for disposal. DADS is located at Highway 30 and Hampden Avenue in Arapahoe County, Colorado. The City will pay all fees associated with such disposal but the bidder shall be responsible for the costs of transporting the loads. Non-hazardous waste is defined as those substances and materials not defined or classified as hazardous by the Colorado Hazardous Waste Commission pursuant to C.R.S. §25-15-101(6), as amended from time to time, and includes construction debris, soil and asbestos. Bidders shall not use Gun Club Road between I-70 and Mississippi Avenue as a means of access to DADS.

### **SC-13 PROHIBITION ON USE OF CCA-TREATED WOOD PRODUCTS**

The use of any wood products pressure-treated with chromated copper arsenate (CCA) is prohibited. Examples of CCA-treated wood products include wood used in play structures, decks, picnic tables, landscaping timbers, fencing, patios, walkways and boardwalks.

### **SC-14 WAIVER OF: PART 8 OF ARTICLE 20 OF TITLE 13, COLORADO REVISED STATUTES.**

The Contractor specifically waives all the provisions of Part 8 of Article 20 of Title 13, Colorado Revised Statutes regarding defects in the Work under this Construction Contract.

### **SC-15 ATTORNEY'S FEES**

Colorado Revised Statute 38-26-107 requires that in the event any person or company files a verified statement of amounts due and unpaid in connection with a claim for labor and materials supplied on this project, the City shall withhold from payments to the Contractor sufficient funds to insure the payment of any such claims. Should the City and County of Denver be made a party to any lawsuit to enforce such unpaid claims or any lawsuit arising out of or relating to such withheld funds, the Contractor agrees to pay to the City its costs and a reasonable attorney's fee which cost shall be included as a Cost of the Work.

Because the City Attorney Staff does not bill the City for legal services on an hourly basis, the Contractor agrees a reasonable fee shall be computed at the rate of one hundred dollars per hour of City Attorney time.

### **SC-16 INSURANCE**

General Condition 1601 is hereby deleted in its entirety and replaced with the following:

(1) **General Conditions:** Contractor agrees to secure, at or before the time of execution of this Agreement, the following insurance covering all operations, goods or services provided pursuant to this Agreement. Contractor shall keep the required insurance coverage in force at all times during the term of the Agreement, or any extension thereof, during any warranty period, and for eight (8) years after termination of the Agreement. The required insurance shall be underwritten by an insurer licensed or authorized to do business in Colorado and rated by A.M. Best Company as "A-"VIII or better. Each policy shall contain a valid provision or endorsement requiring notification to the City in the event any of the required policies be canceled or non-renewed before the expiration date thereof. Such written notice shall be sent to the parties identified in the Notices section of this Agreement. Such notice shall reference the City contract number listed on the signature page of this Agreement. Said notice shall be sent thirty (30) days prior to such cancellation or non-renewal unless due to non-payment of premiums for which notice shall be sent ten (10) days prior. If such written notice is unavailable from the insurer, contractor shall provide written notice of cancellation, non-renewal and any reduction in coverage to the parties identified in the Notices section by certified mail, return receipt requested within three (3) business days of such notice by its insurer(s) and referencing the City's contract number. If any policy is in excess of a deductible or self-insured retention, the City must be notified by the Contractor. Contractor shall be responsible for the payment of any deductible or self-insured retention. The insurance coverages specified in this Agreement are the minimum requirements, and these requirements do not lessen or limit the liability of the Contractor. The Contractor shall maintain, at its own expense, any additional kinds or amounts of insurance that it may deem necessary to cover its obligations and liabilities under this Agreement.

(2) **Proof of Insurance:** Contractor shall provide a copy of this Agreement to its insurance agent or broker. Contractor may not commence services or work relating to the Agreement prior to placement of coverage. Contractor certifies that the certificate of insurance attached as part of the Contract Documents, preferably an ACORD certificate, complies with all insurance requirements of this Agreement. The City requests that the City's contract number be referenced on the Certificate. The City's acceptance of a certificate of insurance or other proof of insurance that does not comply with all insurance requirements set forth in this Agreement shall not act as a waiver of Contractor's breach of this Agreement or of any of the City's rights or remedies under this Agreement. The City's Risk Management Office may require additional proof of insurance, including but not limited to policies and endorsements.

(3) **Additional Insureds:** For Commercial General Liability and Auto Liability, Contractor and subcontractor's insurer(s) shall name the City and County of Denver, its elected and appointed officials, employees and volunteers as additional insured.

(4) **Waiver of Subrogation:** For all coverages, Contractor's insurer shall waive subrogation rights against the City.

(5) **Subcontractors and Subconsultants:** All subcontractors and subconsultants (including independent contractors, suppliers or other entities providing goods or services required by this Agreement) shall be subject to all of the requirements herein and shall procure and maintain the same coverages required of the Contractor. Contractor shall include all such subcontractors as additional insured under its policies (with the exception of Workers' Compensation) or shall ensure that all such subcontractors and subconsultants maintain the required coverages.

Contractor agrees to provide proof of insurance for all such subcontractors and subconsultants upon request by the City.

**(6) Workers' Compensation/Employer's Liability Insurance:** Contractor shall maintain the coverage as required by statute for each work location and shall maintain Employer's Liability insurance with limits of \$100,000 per occurrence for each bodily injury claim, \$100,000 per occurrence for each bodily injury caused by disease claim, and \$500,000 aggregate for all bodily injuries caused by disease claims. Contractor expressly represents to the City, as a material representation upon which the City is relying in entering into this Agreement, that none of the Contractor's officers or employees who may be eligible under any statute or law to reject Workers' Compensation Insurance shall effect such rejection during any part of the term of this Agreement, and that any such rejections previously effected, have been revoked as of the date Contractor executes this Agreement.

**(7) Commercial General Liability:** Contractor shall maintain a Commercial General Liability insurance policy with limits of \$1,000,000 for each occurrence, \$1,000,000 for each personal and advertising injury claim, \$2,000,000 products and completed operations aggregate, and \$2,000,000 policy aggregate.

**(8) Business Automobile Liability:** Contractor shall maintain Business Automobile Liability with limits of \$1,000,000 combined single limit applicable to all owned, hired and non-owned vehicles used in performing services under this Agreement

**(9) Additional Provisions:**

- (a) For Commercial General Liability, the policies must provide the following:
  - (i) That this Agreement is an Insured Contract under the policy;
  - (ii) Defense costs in excess of policy limits;
  - (iii) A severability of interests or separation of insureds provision (no insured vs. insured exclusion); and
  - (iv) A provision that coverage is primary and non-contributory with other coverage or self-insurance maintained by the City.
- (b) For claims-made coverage:
  - (i) The retroactive date must be on or before the contract date or the first date when any goods or services were provided to the City, whichever is earlier
- (c) Contractor shall advise the City in the event any general aggregate or other aggregate limits are reduced below the required per occurrence limits. At their own expense, and where such general aggregate or other aggregate limits have been reduced below the required per occurrence limit, the Contractor will procure such per occurrence limits and furnish a new certificate of insurance showing such coverage is in force.

**SC-17 GREENPRINT DENVER REQUIREMENTS**

In accordance with the City and County of Denver Executive Order 123: Greenprint Denver Office and Sustainability Policy, as amended, Contractor shall adhere to sections of Executive Order 123 pertinent to the construction of the built environment. This includes but is not limited to: all construction and renovation of buildings shall follow instructions and memorandum for high performance buildings; horizontal projects shall include the use of fly ash concrete and recycled aggregate where possible; and, all projects shall recycle construction and demolition waste, and install materials that contain recycled content whenever possible using the U.S. Green Building Council Leadership in Energy and Environmental Design (LEED) as guidance. Non-hazardous solid waste that is eligible for reuse or recycling is not subject to the DADS disposal requirement defined in SC-12.

A completed "Greenprint Denver Closeout Form for Construction Projects" shall be delivered to the Project Manager as a submittal requirement of Final Acceptance.

<http://www.denvergov.org/constructioncontracts/Home/ContractorResources/tabid/443154/Default.aspx>

**CITY AND COUNTY OF DENVER  
DEPARTMENT OF PUBLIC WORKS**

**PERFORMANCE AND PAYMENT BOND**

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned CTM Inc., P. O. Box 118, Englewood, CO 80151, corporation organized and existing under and by virtue of the laws of the State of Colorado, hereafter referred to as the "Contractor", and Developers Surety & Indemnity Company, a corporation organized and existing under and by virtue of the laws of the State of Iowa, and authorized to transact business in the State of Colorado, as Surety, are held and firmly bound unto the CITY AND COUNTY OF DENVER, a municipal corporation of the State of Colorado, hereinafter referred to as the "City", in the penal sum of One Million Fifty Eight Thousand and Three Hundred Seventy Five Dollars and No Cents (\$1,058,375.00), lawful money of the United States of America, for the payment of which sum, well and truly to be made, we bind ourselves and our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents;

THE CONDITION OF THE FOREGOING OBLIGATION IS SUCH THAT:

WHEREAS, the above bounden Contractor has entered into a written contract with the aforesaid City for furnishing all labor and tools, supplies, equipment, superintendence, materials and everything necessary for and required to do, perform and complete the construction of **CONTRACT NO. 201309801 STATE HOME-HARVARD GULCH IRRIGATION**, Denver, Colorado, and has bound itself to complete the project within the time or times specified or pay liquidated damages, all as designated, defined and described in the said Contract and Conditions thereof, and in accordance with the Plans and Technical Specifications therefore, a copy of said Contract being made a part hereof;

NOW, THEREFORE, if the said Contractor shall and will, in all particulars well and truly and faithfully observe, perform and abide by each and every Covenant, Condition and part of said Contract, and the Conditions, Technical Specifications, Plans, and other Contract Documents thereto attached, or by reference made a part thereof and any alterations in and additions thereto, according to the true intent and meaning in such case, then this obligation shall be and become null and void; otherwise, it shall remain in full force and effect;


PROVIDED FURTHER, that if the said Contractor shall satisfy all claims and demands incurred by the Contractor in the performance of said Contract, and shall fully indemnify and save harmless the City from all damages, claims, demands, expense and charge of every kind (including claims of patent infringement) arising from any act, omission, or neglect of said Contractor, its agents, or employees with relation to said work; and shall fully reimburse and repay to the City all costs, damages, and expenses which it may incur in making good any default based upon the failure of the Contractor to fulfill its obligation to furnish maintenance, repairs or replacements for the full guarantee period provided in the Contract Documents, then this obligation shall be null and void; otherwise it shall remain in full force and effect;

PROVIDED FURTHER, that if said Contractor shall at all times promptly make payments of all amounts lawfully due to all persons supplying or furnishing it or its subcontractors with labor and materials, rental machinery, tools or equipment used or performed in the prosecution of work provided for in the above Contract and that if the Contractor will indemnify and save harmless the City for the extent of any and all payments in connection with the carrying out of such Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect;

PROVIDED FURTHER, that if the said Contractor fails to duly pay for any labor, materials, team hire, sustenance, provisions, provender, gasoline, lubricating oils, fuel oils, grease, coal, or any other supplies or materials used or consumed by said Contractor or its subcontractors in performance of the work contracted to be done, or fails to pay any person who supplies rental machinery, tools or equipment, all amounts due as the result of the use of such machinery, tools or equipment in the prosecution of the work, the Surety will pay the same in any amount not exceeding the amount of this obligation, together with interest as provided by law;

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, or to contracts with others in connection with this project, or the work to be performed thereunder, or the Technical Specifications and Plans accompanying the same, shall in any way affect its obligation on this bond and it does hereby waive notice of any change, extension of time, alteration or addition to the terms of the Contract, or contracts, or to the work, or to the Technical Specifications and Plans.

IN WITNESS WHEREOF, said Contractor and said Surety have executed these presents as of this 3rd day of April, 2013

Attest: [Signature]  
Secretary President  


CTM Inc.  
Contractor  
By: [Signature]  
President CEO

Developers Surety & Indemnity Company  
Surety  
By: [Signature]  
Attorney-In-Fact Jessika Gulliver

(Accompany this bond with Attorney-in-Fact's authority from the Surety to execute bond, certified to include the date of the bond).

APPROVED AS TO FORM:  
Attorney for the City and County of Denver

By: [Signature]  
Assistant City Attorney

APPROVED FOR THE CITY AND COUNTY OF DENVER

By: [Signature]  
MAYOR  
By: [Signature]  
MANAGER OF PUBLIC WORKS

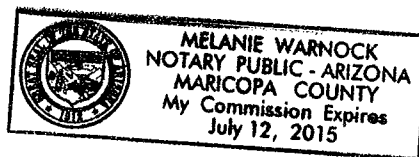
STATE OF ARIZONA )  
COUNTY OF MARICOPA )

On this 3<sup>rd</sup> day of April 2013, before me, Melanie Warnock, the undersigned Notary Public, in and for the State of Arizona personally appeared Jessika Gulliver, personally known to me (or proven to me on the basis of satisfactory evidence) to be the person who executed the written instrument as Attorney-in-Fact on behalf of the Corporation therein named and acknowledged to me that the Corporation executed it.

Given under my hand and the Notary Seal this 3<sup>rd</sup> day of April, 2013

My commission Expires: July 12, 2015

[Signature]  
Notary Public



**POWER OF ATTORNEY FOR  
DEVELOPERS SURETY AND INDEMNITY COMPANY  
INDEMNITY COMPANY OF CALIFORNIA  
PO Box 19725, IRVINE, CA 92623 (949) 263-3300**

KNOW ALL BY THESE PRESENTS that except as expressly limited, DEVELOPERS SURETY AND INDEMNITY COMPANY and INDEMNITY COMPANY OF CALIFORNIA, do each hereby make, constitute and appoint:

\*\*\*Jennifer Castillo, Jorge L. Mendez, Jessika Gulliver, Melanie Warnock, jointly or severally\*\*\*

as their true and lawful Attorney(s)-in-Fact, to make, execute, deliver and acknowledge, for and on behalf of said corporations, as sureties, bonds, undertakings and contracts of suretyship giving and granting unto said Attorney(s)-in-Fact full power and authority to do and to perform every act necessary, requisite or proper to be done in connection therewith as each of said corporations could do, but reserving to each of said corporations full power of substitution and revocation, and all of the acts of said Attorney(s)-in-Fact, pursuant to these presents, are hereby ratified and confirmed.

This Power of Attorney is granted and is signed by facsimile under and by authority of the following resolutions adopted by the respective Boards of Directors of DEVELOPERS SURETY AND INDEMNITY COMPANY and INDEMNITY COMPANY OF CALIFORNIA, effective as of January 1st, 2008.

RESOLVED, that a combination of any two of the Chairman of the Board, the President, Executive Vice-President, Senior Vice-President or any Vice President of the corporations be, and that each of them hereby is, authorized to execute this Power of Attorney, qualifying the attorney(s) named in the Power of Attorney to execute, on behalf of the corporations, bonds, undertakings and contracts of suretyship; and that the Secretary or any Assistant Secretary of either of the corporations be, and each of them hereby is, authorized to attest the execution of any such Power of Attorney;

RESOLVED, FURTHER, that the signatures of such officers may be affixed to any such Power of Attorney or to any certificate relating thereto by facsimile, and any such Power of Attorney or certificate bearing such facsimile signatures shall be valid and binding upon the corporations when so affixed and in the future with respect to any bond, undertaking or contract of suretyship to which it is attached.

IN WITNESS WHEREOF, DEVELOPERS SURETY AND INDEMNITY COMPANY and INDEMNITY COMPANY OF CALIFORNIA have severally caused these presents to be signed by their respective officers and attested by their respective Secretary or Assistant Secretary this October 4th, 2011.

By: *Daniel Young*  
Daniel Young, Senior Vice-President

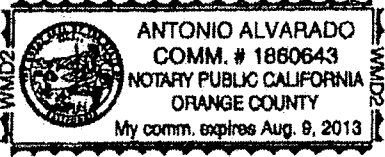
By: *Steve A. Tvedt*  
Steve A. Tvedt, Vice-President



State of California  
County of Orange

On October 4, 2011 before me, Antonio Alvarado, Notary Public  
Date Here Insert Name and Title of the Officer

personally appeared Daniel Young and Steve A. Tvedt  
Name(s) of Signer(s)



Place Notary Seal Above

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.  
Signature *Antonio Alvarado*  
Antonio Alvarado, Notary Public

CERTIFICATE

The undersigned, as Secretary or Assistant Secretary of DEVELOPERS SURETY AND INDEMNITY COMPANY or INDEMNITY COMPANY OF CALIFORNIA, does hereby certify that the foregoing Power of Attorney remains in full force and has not been revoked and, furthermore, that the provisions of the resolutions of the respective Boards of Directors of said corporations set forth in the Power of Attorney are in force as of the date of this Certificate.

This Certificate is executed in the City of Irvine, California, this 3rd day of April, 2013.

By: *Gregg Okura*  
Gregg Okura, Assistant Secretary



UNDERSTAND. SERVICE. INNOVATE.

USI Insurance Services, LLC  
P.O. Box 10067  
Phoenix, AZ 85064  
www.usi.biz  
Toll-free: 855.874.0101  
Fax: 484.652.5101

**PERFORMANCE AND PAYMENT BOND  
SURETY AUTHORIZATION**

April 3, 2013

City and County of Denver  
201 W Colfax Ave, Dept 1207  
Denver, CO 80202

RE: CTM, Inc.

Project Name: State Home Harvard Gulch Irrigation  
Contract Number 201309801  
Contract Amount: \$1,058,375.00

Performance/Payment Bond No. 537952P

To Whom It May Concern:

The Performance and Payment bonds covering the above captioned project were executed by this agency for Developers Surety and Indemnity Company on April 3, 2013.

We hereby authorize the City and County of Denver to date all bonds and powers of attorney to coincide with the date of the contract.

If you should have any additional questions or concerns, please don't hesitate to give me a call at 602 374 1309..

Sincerely,

Jessika Gulliver  
Attorney-in-Fact



# CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)  
4/2/2013

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 Moody Insurance Agency, Inc. 8055 East Tufts Avenue Suite 1000 Denver CO 80237	CONTACT NAME: Eileen Munoz	
	PHONE (A/C, No. Ext): (303) 824-6600	FAX (A/C, No): (303) 370-0118
INSURED CTM, Inc. dba Colorado Total Maintenance P.O. Box 118 Englewood CO 80151	E-MAIL ADDRESS: emunoz@moodyins.com	
	INSURER(S) AFFORDING COVERAGE	
	INSURER A: Cincinnati Casualty Company	NAIC # 28665
	INSURER B: Pinnacle Assurance	41190
	INSURER C:	
	INSURER D:	
	INSURER E:	
	INSURER F:	

**COVERAGES**                      **CERTIFICATE NUMBER:**                      **REVISION NUMBER:**

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.

INSR LTR	TYPE OF INSURANCE	ADDL SUBR INSR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	GENERAL LIABILITY <input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR	X	CPP1081287 Form GA233CO 06/10 attached *Addl Ins. status applies only when required by written contract	7/26/2012	7/26/2013	EACH OCCURRENCE \$ 1,000,000
	DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 100,000					
	GEN'L AGGREGATE LIMIT APPLIES PER: <input checked="" type="checkbox"/> POLICY <input type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC					MED EXP (Any one person) \$ 5,000
						PERSONAL & ADV INJURY \$ 1,000,000
						GENERAL AGGREGATE \$ 2,000,000
						PRODUCTS - COMP/OP AGG \$ 2,000,000
						\$
A	AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> ANY AUTO ALL OWNED AUTOS <input checked="" type="checkbox"/> HIRED AUTOS	X	CPP1081287	7/26/2012	7/26/2013	COMBINED SINGLE LIMIT (Ea accident) \$ 1,000,000
	<input type="checkbox"/> SCHEDULED AUTOS NON-OWNED AUTOS					BODILY INJURY (Per person) \$
						BODILY INJURY (Per accident) \$
						PROPERTY DAMAGE (Per accident) \$
						\$
A	<input checked="" type="checkbox"/> UMBRELLA LIAB <input checked="" type="checkbox"/> OCCUR <input type="checkbox"/> EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE		CPP1081287	7/26/2012	7/26/2013	EACH OCCURRENCE \$ 2,000,000
	DED RETENTION \$					AGGREGATE \$ 2,000,000
						\$
B	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	N/A	4010532	5/1/2012	5/1/2013	<input checked="" type="checkbox"/> WC STATUTORY LIMITS <input type="checkbox"/> OTHER
						E.L. EACH ACCIDENT \$ 1,000,000
						E.L. DISEASE - EA EMPLOYEE \$ 1,000,000
						E.L. DISEASE - POLICY LIMIT \$ 1,000,000
A	Commercial Equip ACV		CPP1081287 Deduct \$1000	7/26/2012	7/26/2013	Leased/Rented Equipment Lmt \$100,000
A	Installation Floater		CPP1081287 Deduct \$1000	7/26/2012	7/26/2013	Limit Any Single Location \$300,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)  
The City and County of Denver its elected and appointed officials, employees and volunteers are included as additional insured with respect to the general liability policy and automobile liability as required by written contract.

**CERTIFICATE HOLDER**

City and County of Denver  
Department of Public Works  
201 West Colfax, Dept 611  
Denver, CO 80202

**CANCELLATION**

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  
Eileen Munoz/JUSNIG





**PERFORMANCE AND PAYMENT BOND  
SURETY AUTHORIZATION  
(SAMPLE)**

FAX NUMBER: 720-913-3183  
TELEPHONE NUMBER: 720-913-3267

Assistant City Attorney  
201 W. Colfax Ave. Dept 1207  
Denver, Colorado 80202

RE: (Company name)

Contract No: 201309801  
Project Name: State Home-Harvard Gulch Irrigation  
Contract Amount:  
Performance and Payment Bond No.:

Dear Assistant City Attorney,

The Performance and Payment Bonds covering the above captioned project were executed by this agency, through \_\_\_\_\_ insurance company, on \_\_\_\_\_, 20\_\_.

We hereby authorize the City and County of Denver, Department of Public Works, to date all bonds and powers of attorney to coincide with the date of the contract.

If you should have any additional questions or concerns, please don't hesitate to give me a call at \_\_\_\_\_.

Thank you.

Sincerely,





**NOTICE OF APPARENT LOW BIDDER**  
**(SAMPLE)**

Current Date

To:

Gentlemen:

The MANAGER OF PUBLIC WORKS has considered the Bids submitted on March 14, 2013 for work to be done and materials to be furnished in and for:

**CONTRACT NO. 201309801 STATE HOME-HARVARD GULCH IRRIGATION**

as set forth in detail in the Contract Documents for the City and County of Denver, Colorado. It appears that your Bid is fair, equitable, and to the best interest of the City and County; therefore, said Bid is hereby accepted at the bid price contained herein, subject to execution of the Contract Documents and your furnishing the items specified below, the total cost thereof (Contract Amount Written), (Contract Amount Numeric).

It will be necessary for you to appear forthwith at the office of the Department of Public Works, Finance and Administration, 201 W. Colfax Ave., Denver, Colorado 80202, to receive the said Contract Documents, execute the same and return them to the Department of Public Works, Finance and Administration, within the time limit set forth in the Bid Proposal.

In accordance with the requirements set forth in the Contract Documents, you are required to furnish the following documents:

- a. Insurance Certificates: General Liability and Automotive Liability, Workman's Compensation and Employer Liability; or any other coverage required by the contract; and
- b. One original plus four copies of the Power of Attorney relative to Performance and/or Payment Bond;

All construction Contracts made and entered into by the City and County of Denver are subject to Affirmative Action and Equal Opportunity Rules and Regulations, as adopted by the Manager of Public Works, and each contract requiring payment by the City of one-half million dollars (\$500,000.00) or more shall first be approved by the City Council acting by ordinance and in accordance with Section 3.2.6 of the Charter of the City and County of Denver.

Prior to issuance of Notice to Proceed, all Equal Opportunity requirements must be completed. Additional information may be obtained by contacting the Director of Contract Compliance at (720-913-1700).



**NOTICE OF APPARENT LOW BIDDER  
(SAMPLE)**

CONTRACT NO. 201309801

Page 2

The Bid Security submitted with your Bid, will be returned upon execution of the Contract and furnishing of the Performance Bond. In the event you should fail to execute the Contract and to furnish the performance Bond within the time limit specified, said Bid Security will be retained by the City and County of Denver as liquidated damages, and not as a penalty for the delay and extra work caused thereby.

Dated at Denver, Colorado this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_.

CITY AND COUNTY OF DENVER

By

\_\_\_\_\_   
Manager of Public Works



Department of Public Works  
Engineering Department

201 W. Colfax Avenue  
Denver, CO 80202  
[www.denvergov.org/PublicWorks](http://www.denvergov.org/PublicWorks)

Current Date

**NOTICE TO PROCEED  
(SAMPLE)**

Name  
Company  
Street  
City/State/Zip

**CONTRACT NO. 201309801, STATE HOME-HARVARD GULCH IRRIGATION**

In accordance with General Contract Condition 302 of the Standard Specifications for Construction, General Contract Conditions, 2011 Edition, you are hereby authorized and directed to proceed on \_\_\_\_\_ with the work of constructing contract number 201309801, as set forth in detail in the contract documents for the City and County of Denver.

With a contract time of \_\_\_\_\_ calendar days, the project must be complete on or before \_\_\_\_\_.

If you have not already done so, you must submit your construction schedule, in accordance with General Contract Condition 306.2.B, to the Project Manager within 10 days. Additionally, you must submit your tax exempt certificate, and copies of your subcontractors' certificates, in accordance with General Contract Condition 323.5, to the Project Manager as soon as possible. Failure to submit these certificates will delay processing of payment applications.

Sincerely,

Lesley B. Thomas  
City Engineer

cc:





**DENVER**  
THE MILE HIGH CITY

Certificate of Contract Release  
(SAMPLE)

Date

Name  
Company  
Street  
City/State/Zip

RE: Certificate of Contract Release for  
**201309801, STATE HOME-HARVARD GULCH IRRIGATION**

Received this date of the City and County of Denver, as full and final payment of the cost of the improvements provided for in the foregoing contract, \_\_\_\_\_ dollars and \_\_\_\_\_ cents (\$\_\_\_\_\_), in cash, being the remainder of the full amount accruing to the undersigned by virtue of said contract; said cash also covering and including full payment for the cost of all extra work and material furnished by the undersigned in the construction of said improvements, and all incidentals thereto, and the undersigned hereby releases said City and County of Denver from any and all claims or demands whatsoever, regardless of how denominated, growing out of said contract.

And these presents are to certify that all persons performing work upon or furnishing materials for said improvements under the foregoing contract have been paid in full and this payment to be made is the last or final payment.

\_\_\_\_\_  
Contractor's Signature

\_\_\_\_\_  
Date Signed

If there are any questions, please contact me by telephone at (720) 913-XXXX. Please return this document via facsimile at (720) 913-1805 and mail to original to the above address.



# CITY AND COUNTY OF DENVER

STATE OF COLORADO



DEPARTMENT OF PUBLIC WORKS/ PARKS AND RECREATION DIVISION

## **PREVAILING WAGE RATES**

**Contract No. 201309801**

---

**State Home-Harvard Gulch Irrigation**

**February 19, 2013**



**DENVER**  
THE MILE HIGH CITY

**Career Service Authority**

Denver's Human Resource Agency

201 W. Colfax, Department 412

Denver, CO 80202

p: 720.913.5751

f: 720.913.5720

[www.denvergov.org/csa](http://www.denvergov.org/csa)

TO: All Users of the City of Denver Prevailing Wage Schedules  
FROM: Seth Duhon-Thornton, Staff Human Resources Professional  
DATE: Friday January 18, 2013  
SUBJECT: Latest Change to Prevailing Wage Schedules

Please be advised, prevailing wage rates for some building, heavy, and highway construction trades have not been updated by the United States Department of Labor (DOL) since March 1, 2002. The Career Service Authority Board, in their meeting held on April 21, 2011, approved the use of the attached supplemental wage rates until prevailing wage rates for these classifications of work are again published by the United States Department of Labor in accordance with the Davis-Bacon Act. The rates will be provided as a supplemental to the Davis-Bacon Building rates issued by CSA.

The attached Prevailing Wage Schedule is effective as of **Friday January 18, 2013** and applies to the City and County of Denver for **BUILDING CONSTRUCTION PROJECTS** (does not include residential construction consisting of single family homes and apartments up to and including 4 stories) in accordance with the Denver Revised Municipal Code, Section 20-76(c).

General Wage Decision No. CO130004  
Superseded General Decision No. CO20120004  
Modification No.01  
Publication Date: 01/11/2013  
(5 pages)

Unless otherwise specified in this document, apprentices shall be permitted only if they are employed pursuant to, and individually registered in, a bona fide apprenticeship program registered with the U.S. Department of Labor (DOL). The employer and the individual apprentice must be registered in a program, which has received prior approval, by the DOL. Any employer, who employs an apprentice and is found to be in violation of this provision, shall be required to pay said apprentice the full journeyman scale.

For questions call (720) 913-5018

Attachments as listed above.

General Decision Number: CO130004 01/11/2013 CO4

Superseded General Decision Number: CO20120004

State: Colorado

Construction Type: Building

County: Denver County in Colorado.

BUILDING CONSTRUCTION PROJECTS (does not include residential construction consisting of single family homes and apartments up to and including 4 stories)

Modification Number	Publication Date
0	01/04/2013
1	01/11/2013

ASBE0028-001 10/01/2012

	Rates	Fringes
Asbestos Workers/Insulator (Includes application of all insulating materials, protective coverings, coatings and finishings to all types of mechanical systems).....	\$ 28.98	13.03

-----  
BRCO0007-001 01/01/2011

	Rates	Fringes
BRICKLAYER.....	\$ 22.13	9.89

-----  
BRCO0007-005 06/01/2011

	Rates	Fringes
TILE SETTER.....	\$ 25.15	9.18

-----  
CARP0001-004 05/01/2009

	Rates	Fringes
Carpenters: Acoustical, Drywall Hanging/Framing and Metal Stud, Form Building/Setting.	\$ 26.60	8.89

-----  
CARP1607-002 06/01/2012

	Rates	Fringes
MILLWRIGHT.....	\$ 28.95	11.10



-----  
ELEC0068-002 12/01/2012

	Rates	Fringes
ELECTRICIAN (Includes Low Voltage Wiring and Installation of Fire alarms, Security Systems, Telephones, Computers and Temperature Controls).....	\$ 32.10	12.53

-----  
\* ELEV0025-002 01/01/2013

	Rates	Fringes
Elevator Constructor.....	\$ 39.59	25.685

FOOTNOTE:

a. Employer contributes 8% of basic hourly rate for over 5 years' service and 6% basic hourly rate for 6 months' to 5 years' service as Vacation Pay Credit.

PAID HOLIDAYS: New Year's Day; Memorial Day; Independence Day; Labor Day; Veterans Day; Thanksgiving Day; Friday after Thanksgiving Day; and Christmas Day.

-----  
ENGI0009-003 06/25/2012

	Rates	Fringes
Power equipment operator - crane		
141 tons and over.....	\$ 25.48	8.62
50 tons and under.....	\$ 24.42	8.62
51 to 90 tons.....	\$ 24.57	8.62
91 to 140 tons.....	\$ 24.72	8.62

-----  
IRON0024-001 07/01/2011

	Rates	Fringes
IRONWORKER, STRUCTURAL.....	\$ 23.80	10.91

-----  
LABO0720-003 05/01/2009

	Rates	Fringes
Laborers: Concrete/Mason Tenders.....	\$ 16.52	6.84

-----  
PAIN0079-002 08/01/2012

	Rates	Fringes
Drywall Finisher/Taper		

Hand.....	\$ 18.69	6.37
Tool.....	\$ 19.04	6.37
Painters:.....	\$ 17.99	6.37
PAPERHANGER.....	\$ 18.69	6.37

---

PAIN0930-001 07/01/2012

	Rates	Fringes
GLAZIER.....	\$ 27.77	7.42

---

PLAS0577-001 08/01/2011

	Rates	Fringes
Cement Mason/Concrete Finisher...	\$ 23.00	10.75

---

PLUM0003-001 07/01/2012

	Rates	Fringes
PLUMBER (Excluding HVAC work).....	\$ 33.18	11.44

---

PLUM0208-001 07/12/2012

	Rates	Fringes
PIPEFITTER (Including HVAC pipe).....	\$ 30.10	11.52

---

SFCO0669-001 04/01/2012

	Rates	Fringes
SPRINKLER FITTER.....	\$ 32.44	18.45

---

SHEE0009-001 01/01/2011

	Rates	Fringes
Sheet metal worker (Includes HVAC duct and installation of HVAC systems).....	\$ 31.66	10.98

---

SUCO2001-011 12/20/2001

	Rates	Fringes
Carpenters: All Other Work.....	\$ 16.12	2.84
Ironworkers: Reinforcing.....	\$ 18.49	3.87

Laborers:

Brick Finisher/Tender.....	\$ 12.78	1.41
Common.....	\$ 10.62	2.09

Power equipment operators:

Mechanic.....	\$ 18.48	
---------------	----------	--

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WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

**Career Service Authority**  
**Supplemental to the Davis-Bacon *Building* Construction Project rates**  
**(Specific to the Denver projects)**  
**Supp #100, Date: 03-02-2012**

<b>Classification</b>		<b>Base</b>	<b>Fringe</b>
Boilermakers		\$30.97	\$21.45
Power Equipment Operators (Concrete Mixers):			
	Less than 1 yd	\$23.67	\$10.67
	1 yd and over	\$23.82	\$10.68
	Drillers	\$23.97	\$10.70
	Loaders over 6 cu yd	\$23.82	\$10.68
	Oilers	\$22.97	\$10.70
Soft Floor Layers		\$16.70	\$9.81
Ironworkers (Ornamental)		\$24.80	\$10.03
Plasters		\$24.60	\$12.11
Plaster Tenders		\$10.79	-
Laborers: Concrete Saw		\$13.89	-
Power Equipment Operators:			
	Backhoe	\$23.67	\$10.67
	Loader up to and incl 6 cu yd	\$23.67	\$10.67
	Motor Grader	\$23.97	\$10.70
	Roller	\$23.67	\$10.67
Truck Drivers (Dump Trucks):			
	6 to 14 cu yds	\$19.14	\$10.07
	15 to 29 cu yds	\$19.48	\$10.11
	Flatbed	\$19.14	\$10.07
	Semi	\$19.48	\$10.11

- To determine the Tile Setters-Marble Mason-Terrazzo mechanic rates—Use Davis Bacon-Building rates adopted by the Career Service Board.
- To determine the Tile Finisher-Floor Grinder-Base Grinder—Use current Career Service Prevailing Wage Schedules.
- Caulkers—Receive rate prescribed for craft performing operation to which caulking is incidental .i.e. glazier, painter, brick layer, cement mason.
- Use the “Carpenters—All Other Work” rates published by the federal Davis Bacon rates for batt insulation, pre-stress concrete and tilt up concrete walls, Roofers (including foundation waterproofing).
- Use the “Laborer—Common”, rates published by the federal Davis Bacon rates for General Housekeeping, Final Cleanup and Fence Installer.

CITY AND COUNTY OF DENVER

STATE OF COLORADO



DEPARTMENT OF PUBLIC WORKS/ PARKS AND RECREATION  
DIVISION

# TECHNICAL SPECIFICATIONS

**Contract No. 201309801**

---

State Home-Harvard Gulch Irrigation

February 19, 2013

**TECHNICAL SPECIFICATIONS**  
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PART 1 - GENERAL

## 1.1 DESCRIPTION

- A. The Work specified in this contract consists of furnishing all management, supervision, labor, materials, tools, equipment, services, testing and incidentals for the construction of the Work indicated in the contract documents including lump sum items and unit price items.
- B. Reference Contract General Conditions, GC 301, GC 306, GC 804, GC Title 8

## 1.2 SITE CONDITIONS

- A. The Contractor acknowledges satisfaction as to the nature and location of the Work, all of the general and local conditions, particularly those bearing upon availability of transportation, access to the site, disposal, handling and storage of materials, availability of labor, water, power, roads, and uncertainties of weather, or similar physical conditions at the site, the conformation and conditions of the ground, the character of equipment and facilities needed preliminary to and during work, and all other matters that can in any way affect the work or the cost thereof under this contract.
- B. The Contractor further acknowledges, by submission of a bid and on each change in work proposal, satisfaction as to the character, quality and quantity of all surface and subsurface materials and all features on top of the surface or at worksites that would be encountered from his inspection of the site and from reviewing available records of exploratory work furnished by the City. Failure by the Contractor to become acquainted with the physical conditions of the sites and all the available information will not relieve the Contractor from responsibility for properly estimating the difficulty or cost of performing the Work.
- C. The Contractor warrants that as a result of examination and investigation of all the aforesaid data and the site, that the Contractor can perform the Work in a good and workmanlike manner and to the satisfaction of the City. The City assumes no responsibility for any representations made by any of its officers or agents during or prior to the execution of this contract unless such representation is expressly stated in the contract.

## 1.3 DESCRIPTION OF WORK

- A. Tree protection, traffic control, utility verification, existing irrigation equipment salvage, existing water tap abandonment, existing water tap reconfiguration new water tap installation, existing irrigation controller salvage, existing electrical service extension and existing electrical service termination, backflow assembly, master valve, irrigation service line, booster pump, irrigation distribution loop, irrigation sub-main loop point of connection to irrigation distribution loop, irrigation sub-main installation, directional boring, sleeving, open trenching, control valve manifolds, isolation valves, quick coupler valves, drain valves, air relief valves, and controllers with electrical service extension, two wire path valve control wire system, control wire access loops, master valve wire and flow sensor cable, secondary pipe, sprinkler heads, crusher fine installation, all excavation, backfill, compaction and landscape restoration including fine grade and seed and sod installation.

## PART 2 - PRODUCTS (NOT USED)

## PART 3 - EXECUTION

### 3.1 CONTRACTOR'S DUTIES

- A. Except as otherwise specified, furnish the following to the full extent required by the contract:
  - 1. Labor, superintendence, supervision and products.
  - 2. Construction equipment, tools, machinery and materials.
  - 3. Utilities required for construction and related activities.
  - 4. Other facilities and services necessary to properly execute and complete the Work, including security for worksite, testing and storage and protection of all materials awaiting incorporation into the Work, providing a safe working environment for workers, City and County of Denver representatives, and the public in accordance with all local, state and federal requirements.
- B. Prosecute the Work as specified and in a timely manner. Submit a schedule of Work that will be performed at times other than during the eight-hour working day of Monday through Friday, daylight hours. Submit this schedule five working days prior to the beginning of Work to the Project Manager for review and acceptance. Approval to work at night may be obtained after Contractor presents a written program outlining special precautions to be taken to control the extraordinary hazards presented by night work. That program shall include, but not limited to, supplementary lighting of work areas, availability of medical facilities, security precautions and noise limitations.

### 3.2 COORDINATION

- A. Coordinate prosecution of the Work with those public utilities, governmental bodies, private utilities and other contractors performing work on and adjacent to the worksites. Eliminate or minimize delays in the Work and conflicts with those utilities, bodies and contractors. Schedule governmental, private utility and public utility work that relies upon survey points, lines and grades established by the Contractor to occur immediately after those points, lines and grades have been established. Confirm coordination measures for each individual case with the City in writing.
- B. In the coordination effort of work by others, the Contractor shall obtain and refer to equipment locations and other layouts, as available, to avoid interface problems.
- C. The City reserves the right to permit access to the site of the Work for the performance of work by other contractors and persons at such times that the City deems proper. The exercise of such reserved right shall in no way or to any extent relieve the Contractor from liability for loss and damage to the work due to or resulting from its operations or from responsibility for complete execution of the Contract. The Contractor shall cooperate with other contractors and persons in all matters requiring common effort.

### 3.3 CONTRACTOR USE OF WORKSITE

- A. Confine worksite operations to areas permitted by law, ordinances, permits and the contract.



- B. Consider the safety of the Work and that of the people and property on and adjacent to the worksite when determining amount, location, movement and use of materials and equipment on worksite.
- C. Do not load worksite with equipment and products that would interfere with the Work. Only equipment, tools or materials required for this Work may be stored at the worksite.
- D. Protect products, equipment and materials stored on worksite.
- E. Relocate stored products, equipment and materials which interfere with operations of City, government bodies, public and private utilities, and other contractors.

#### PART 4 - MEASUREMENT AND PAYMENT

##### 4.1 MEASUREMENT

- A. No separate measurement shall be made for work under this Section.

##### 4.2 PAYMENT

- A. No separate payment will be made for work under this section including any and all necessary relocations requested by the City. The cost of the work described in this section shall be included in the Contract price.

END OF SECTION 01010

PART 1: GENERAL

## 1.1 DESCRIPTION

## A. General:

1. NOTE: The Pay Item descriptions listed herein are hypothetical and will vary with each project. Do not prepare pay estimates based on these descriptions.
2. All measurements and payments will be based on work completed in strict accordance with the Drawings and specifications for the project.
3. The method of measurement and basis of payment described are for the work itemized in the Bid Form and in the sections of the specifications. Items may include work within a single section or in more than one section.
4. See the General Contract Conditions for additional information pertaining to measurement and payment. This section is intended to supplement the General and Special Conditions.

## B. Measurement:

1. Work shall not be measured but shall be paid for as a Lump Sum. Progress payments will be based on the percentage of work complete.
2. No measurement will be made by weight tickets.

## C. Units

1. Project will not be measured but will be paid on a Lump Sum basis. Item inclusion will be as outlined on the Bid Form.

## D. Payment:

1. Unit bid prices, as quoted in the Bid Schedule, shall constitute full compensation for labor, materials, equipment, rentals, overhead, profit and incidentals to complete all work for each pay item and for all risk, loss, damage, or expense of whatever nature arising from the nature of the work or prosecution thereof.
2. Progress payment for work completed shall be paid based on the percentage of work complete.
3. Work or materials that are essential to the work, but for which there are no pay items, will be considered as a subsidiary obligation of the contractor under the lump sum contract unit price. Payment for work listed as lump sum bid items completed under this contract shall be paid for on a lump sum fixed price basis.

4. Final payment for work governed by unit prices will be made on the basis of the work accepted by the Parks Project Manager at the lump sum price stated for work which is incorporated in or made necessary by the Work.

## **BID SCHEDULE**

### ***BID ITEM NO. 01010 THROUGH 01500 AND 01600 THROUGH 01999- MOBILIZATION***

- A. Measurement: Mobilization will not be measured but will be a lump sum item. Fifty percent (50%) of the lump sum price for this item will be paid when ten percent (10%) of the original contract amount is earned. The balance of the lump sum bid price will be paid when fifty percent (50%) of the original contract amount is earned.
- B. Payment: The lump sum price shall include all the Contractor's costs including labor, material, and any incidental work and equipment necessary for mobilization of personnel, equipment and supplies at the project site. This item shall also include the establishment of the Contractor's fenced staging area, portable toilets and other necessary temporary facilities, grading and restoration of staging area, and all other costs incurred of labor and operations which must be performed prior to beginning the other items under this contract.

The lump sum price shall also include the following: all necessary permits required to for the project; protection of the work by means of a temporary construction fence; repair and restoration of any damage to pavement or landscape areas caused by construction under this contract; repairs due to vandalism; job site security; and coordination with others performing work on the site. The removal of the Contractor's equipment, supplies, excess materials, and cleanup of the site is also included in this item. Pedestrian Traffic Control within the park (signage) is included in this item

### ***BID ITEM NO. 01565- EROSION AND SEDIMENTATION CONTROL***

- A. Measurement: Work shall not be measured but shall be paid for as a Lump Sum. Progress payments will be based on the percentage of work complete.
- B. Payment: Progress payment for work completed shall be paid based on the percentage of work complete. Work or materials that are essential to the work, but for which there are no pay items, will be considered as a subsidiary obligation of the contractor under the lump sum contract price. Final payment for work governed by unit prices will be made on the basis of the work accepted by the Parks Project Manager at the lump sum price stated for work which is incorporated in or made necessary by the Work.

### ***BID ITEM NO. 02150- TREE PROTECTION***

- A. Measurement: Work shall not be measured but shall be paid for as a Lump Sum. Progress payments will be based on the percentage of work complete.
- B. Payment: Progress payment for work completed shall be paid based on the percentage of work complete. Work or materials that are essential to the work, but for which there are no pay items, will be considered as a subsidiary obligation of the contractor under the lump sum contract price. Final payment for work governed by unit prices will be made on the basis of the work accepted by the Parks Project Manager at the lump sum price stated for work which is incorporated in or made necessary by the Work.

***BID ITEM NO. 02810- IRRIGATION SYSTEM***

- A. Measurement: Work shall not be measured but shall be paid for as a Lump Sum. Progress payments will be based on the percentage of work complete.
- B. Payment: Progress payment for work completed shall be paid based on the percentage of work complete. Work or materials that are essential to the work, but for which there are no pay items, will be considered as a subsidiary obligation of the contractor under the lump sum contract price. Final payment for work governed by unit prices will be made on the basis of the work accepted by the Parks Project Manager at the lump sum price stated for work which is incorporated in or made necessary by the Work.

***BID ITEM NO. 02935- SODDING, SEEDING, AND SURFACING***

- A. Measurement: Work shall not be measured but shall be paid for as a Lump Sum. Progress payments will be based on the percentage of work complete.
- B. Payment: Progress payment for work completed shall be paid based on the percentage of work complete. Work or materials that are essential to the work, but for which there are no pay items, will be considered as a subsidiary obligation of the contractor under the lump sum contract price. Final payment for work governed by unit prices will be made on the basis of the work accepted by the Parks Project Manager at the lump sum price stated for work which is incorporated in or made necessary by the Work.

END OF SECTION 01025

PART 1 - GENERAL

## 1.1 SCOPE

- A. This Section covers the procedures for project and construction coordination between the City and the Contractor.
- B. Reference Contract General Conditions, GC 301, GC 308, and GC TITLE 3.

## 1.1 SUMMARY:

- A. Section Includes: Requirements for coordination, supervision and administration for the Work, including but not necessarily limited to:
  - 1. Coordination
  - 2. Administrative and supervisory personnel
  - 3. General installation provisions
  - 4. Cleaning and protection
  - 5. Utilities and site work
- B. Related Work:
  - 1. Section 01050 - Construction Surveying
  - 2. Section 01105 - Administration, Procedures, Codes
  - 3. Section 01200 - Project Meetings

## 1.2 GENERAL COORDINATION:

- A. General:
  - 1. The Contractor shall ensure that each entity involved in the performance of the Work shall cooperate in the overall coordination of the Work; promptly, when requested by the Contractor, furnish information concerning the entity's portion of the Work; and respond promptly and reasonably to the decisions and requests of persons designated with coordination, supervisory, administrative, or similar authority.
  - 2. The Contractor shall, where necessary, prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.
  - 3. Prepare similar memoranda for the Owner and separate Contractors where coordination of their work is required.
- B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction work. Such administrative activities include, but are not limited to, the following:

1. Preparation of schedules
  2. Installation and removal of temporary facilities
  3. Delivery and processing of submittals
  4. Progress meetings
  5. Project close-out activities
- C. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water and materials. Salvage materials and equipment involved in performance of, but not actually incorporated in, the Work. Refer to other sections for disposition of salvaged materials that are designated as the City's property.
- D. Site Utilization: In addition to the site utilization limitations and requirements shown on the Drawings and indicated by the Contract Documents, administer the allocation of available space equitably among entities needing access and space, so as to produce the best overall efficiency in the performance of the Work. Schedule deliveries so as to minimize the space and time requirements for storage of materials and equipment on the site; but do not unduly risk delays in the Work.
- E. Coordination Meetings: Include in scheduled meetings, coordination of various entities and activities as set forth in Section 01200 – Project Meetings. Where necessary, schedule additional coordination meetings for this purpose on an as-needed basis.
- F. Layout: It is recognized that the Contract Documents are diagrammatic in showing certain physical relationships of the various elements and systems and their interfacing with other elements and systems. Establishment and coordination of these relationships is the exclusive responsibility of the Contractor. Do not scale the Drawings. Lay out and arrange all elements to contribute to safety, efficiency and to carry the harmony of design throughout the Work. In case of conflict or un-dimensioned locations, verify required positioning with the Parks Project Manager. The Contractor shall provide surveying for the layout of all improvements including both horizontal and vertical control, in accordance with the requirements of Section 01050 – Construction Surveying.
- G. Substrate Examination: The Contractor shall ensure that the subcontractor of each element of the Work examines the conditions of the substrate to receive the work, dimensions and spaces adjacent, tolerances, interfacing with other elements and services, and the conditions under which the Work will be performed. The Contractor shall require each subcontractor to notify the Contractor in writing of conditions detrimental to the proper or timely completion of the Work, and ensure that they do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to the subcontractor.
- 1.3 COMPLETE SYSTEMS: It is the intent of the Contract Documents that the system be complete and functional to provide the intended or specified performance. The Contractor shall provide all incidental items and parts necessary to achieve this requirement.
- 1.4 COMPATIBILITY: Provide products and equipment which are compatible with other work requiring mechanical interface including connections, control devices, water, drain and other piping connections. Verify requirements and other interface requirements before ordering equipment and resolve conflicts that may arise.

PART 2 - PRODUCTS (Not applicable)

PART 3 – EXECUTION

3.1 GENERAL INSTALLATION PROCEDURES:

- A. Require the subcontractor of each major component to inspect both the substrate and conditions under which work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
- B. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items. Re-check measurements and dimensions before starting each installation.
- C. Manufacturer's Instructions: Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.
- D. Installation:
  - 1. Provide attachment and connection devices and methods necessary for securing work. Secure work true to line and level. Allow for expansion and building movement.
  - 2. Install each component during weather conditions and the Work status that will ensure the best possible results. Isolate each part of the completed construction from incompatible materials as necessary to prevent deterioration.
  - 3. Coordinate work with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.
- E. Visual Effects: Provide uniform joint widths in exposed work. Arrange joints in exposed work to obtain the best visual effect. Refer questionable choices to the Parks Project Manager for final decision.
- F. Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Parks Project Manager for final decision.

3.2 CLEANING AND PROTECTION:

- A. During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration prior to achieving substantial completion.
- B. Clean and maintain completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

END OF SECTION 01040

PART 1 - GENERAL

## 1.1 SCOPE

- A. This Section covers the procedures and accuracy requirements for survey services for layout of work and field measurement of work quantities to be determined by surveys.
- B. Reference Contract General Conditions, GC 318, GC 319.

## 1.2 SUBMITTAL

- A. Refer to Technical Specifications Sections 01300 and 01340 for the submittal process.
  - 1. Copies of original pages of field notes.
  - 2. Original field notebooks when filled and at end of contract.
  - 3. As-built measurements.

PART 2 - PRODUCTS (NOT USED)PART 3 - EXECUTION

## 3.1 CONSTRUCTION LINES AND GRADES

- A. The Contractor shall make surveys and layouts as necessary to delineate the work. The Contractor shall make the surveys for the proper performance of the Work. As a part of such surveys, the Contractor shall furnish, establish and maintain in good order survey control points that may be required for the completion of the Work subject to the approval of the Project Manager as to their location, sufficiency and adequacy. However, such approval by the Project Manager shall not relieve the Contractor of his responsibility for the accuracy of his survey work.
- B. The Contractor shall furnish skilled labor, instrument platforms, ladders and such other temporary structures as may be necessary for making and maintaining points and lines in connection with the surveys required.
- C. The City may draw the Contractor's attention to errors or omissions in lines or grades, but the failure to point out such errors or omissions shall not give the Contractor any right or claim nor shall in any way relieve the Contractor of his obligations according to the terms of this contract.
- D. The Contractor's instruments and other survey equipment shall be accurate, suitable for the surveys required in accordance with recognized professional standards and in proper condition and adjustment at all times. Surveys shall be performed under the direct supervision of a Colorado licensed surveyor.

## 3.2 SURVEYING ACCURACY AND TOLERANCES IN SETTING SURVEY, LAYOUT AND



## QUANTITY CALCULATION STAKES

- A. The tolerances generally applicable in setting survey stakes shall be as set forth in the CDOT Survey Manual, latest edition. Such tolerances shall not supersede stricter tolerances required by the drawings or specifications, and shall not otherwise relieve the Contractor of responsibility for measurements in compliance therewith.

### 3.3 AS-BUILT MEASUREMENTS

- A. As-built measurement for items that will be hidden or visible including all civil, mechanical, electrical, control work and all utilities that are placed in concrete, earth or behind walls shall be made. Items located within or five feet beyond a building shall be referenced to building column lines and finish floor elevations. Special attention shall be paid to items requiring service, sensors, items with moving parts, access points and locations of junctions, elevation changes and directional changes.

## PART 4 - MEASUREMENT AND PAYMENT

### 4.1 MEASUREMENT

- A. No separate measurement shall be made for work under this Section

### 4.2 PAYMENT

- A. No separate payment will be made for work under this Section. The cost of the work described in this Section shall be included in the Contract price.

END OF SECTION 01050

PART 1 - GENERAL

## 1.1 SUMMARY

- A. This Section identifies primary compliance with the State, City and County of Denver's regulatory requirements including:
  - 1. Colorado Department of Transportation
  - 2. Department of Public Works (including The Division of Wastewater Management)
- B. Construction shall be based on the latest edition of the referenced codes including additions and revisions thereto that are in effect at the time of project bidding.

## 1.2 BUILDING CODE

- A. All design and construction work shall be governed by the Building Code for the City and County of Denver, latest edition. This is based upon the International Building Code of the International Code Council with Denver Amendments to this code.

## 1.3 DENVER BUILDING DEPARTMENT

- A. For review and approval of all construction documents for compliance to the Denver building code:
  - City and County of Denver
  - Community Planning and Development
  - Building Inspection Division
  - 201 West Colfax Avenue, Dept 205
  - Denver, Colorado 80202
  - Telephone 720-865-2720
  - Fax 720-865-2880

## 1.4 DENVER FIRE DEPARTMENT

- A. For review and approval of plans for compliance with the Denver Fire Department's requirements as they apply to projects for the Department of Public Works:
  - Denver Fire Department
  - 745 W. Colfax Ave.
  - Denver, Colorado 80204
  - Telephone 720-865-2833
- B. The Contractor is advised that the Denver Fire Department – Fire Prevention Bureau requires permitting for the following activities as they apply to the scope of work. The Contractor is responsible for obtaining the appropriate permits necessary to complete the work. All costs associated with this permitting and policy compliance shall be the responsibility of the Contractor. The policies all reference the International Fire Code (IFC).
  - 1. “Hot work”, which is defined as the operation of any equipment or tool that creates sparks, hot slag, or radiant or convective heat as a result of the work. This includes,

but is not limited to, welding, cutting, brazing, or soldering.

2. Use and storage of compressed gas for both temporary storage and permanent facility installation. This includes, but is not limited to, flammable gas (excluding propane-LPG), oxidizer (including oxygen), and inert and/or simple asphyxiates.
  3. Tank installation, which includes above-ground storage tanks (AST) and underground storage tanks (UST) for both temporary tanks and permanent facility installations.
- C. In addition to the above permits, the Denver Fire Department may require other permits that are associated with the specific work in the Contract Documents. Policies provided by the Denver Fire Department are meant to provide basic information for the most common conditions and situations. In any given occupancy, many other International Fire Code (IFC) requirements may be enforced. These should be addressed with the Denver Fire Department before construction begins and during construction with premise inspection(s). Any questions can be addressed to the Fire Prevention Bureau between 6:30 AM and 9:00 AM Monday-Friday at 720-913-8242 or -8237.

## PART 2 - PRODUCTS (NOT USED)

## PART 3 - EXECUTION

### 3.1 PERMITS AND CERTIFICATIONS

- A. The Contractor shall maintain records on site of all permits acquired by federal, state, and local agencies. Posting of permits shall conform to requirements of the respective agencies.
- B. At the completion of any inspection by other agencies, the Contractor shall forward copies of the status of the inspection and copies of any approved or "signed-off" inspections by the respective agencies to the Project Manager.
- C. At the time of request for Substantial Completion, the Contractor shall forward to the Project Manager all permits approved by the respective agencies.

## PART 4 - MEASUREMENT AND PAYMENT

### 4.1 MEASUREMENT

- A. No separate measurement shall be made for work under this Section.

### 4.2 PAYMENT

- A. No separate payment will be made for work under this Section. The cost of the work described in this Section shall be included in the Contract price.

END OF SECTION 01060

PART 1 - GENERAL

## 1.1 SUMMARY

- A. This Section contains a list of definitions of words or phrases and grammatical or contextual conventions commonly used in these contract documents.

## 1.2 REFERENCES

- A. Related Documents: General Conditions, Special Conditions, and applicable provisions of Technical Specifications Division 1 apply to this Section.

## 1.3 DEFINITIONS

## A. Alphabetical Listing of Definitions

1. As indicated: Shown on the drawings by graphic indication, notes or schedules, or written in the specifications or elsewhere in the contract documents.
2. As directed, as approved, as requested: Unless otherwise indicated, these terms imply "by the Project Manager" and require that an instruction be obtained by the Contractor from the Project Manager.
3. Concealed: Embedded in masonry, concrete or other construction; installed in furred spaces; within double partitions or hung ceilings; in trenches; in crawl spaces or in enclosures.
4. Ensure: To make certain in a way that eliminates the possibility of error.
5. Exposed: Not installed underground or "concealed" as defined above.
6. Furnish or Provide: To supply, install and connect complete and ready for safe and regular operation of particular work unless specifically otherwise noted.
7. Indicated, Shown, or Noted: As depicted on drawings or specifications.
8. Install: To erect, mount and connect complete with related accessories.
9. Or equal, or approved equal: Refers to products which, in the opinion of the Project Manager, are similar in all respects to products specified by proprietary brand name. (Refer to Section 01630 for procedures for submittal of proposed substitutions.)
10. Rework: To repair existing items or work required to be removed and replaced in order to accomplish the Work in accordance with the contract documents.
11. Related Work: Includes, but not necessarily limited to, mentioned work associated with, or affected by, the work specified.
12. Reviewed, Satisfactory, Accepted, or Directed: Assumes by or to the Project Manager.
13. Similar, or Equal: Same in materials, weight, size, design, construction, capacity, performance and efficiency of specified product.
14. Supply: To purchase, procure, acquire and deliver complete with related accessories.

15. Unless Otherwise Indicated and Unless Otherwise Noted: General note to perform work as indicated or shown on drawings or in specifications unless specifically directed otherwise elsewhere in the contract documents; may be abbreviated "U.O.N.", "U.O.I.", or "U.N.O."

#### 1.4 CONVENTIONS

##### A. Specifications Format

1. In order to standardize the location of information in the Contract Documents, the specifications generally are organized in one or more of the following formats:
  - a. The 2004 edition of "MASTERFORMAT" published by the Construction Specifications Institute.

##### B. Organization of Drawings and Specifications

1. Organization of the specifications into divisions and sections, and arrangement or numbering of drawings is intended solely for the convenience of the Contractor in his responsibilities to divide the Work among subcontractors or to establish the extent of work to be performed by any trade.
2. Neither the City nor the Project Manager assume any liability arising out of jurisdictional issues or claims advanced by trade organizations or other interested parties based on the arrangement or organization of drawings or specifications.

##### C. Gender and Number

1. For convenience and uniformity, parties to the Contract, including the City, Contractor, and Project Manager, and their subcontractors, suppliers, installers, consultants or other interested parties are referred to throughout the contract documents as if masculine in gender and singular in number. Such reference is not intended to limit the meaning of the contract documents to the masculine gender or singular number.

##### D. Singular vs. Plural

1. Materials, products, equipment or other items of work referred to in the singular shall be construed as plural where applicable by the intent of the contract documents and shall not limit quantities to be provided by the Contractor.

##### E. Imperative Mood

1. Specifications and notes on the drawings or elsewhere in the contract documents are generally written in the imperative mood as instructions to the Contractor, whether the Contractor is specifically addressed or not.

##### F. References to Subcontractors or Trades

1. References to subcontractors, trades or other entities which are not parties to the contract shall be construed as meaning the Contractor whose responsibility it shall be to divide the Work among subcontractors or trades. Such references are used as a matter of convention, and are not intended to preclude or direct the Contractor's responsibility to divide the Work.

##### G. Abbreviations

1. Abbreviations are believed to be those in general use in the construction industry. Contact the Project Manager for clarification of abbreviations for which the meaning is not clear.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. No separate measurement shall be made for work under this Section.

4.2 PAYMENT

- A. No separate payment will be made for work under this Section.

END OF SECTION 01095

PART 1 - GENERAL

- 1.1 RELATED DOCUMENTS: The General Contract Conditions, Drawings and other Division-1 Specification sections apply to work of this section.
- 1.2 SUMMARY: This section includes general administrative requirements and procedures, and related applicable codes.
- 1.3 CODES:
- A. Obtain all permits and licenses in accordance with General Condition 317.
  - B. Publication Dates: Comply with General Condition 401.2.
- 1.4 EXISTING UTILITIES:
- A. Locate and protect existing utilities in accordance with General Condition 804.
  - B. Although existing utilities may be shown on the drawings, their location is not guaranteed. Contractor is required to call Utility Notification Center of Colorado (UNCC) at 811 three days (72 hours) prior to starting any work.
- 1.5 CONTRACTOR'S CONSTRUCTION SCHEDULE
- A. Furnish construction schedule, as required by General Condition 306.
  - B. IMPORTANT: Prior to beginning work on project site, the Contractor shall give minimum 48 hour notification to both the Project Manager and the District Superintendent.
  - C. The schedule may be used as a tool in analyzing any requests for the extension of the contract completion date due to changes in the Work or abnormal weather conditions. Normal weather conditions are based on the 10-year historical weather information provided by the local branch of the U.S. Weather Service. Normal weather conditions shall be incorporated into the bar chart schedule. Additional time will be added to the Contract time only if the activities involved will affect the project's Completion Date because of the criticality of the activities changed or altered.
- 1.6 DELIVERY, STOPRAGE AND HANDLING
- A. Properly carton, crate, cover, and protect materials, products and equipment for shipping, handling and storing. Use appropriate means for hoisting and loading which will prevent damage or overstress to items being handled or shipped. Store them under roof in controlled environment whenever feasible; otherwise store off the ground under suitable coverings properly secured against wind and weather. Protect all items from rain, snow, moisture, wind, cold, heat, frost, sun, staining, discoloration, deterioration and physical damage from any cause. Refer to individual sections for specific requirements.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not applicable)

END OF SECTION 01105



PART 1 - GENERAL

## 1.1 WORK INCLUDED

- A. Work specified in this Section includes construction safety precautions and programs by the Contractor and the basis for reviews by the Project Manager.
- B. Reference Contract General Conditions, GC 801, GC 802, GC 803.

## 1.2 RESPONSIBILITY

- A. The General Conditions make it clear that all safety precautions during the construction process are the responsibility of the Contractor. The Contractor is responsible for the health and safety of his employees, agents, subcontractors and their employees, and other persons on the worksite; for the protection and preservation of the work and all materials and equipment to be incorporated therein; and for the worksite and the area surrounding the worksite. The Contractor shall take all necessary and reasonable precautions and actions to protect all such persons and property.
- B. This Section shall be interpreted in its broadest sense for the protection of persons and property by the Contractor and no action or omission by the Project Manager or his authorized representatives shall relieve the Contractor of any of its obligations and duties hereunder.

## 1.3 SUBMITTAL

- A. Refer to Technical Specifications Section 01300 and 01340 for the process. A safety plan shall be submitted by the General Contract prior to commencing any work.

## 1.4 PROJECT MANAGER'S REVIEW

- A. The Contractor shall provide two (2) copies of its safety program to the Project Manager for review at least ten days before on-site construction begins. The Contractor's program must meet as a minimum all applicable federal, state and local government requirements.
  - 1. The Contractor must, as part of the Contractor's safety program, submit one electronic file in the form of a security-free, fully bookmarked PDF file compatible with Adobe Acrobat 6.0 or newer and one body hard copy of the following information for acceptance by the Project Manager prior to construction:
    - a. Name of the Contractor's site safety representative.
    - b. If the Contractor is running multiple shifts or working more than forty (40) hours per week, the name of an assistant Contractor's safety representative who can act in the absence of the site safety representative.
    - c. Twenty-four hours per day emergency phone numbers of Contractor site management to be used in case of injury or accident. Provide at least four contacts.
    - d. The Contractor's method of ditching and trenching excavation to be used including how slopes will be stabilized with calculations showing the slope stability.

The Contractor shall also show how material will be stored beside the excavation. Stored material will include the excavated and backfilled material.

- e. How injuries or accidents will be handled including samples of the forms used to report injuries or accidents.
  - f. How employees will be handled who are unable to safely perform their duties, including how the Contractor will determine whether an employee is unable to safely perform his duties.
  - g. How and when equipment will be checked to see that it is safe, that all safety guards are in place and that the equipment is being used for its designed purpose and within its rated capacity.
  - h. How and when all electric devices will be checked for proper grounding and insulation. What system will be used to lock out electric systems that should not be energized.
  - i. How trash and human organic waste will be disposed.
  - j. How snow and ice will be removed by the Contractor within the project area.
  - k. How concrete forms will be anchored to ensure their stability, including calculations showing that the forms will safely hold the maximum construction loads.
  - l. How flammable materials will be stored and handled, and how any spills will be cleaned up and removed for disposal.
  - m. What system will be used to prevent fires, and if fires do occur who will be trained to fight them. Also what fire fighting equipment will the Contractor have available and how will this equipment's condition be monitored.
  - n. How materials will be received, unloaded, stored, moved and disposed of.
  - o. How personnel working above ground level will be protected from falling.
  - p. How people working underneath work will be protected.
  - q. What will be done to protect personnel in case of severe weather.
  - r. How adequate lighting will be provided and monitored.
  - s. How the safety of work platforms, man lifts, material lifts, ladders, shoring, scaffolding, etc. will be ensured relating to load capacity and the protection of personnel using or working around them.
- B. Prior to the start of any work by a contractor or subcontractor employee, the Contractor shall provide the Project Manager with a list of its employees, subcontractor's employees and other personnel the Contractor has requested to work on site, who have signified in writing that they have been briefed on, or have read and understand, the Contractor's Safety Plan.

## PART 2 - PRODUCTS

### 2.1 CONTRACTOR'S SAFETY PLAN

- A. Provide a Contractor's Safety Program as described in Part 1 of Technical Specifications Section 01110.

## PART 3 - EXECUTION

3.1 IMPLEMENT CONTRACTOR'S SAFETY PLAN

- A. Implement the approved Contractor's Operational Safety Plan as described in Part 1 of this Technical Specifications Section 01110. Technical Specifications Section 01110.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. No separate measurement shall be made for work under this Section.

4.2 PAYMENT

- A. No separate payment will be made for work under this Section. The cost of the work described in this Section shall be included in the Contract price.

END OF SECTION 01110

PART 1 - GENERAL

1.1 DESCRIPTION

- A. The Work specified in this Section requires the Contractor's Project Manager, Superintendent and Quality Control representative to attend meetings scheduled by the City for the collection and dissemination of information related to the subject contract.
- B. The Project Manager will prepare the minutes of each meeting and distribute them to each of the participants.

1.2 OTHER MEETINGS

- A. The Contractor will be advised of times, dates and places of contract meetings.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PRECONSTRUCTION MEETING

- A. A Preconstruction Meeting will be scheduled by the City after the Contract has been signed by all parties. The purpose of this meeting is to introduce the City's Representatives to their counterparts in the Contractor's organization and to establish lines of communication between these representatives and outline some contract requirements. The Contractor's Superintendent, Contractors LEED manager and Quality Control Representative(s) shall attend this meeting.
- B. The Project Manager will distribute a notice of this meeting, along with an agenda of the subjects to be addressed.
- C. The Project Manager will explain and discuss the responsibilities and authorities of the City, the Designer, and the Project Manager's organization.
- D. The Project Manager will provide highlights of the following information at this meeting:
  - 1. Minority Business Enterprise (MBE) and Women Business Enterprise (WBE) requirements.
  - 2. Insurance, laws, codes, traffic regulations and permit requirements of public agencies and their regulations.
  - 3. Procedures for processing change orders.
  - 4. Procedures for submitting shop and working drawings, product data and samples.
  - 5. Monthly pay estimate cutoff dates.

6. Payment procedures.
  7. Request for information procedures.
  8. Communication procedures.
  9. Contractor-required Daily Report showing the quantitative progress of work, the use of men, material and equipment, problems, potential delays, weather, shift, down equipment, material and equipment received and information received from the City. Daily reports will be submitted to the Project Manager within 48 hours of start of work. Daily Reports are required every day, including weekends and holidays.
  10. Scheduling and coordination requirements.
  11. Quality control/assurance procedures.
  12. Environmental requirements and permits.
  13. As-built documents.
  14. Project closeout requirements.
- E. The Contractor will introduce the Contractor's representatives and briefly describe each person's responsibilities. The Contractor will provide the following:
1. A list of all subcontractors.
  2. Office, storage areas and construction area layouts, along with temporary easements.
  3. Safety, first aid, emergency actions and security procedures including the name of the Contractor's insurance company.
  4. Sixty (60) day preliminary schedule.
  5. Sequence of Work.
  6. Construction methods and general worksite layout and haul plan.
  7. Housekeeping procedures.
  8. The Contractor's general erosion and sedimentation control plans, noise, hazardous material, air and water pollution control plans and Quality Control Plan.
  9. Coordination and notification for utility work.
  10. Deliveries and priorities of major equipment.
  11. Submittal Schedule
- F. Explanations provided by the City will not amend, supersede or alter the terms or meaning of any contract document, and the Contractor shall not claim reliance on such explanations as a defense to any breach or failure by the Contractor to perform as specified in the contract.

### 3.2 CONSTRUCTION PROGRESS MEETINGS

- A. Progress meetings will be scheduled weekly and more often as necessary by the Parks Project Manager to promote the competent and timely execution of the contract.
- B. The meetings will be held at the worksite or at a location selected by the Parks Project Manager. Meetings will be chaired by the Contractors Project Manager.

- C. The Contractor's personnel, as listed in Technical Specification Section 01200, 3.01.A, shall attend unless otherwise agreed by the Parks Project Manager.
- D. The Contractors Project Manager will be responsible for publishing minutes of the meetings.
- E. At a minimum, the following items will be addressed at each meeting. The items addressed in the meeting do not waive notification or submittal requirements as required elsewhere in the contract.
  - 1. Safety: Contractor shall report any safety issues
  - 2. Quality Control
    - a. The Contractor's Quality Control Representative shall present and discuss the Independent Testing Agency weekly test report and/or testing schedule.
    - b. The Contractor's Quality Control representative shall report on inspections by other agencies and any follow-up activity required.
    - c. The Project Manager will present and discuss issues regarding quality control.
  - 3. Quality Assurance
    - a. The Project Manager will present and discuss issues regarding quality assurance.
  - 4. Design activities: open discussion
  - 5. Shop drawings/submittals/material procurement
    - a. The Contractor shall provide and review the Contractor's submittal schedule and provide any updated information and/or changes to the schedule.
    - b. The Contractor shall provide information on the status of submittals requiring re-submittal.
    - c. The Contractor shall review any accepted submittals that the Contractor plans to re-submit with changes.
    - d. Contract shall provide the status of material procurement for long-lead items (long-lead items are materials and equipment that have a fabrication and/or delivery duration that exceeds 15 working days). This information shall be provided by the Contractor in a format satisfactory to the City Project Manager and shall include, at a minimum: submittal/shop drawing preparation duration, review duration, fabrication duration and a delivery duration. All long-lead items shall be identified with a separate activity on the approved CPM project schedule.
  - 6. Construction activities: Open discussion to include coordination items with other Contractors and or agencies.
  - 7. Schedule
    - a. The Contractor shall provide to the Project Manager the Contractor's three week look-ahead schedule and review at the meeting the items on the schedule. The schedule shall be in bar chart format based on the approved CPM, and shall include dates of testing activities, items in progress, percentage of completion of items, responsible subcontractor for the items.

## PART 4 - MEASUREMENT AND PAYMENT

### 4.1 MEASUREMENT

A. No separate measurement shall be made for work under this Section.

4.2 PAYMENT

A. No separate payment will be made for work under this Section. The cost of the work described in this Section shall be included in the Contract price.

END OF SECTION 01200

PART 1 - GENERAL

## 1.1 DESCRIPTION

- A. The Work specified in this Section summarizes the requirements for the submittal of documents to the City that are defined in these Specifications. It also describes the procedures for "supplemental" submittals.
- B. Reference Contract General Conditions, GC 309, GC 405.

PART 2 - PRODUCTS

## 2.1 SUBMITTAL SCHEDULE

- A. The Contractor shall provide a submittal schedule within fourteen (14) days after Notice to Proceed. The Submittal Schedule shall be directly related to the CPM schedule, shall identify all the submittals, and shall include the following information for each submittal item:
  - 1. Specification section, contract article, or special condition
  - 2. Specification Subparagraph
  - 3. Item description
  - 4. Date the submittal shall be submitted
  - 5. Name of subcontractor or supplier
- B. The submittal schedule shall be updated every two weeks by the Contractor and submitted with the progress payment request.
- C. One electronic submittal submitted on a single CD-ROM or DVD-ROM.

## 2.2 ELECTRONIC SUBMITTALS

- A. All submittals shall be delivered to the Project Manager and Designer in electronic format.
  - 1. Acceptable electronic formats
    - a. Adobe Acrobat 8.0 or newer. All files shall be fully compatible with Adobe Acrobat 8.0. File shall have no security and bookmark every applicable submittal.
  - 2. Formats are acceptable only with written permission of the project manager or required by individual spec sections:
    - a. Microsoft Office 2003 (2007 preferred) or newer. All files shall be fully compatible with Microsoft Office 2003.
    - b. AutoDesk AutoCAD 2007 or newer. All files shall be fully compatible with AutoDesk AutoCAD 2007.
      - 1) AutoCAD files shall be self contained with no external x-references.



- c. Other files pre-approved by the Project Manager.
- 3. Electronic file names: Each electronic document shall have a unique file name. File name convention shall be as follows unless otherwise agreed to by Project Manager: - AAA-BBBBB-CCC-RZ
  - a. AAA = sequential submittal number starting at 001.
  - b.BBBBB = specification section containing submittal requirements
  - c. CCC = sequential specification submittal number starting at 001.
  - d. RZ = sequential revision number. RZ not required on initial submittals.
  - e. Example A:005-01370-002”, five submittals have been logged overall with two submittals made to specification section 01370.
  - f. Example B: 009-01370-002-R3, nine submittals made overall and three revisions to submittal 01370-002.

### 2.3 INITIAL SUBMITTAL

- A. Each submittal document shall include a title block showing the following information:
  - 1. Date of submittal and revision dates.
  - 2. Contract title and number.
  - 3. The names of Contractor, subcontractor, supplier, manufacturer and when applicable, the seal and signature of an engineer registered in the State of Colorado, for the involved discipline.
  - 4. Identification of product by either description, model number, style number or lot number.
  - 5. Subject identification by contract drawing or specification reference.
- B. On each submitted drawing, include a blank space on each sheet, three inches by four inches, in the lower right corner, just above the title block, in which the City or the Designer of Record may indicate the action taken.
- C. Make submissions sufficiently in advance so that the Designer and City review may be completed before any material procurement or Work represented by those submittals is scheduled to be performed.
- D. Allow a minimum cycle of ten (10) working days for review of each submittal by the City.
- E. The Contractor shall at the time of submission describe variations from the contract documents in writing, separate from the submittal document. If the Project Manager approves any such variations, an appropriate contract change order shall be issued except that, if the variation is minor and does not involve a change in price or in time of performance, a modification need not be issued. If a submission contains variations and the variation column is not marked on the transmittal form, it will not be considered for review and acceptance. Along with marking the transmittal as a variation, a description must be included which outlines all the differences including maintenance and utility services along with any cost savings from an item not containing the variation.
- F. Changes in accepted submittal documents will not be permitted unless those changes have been accepted, in writing, by the City.

- G. The form and quality of submittal documents shall comply with Technical Specifications Section 01340.

#### 2.4 SUPPLEMENTAL SUBMITTALS

- A. Supplemental submittal documents initiated by the Contractor for consideration of corrective procedures shall contain sufficient data for review. Make supplemental submittals in the same manner as initial submittals with the appropriate primary transmittal referenced.

### PART 3 - EXECUTION

#### 3.1 CONTRACTOR'S REVIEW

- A. The Contractor shall review submittal documents, stamp and sign as reviewed and approved as complying with contract documents prior to submission to the City.

#### 3.2 CITY REVIEW

- A. Submittal documents will be reviewed by the Designer and the Project Manager for conformance to requirements of the contract drawings and specifications. Review of a separate item will not constitute review of an assembly in which the item functions. The Designer or the Project Manager will withhold approval of submittals that depend on other submittals not yet submitted. Review and acceptance will not relieve the Contractor from his responsibility for accuracy of submittals, for conformity of submittal document to requirements of contract drawings and specifications, for compatibility of described product with contiguous products and the rest of the system, or for protection and completion of the contract in accordance with the contract drawings and specifications.
- B. The Designer, and/or the Project Manager will review the submittal documents for general conformance with the contract documents and mark the Action Code, sign and date the transmittal.
- C. The Action Codes have the following meanings:
  1. A - ACCEPTED is an approval, and means that the illustration and description appears to conform to the respective requirements of the contract documents.
  2. B - ACCEPTED AS NOTED is an approval, and means that the illustration and description will conform to the respective requirements of the contract documents after changes in recognition of the reviewer's comments. Submittals so marked need not be resubmitted.
  3. C - REVISE AND RESUBMIT means that the submittal is unacceptable and must be revised and resubmitted.
  4. E - NOT ACCEPTED means that the submittal is not approved and that a new submittal in accordance with the contract documents shall be made.
  5. F - RECEIPT ACKNOWLEDGED, means an item is received by the Project Manager but no review was made. This mark is for use in resubmitting items that were previously Accepted as Noted and the Contractor has incorporated the notes and wants the Project Managers' staff to have the same material that the Contractor's field staff is using.

### 3.3 CONTRACTOR'S RESPONSIBILITIES

- A. Coordinate each submittal document with the requirements of the Work; place particular emphasis upon ensuring that each submittal of one trade is compatible with other submittals of that trade and submittals of other trades including producing as needed drawings showing the relationship of the work of different trades.
- B. Contractor's responsibility for errors and omissions in submittal documents and associated calculations is not relieved by the City's review, correction and acceptance of submittals.
- C. Contractor's liability to the City, in case of variations in the submittal document from the requirements of the contract documents, is not relieved by the City's review and acceptance of submittals containing variations unless the City expressly approves the deviation in writing, in which the City describes the variation.
- D. The Contractor shall maintain a file of all approved submittal documents at the worksite. The complete file of approved submittal documents shall be turned over to the City with the as-built documents at the end of the job.
- E. Schedule impact due to resubmittal requirements is the responsibility of the Contractor.

### PART 4 - MEASUREMENT AND PAYMENT

#### 4.1 MEASUREMENT

- A. No separate measurement shall be made for work under this Section.

#### 4.2 PAYMENT

- A. No separate payment will be made for work under this Section. The cost of the work described in this Section shall be included in the Contract price.

END OF SECTION 01300

PART 1 - GENERAL

## 1.1 DESCRIPTION

- A. This Section specifies the preparation of a preliminary schedule, construction schedule, related narratives and monthly progress reports, all encompassing complete performance of contract requirements.
- B. The Contractor shall schedule and coordinate the work of all of its subcontractors and suppliers including their use of the worksite. The Contractor shall keep the subcontractors and suppliers informed of the project construction schedule to enable the subcontractors and suppliers to plan and perform their work properly.
- C. The Contractor shall, in accordance with the requirements of the technical specifications, submit a construction schedule that shall provide for the expeditious and practicable execution of the Work.
- D. The construction schedule for the performance of the Work shall be a Critical Path Method (CPM) system in bar chart format, unless an alternate system is specifically identified in the technical specifications, with reasonable detail including a time scaled network and computer printout as more fully detailed in the technical specifications.
- E. Float or slack is defined as the amount of time between the early start date and the late start date or the early finish date and the late finish date of any activities in the schedule. Float or slack is not time for the exclusive use or benefit of either the Contractor or the City.
- F. The Contractor shall submit a monthly progress report and schedule update in accordance with the scheduling provisions of the technical specifications.
- G. The Contractor shall complete the Work within the contract time and in accordance with the most recent schedule submittal that has been approved in writing by the Project Manager.
- H. Reference Contract General Conditions, GC 306, GC 603, GC 909, GC1103, GC 1202

## 1.2 PLANNING

- A. The schedule shall show total contract time, including project milestones, as indicated in the Special Conditions or elsewhere in the contract documents.
- B. The Contractor shall prepare a work plan to complete the work within the contract time and complete those portions of work relating to each milestone date and other contract requirements. The Contractor shall generate a computerized Critical Path Method (CPM) schedule in the Precedence Diagram Method (PDM) format for the Work. The computerized format shall be compatible with the City's Primavera system, version 3.1 or Microsoft Office Project Professional 2003 or later. The Schedule shall be submitted electronically to the Project Manager in a dynamic format which will allow review and manipulation of any part of the schedule, and in reproducible hard copy. The schedule activities shall be resource

loaded showing labor man hours by crafts, major construction equipment by type and value of the work. The value of the work shall summarize each pay item shown in the Schedule of Values and balance to their amount.

- C. In addition to the construction activities the schedule shall include activities for furnishing materials and equipment and vendor shop drawing preparation. The construction schedule, a supporting narrative, and the overall progress curve shall be submitted for approval within 30 days after Notice to Proceed. Within thirty (30) days the City will respond with approval or direction to revise and resubmit within ten days. Failure of the Contractor to have a construction schedule approved by the City will be considered cause for withholding progress payment(s).
- D. To the extent that the construction schedule or any revisions thereof contains anything not jointly agreed upon in writing, or fails to show anything jointly agreed upon in writing, it shall not be considered to have the approval of the City. Failure to include any work item required for performance of this contract shall not excuse the Contractor from completing all work within applicable completion dates, regardless of the City's approval of the schedule.
- E. Failure of the Contractor to comply with this Section will be considered cause for withholding progress payment(s) or termination for default.

### 1.3 SUBMITTALS

- A. Refer to Technical Specifications Section 01300 for submittal procedures. Submit the following as indicated:
  - 1. Preliminary schedule (with narrative)
  - 2. Construction schedule data and work plan (with narrative)
  - 3. Monthly progress report
  - 4. Construction schedule change request (as needed)
  - 5. As built construction schedule.

## PART 2 - PRODUCT

### 2.1 PLOT AND REPORT FORMAT

- A. All plots shall be either 24 x 36 inches or 36 x 44 inches. They shall contain a title block with a minimum 18-point font showing:
  - 1. Contractor's name
  - 2. Contract number and title
  - 3. Plot date
  - 4. Data date
  - 5. Symbol definitions
  - 6. List of all approved changes to the original approved schedule.

- B. Plots shall contain a time line at the top.
- C. Reports shall be submitted on 8 ½ x 11-inch paper with a one-inch margin in a 3-ring binder, or as directed by the Project Manager.

## PART 3 - EXECUTION

### 3.1 PRELIMINARY SCHEDULE

- A. The Contractor shall prepare a preliminary schedule covering the first 90 calendar days of the contract. All reports shall be on 8 ½ x 11-inch paper. This preliminary schedule shall be submitted at the Preconstruction Meeting and shall be accompanied by a narrative description of the work plan. Within fourteen (14) days, the City will respond with acceptance or direction to revise and resubmit within ten days.
- B. The preliminary schedule shall show all significant work tasks that occur in the first 90 days, including planning, mobilization, shop submittals and approvals, procurement, fabrication and construction. It shall identify work items or milestones that affect or are affected by the City, other Contractor's work, utilities and other third parties, and it shall list major data submittals required by the contract.
- C. The preliminary schedule shall be accompanied by a narrative describing the Contractor's approach to mobilization, procurement and construction during the first 90 days. The narrative shall elaborate on the basis of duration, production rates, major equipment to be used, and shall identify all major assumptions used to develop the schedule.

### 3.2 CONSTRUCTION SCHEDULE

- A. The construction schedule shall be a computerized CPM schedule that includes:
  - 1. Work items identified in a Work Breakdown Structure (WBS) format that corresponds with the technical specifications.
  - 2. The order, sequence and interdependence of all significant work items including construction, procurement, fabrication, testing, startup and inspection and delivery of critical or special materials and equipment, submittals and approvals of critical samples, shop drawings, procedures, or other documents that could have a schedule impact.
  - 3. Work items by the City, other Contractors, utilities and other third parties that may affect or be affected by Contractor's activities.
  - 4. Proper referencing of all work items to identify applicable subcontractors or other performing parties.
  - 5. Work item duration not to exceed twenty (20) working days. No more than twenty-five (25%) of the work item may be on the critical path.
  - 6. Work items shall be resource loaded to show the direct craft man-hours estimated to perform the work including work by subcontractors.
  - 7. A narrative that explains the basis for the Contractor's determination of construction logic. It shall include estimated quantities and production rates, hours per shift, work days per week, and types, number and capacities of major construction equipment to

be used and whether the Contractor plans to work weekends or holidays.

- B. The construction schedule shall be prepared to include the data for the total contract duration, and the critical path shall be identified, including critical paths for interim completion dates. Scheduled start or completion dates imposed on the schedule by the Contractor shall be consistent with contract milestone dates. Milestone events shall be the schedule dates specified in the Special Conditions and shall be prominently identified and connected to the appropriate work item, denoting its start or completion. Work items related to any interim milestones shall be coded for that milestone.
- C. The Contractor shall submit the following documents to the City upon completion of preparation of the construction schedule:
  - 1. A time phased plot of the CPM schedule in PDM format showing all logic ties and an electronic copy in dynamic format.
  - 2. Various computer generated construction schedule reports that contain the following data for each work item: Identification, description, responsibility, duration, early start and early finish, late start and late finish, total float, and resources. The work items shall be sorted by float, early start, subcontractor or other sorts mutually agreed to. The reports shall also show the logic ties of successor and predecessor work items.
  - 3. A physical progress curve showing either manpower or other appropriate key contract items derived from the construction schedule and against which physical progress performance will be measured for schedule and payment purposes.
  - 4. The narrative described in Technical Specifications Section 01310-3.02.A.7.

### 3.3 PROGRESS REPORTING

- A. The Contractor shall submit a monthly progress report at the end of each month following the Notice to Proceed. At the end of each month, the Contractor and Project Manager shall agree on the progress of the work and the Contractor shall update the construction schedule accordingly. The updated construction schedule is a prerequisite to the submittal of the Contractor's application for progress payment. The schedule shall be made in accordance with Technical Specifications Section 01310-3.02. This review does not constitute an approval of the construction schedule and shall not be used for the purposes of modifying the initially approved construction schedule.
- B. The Contractor shall submit the monthly progress report consisting of a written narrative and various construction schedule reports. This report will be reviewed in a meeting between the Contractor and Project Manager.
  - 1. The narrative report shall describe overall progress of the work, provide a critical path analysis, discuss significant problems with proposed corrective action, and show the status of major changes and any other changes in sequence of the Work.
  - 2. The construction schedule reports shall include tabular reports showing the status of resources for completed and in progress work items and for work items scheduled to start in the next 30 days. The report shall include all the information outlined in Technical Specifications Section 01310-3.02.C.2.
  - 3. A bar chart format schedule shall be provided showing the Contractor's completion status (progress) on each work item along with plots described in Technical Specifications Section 01310-3.02.C.1.

4. The physical progress curve shall be updated to show actual progress.
- C. The latest completion time for any work item does not fall within the time allowed by the construction schedule, the sequence of work and/or duration shall be revised by the Contractor through concurrent operations, additional manpower, additional shifts or overtime, additional equipment or alternative construction methods until the schedule produced indicates that all significant contract completion dates, occupancy dates and milestones will be met. No additional costs will be allowed if such expediting measures are necessary to meet the agreed completion date or dates except as provided elsewhere in the contract documents.

### 3.4 SCHEDULE CHANGES

- A. The Contractor's request for construction schedule changes shall be made on the latest approved construction schedule and shall be accompanied by a narrative description and justification for the change, and shall be submitted in accordance with the General Conditions Title 1105 on changes in time. Minor revisions submitted at monthly progress review meetings are not considered as changes in this context.
- B. The construction schedule may be changed when one or more of the following occur:
  1. When a change order significantly affects the contract completion date or sequence of work items.
  2. When the Contractor elects to change the sequence or duration of work items affecting the critical path.
  3. When the City directs a change that affects a milestone date(s) specified in the Special Conditions or alters the length of a critical path.
- C. If, after submitting a request for change to the construction schedule, the Project Manager does not agree with the request, the Project Manager will schedule a meeting with the Contractor to discuss the differences. If a settlement cannot be reached on the change in the construction schedule or if the Contractor has failed to submit revisions to the network, the Project Manager has the option of providing suggested logic and/or duration times in all subsequent updating reports. The suggested logic and/or duration times will remain in effect until the change in the construction schedule is settled or until the logic and duration are superseded.
  1. If the Contractor has any objections to the data furnished by the Project Manager, he shall advise the Project Manager within ten days in writing, fully supporting the objections with a counter plan. The revisions suggested by the Project Manager shall be used for updating reports until the Project Manager approves the counter plan.
  2. If the Contractor does not submit a counter plan and data within ten days after the date of the Project Manager's suggested logic, the Contractor is deemed to concur with the Project Manager's suggested logic/duration time changes. The Project Manager's plan will be the basis of negotiations for any adjustment of the time and cost for performance of the Work.

### 3.5 CONTRACT EXTENSIONS

- A. If the Contractor is granted an extension of time for completion of any milestone or contract completion date under the provisions of the contract, the determination of the total number



of extended days will be based upon the current analysis of the schedule and upon all data relevant to the extension. Such data shall be incorporated in the next monthly update of the schedule.

- B. The Contractor acknowledges and agrees that delays in work items which, according to schedule analysis do not affect any milestone dates or contract completion date shown on the CPM network at the time of the delay will not be the basis for a contract extension.

### 3.6 AS-BUILT CONSTRUCTION SCHEDULE

- A. After all contract work items are complete, the Contractor shall submit an as built construction schedule showing actual start and finish dates for all work items and milestones.

## PART 4 - MEASUREMENT AND PAYMENT

### 4.1 MEASUREMENT

- A. No separate measurement shall be made for work under this Section.

### 4.2 PAYMENT

- A. No separate payment will be made for work under this Section. The cost of the work described in this Section shall be included in the Contract price.

END OF SECTION 01310

PART 1 - GENERAL

## 1.1 DESCRIPTION

- A. The Work specified in this Section consists of preparing and submitting shop and working drawings, product data, samples and record documents required by other technical specifications sections.
  - 1. The Contractor shall submit all shop drawings, working drawings, product data and samples, as defined in Title 1 of the General Conditions, to the Designer and Project Manager in accordance with the requirements in the technical specifications. The Project Manager will return one copy of the shop drawings, working drawings and product data to the Contractor with a written transmittal within the time periods noted in the technical specifications.
- B. Reference Contract General Conditions, GC 110, GC 117, GC 405.

## 1.2 SUBMITTALS

- A. Refer to Technical Specifications Section 01300 for submittal procedures.
- B. All submittals shall be delivered to the Designer and Project Manager in electronic format. All submittals must be of a consistent format (all Acrobat or all Word, etc). No combination of electronic file types will be allowed unless required by a specific specification section.
  - 1. Acceptable electronic formats
    - a. Adobe Acrobat 8.0 or newer. All files shall be fully compatible with Adobe Acrobat 8.0
    - b. Formats are acceptable only with written permission of the Project Manager or required by individual spec sections:
      - 1) Microsoft Office 2003 (2007 preferred) or newer. All files shall be fully compatible with Microsoft Office 2003.
      - 2) AutoDesk AutoCAD 2007 or newer. All files shall be fully compatible with AutoDesk AutoCAD 2007.
        - a) AutoCAD files shall be self contained with no external x-references.
      - 3) Other files pre-approved by the Project Manager
  - 2. Adobe Acrobat Requirements:
    - a. Drawings shall have security set to "No Security". Commenting, printing, adding photos, form fields and document signing must be allowed.
    - b. PDF submittals shall be one continuous file. No external links are allowed.
    - c. All individual components of submittals shall be bookmarked inside the PDF file.
    - d. All original documents shall be directly converted from the original electronic format to PDF. Scanning of files shall only be allowed by the Project Manager when the original electronic information is not obtainable.

- e. Failure to comply with these requirements will result in a return of file to the Contractor for immediate revision.
- 3. Electronic file names: Each electronic document shall have a unique file name. File name convention shall be as follows unless otherwise agreed to by Project Manager: - AAA-BBBBB-CCC-RZ
  - a. AAA = sequential submittal number starting at 001.
  - b. BBBBB = specification section containing submittal requirements
  - c. CCC = sequential specification submittal number starting at 001.
  - d. RZ = sequential revision number. RZ not required on initial submittals.
  - e. Example A:005-01370-002”, five submittals have been logged overall with two submittals made to specification section 01370.
  - f. Example B: 009-01370-002-R3, nine submittals made overall and three revisions to submittal 01370-002.

C. Quantities

- 1. Post electronic submittals as PDF electronic files directly to Designer’s FTP, Contractors FTP site or a site specifically established for the Project.
  - a. The Contractor should send an email for each submittal posted to all parties notifying them the submittal is available for review.
  - b. The Project Manager or Designer will send an email to the Contractor when the submittal review is complete.
- 2. Contractor can submit electronic submittals via email as PDF electronic files if approved by the Project Manager.
- 3. Four samples of each item specified in the various specification sections, unless otherwise specified.
- 4. Note: If manufacturer’s printed information is in color, all copies of submittals must be in color.
  - a. Printed information is only allowed when electronic copies are not possible.

D. Review

- 1. Submittal review comments by the City and the Designer will be in electronic form and incorporated into the electronic submittal file.
- 2. Resubmittals of electronic documents shall modify the original electronic file with new information and include the City and the Designer’s comments with appropriate responses and additional information.

1.3 CHANGES

- A. Changes in products for which shop or working drawings, product data or samples have been submitted will not be permitted unless those changes have been accepted and approved in writing by the City and County of Denver.

PART 2 - PRODUCTS

## 2.1 SHOP AND WORKING DRAWINGS

- A. Include the following as they apply to the subject:
  - 1. Contract title, work order and number.
  - 2. Respective contract drawing numbers.
  - 3. Applicable specification section numbers.
  - 4. Relation to adjacent structure or materials.
  - 5. Field dimensions clearly identified as such.
  - 6. Applicable standards such as ASTM or Federal Specification number, and pertinent authority specifications or standards.
  - 7. Identification of deviations from the contract drawings and specifications.
  - 8. Drawing name, number and revision.
  - 9. Contractor's stamp, initialed or signed, certifying:
    - a. Verification of field measurements.
    - b. Review of submittals for compliance with contract requirements.
    - c. Compatibility of the Work shown thereon with that of affected trades.
  - 10. Blank space on each sheet per Technical Specifications Section 01300, paragraph 2.02.B.
- B. Drawings of equipment and other items that contain multiple parts shall include exploded views showing the relationship of parts and the description of the parts into the smallest units that may be purchased or serviced.

## 2.2 PRODUCT DATA

- A. Modify manufacturer's standard and/or schematic drawings to delete information which is not applicable to the contract. Supplement standard information with additional information applicable to this contract.
- B. Modify manufacturer's standard(s), diagrams, schedules, performance charts, illustrations, calculations and other descriptive data to delete information which is not applicable to the contract. Indicate dimensions, clearances, performance characteristics and capacities. Include with the submittal electrical, plumbing, HVAC and any other diagrams, as applicable.
- C. Modify erection, application and placing instructions to delete information that is not applicable to the contract or work order.
- D. Include the following:
  - 1. Contract title, work order and number
  - 2. Respective contract drawing numbers
  - 3. Applicable contract technical specification section numbers
  - 4. Applicable standards such as ASTM or Federal Specification number, and pertinent authority specification or standards

5. Identification of deviations from the contract drawings and specifications
  6. Contractor's stamp, initialed or signed, certifying:
    - a. Dimensional compatibility of the product with the space in which it is intended to be used
    - b. Review of submittals for compliance with contract requirements
    - c. Compatibility of the product with other products with which it is to perform or which will be next to it.
    - d. The products electrical, plumbing, control and HVAC requirements conform to contract documents and the necessary utilities are provided for in the contract documents.
- E. Certificates of compliance shall be submitted for all products. The certificates shall:
1. State that the product complies with the respective specification and contract drawing requirements
  2. Be accompanied by a certified copy of test results pertaining to the product
  3. Show the submittals date, Contractor's name and address, contract title and number, product represented and its location in the contract, producer's name, product trade name and catalog number, place of product origin, test date, testing organization's name and address, quantity of the product to be furnished and related contract drawing and specification section numbers
  4. Be signed by an officer or another authorized representative of the producer and notarized
  5. Submit one electronic copy.
  6. Be received by the City not later than 30 days before the acceptance is needed of the products for ordering.

### 2.3 SAMPLES

- A. Submit samples of sizes and quantities to clearly illustrate full color range and functional characteristics of products and materials including attachment devices.
- B. Erect field samples and mock ups at the worksite as specified in the several technical specifications sections and at locations acceptable to the Project Manager. All field samples shall be erected in a location that will be readily visible throughout the life of the contract to allow comparison of the work as it progresses to the field sample.
- C. The Contractor shall verify, through appropriate inspections and tests, that the samples submitted meet the specifications and shall provide inspection and test data with the samples. The review and comments on the sample shall not relieve the Contractor of his responsibility for completion of the contract.
- D. Show the following information:
  1. Contract title and number
  2. Respective contract drawing numbers
  3. Applicable technical specification section numbers

4. Applicable standards such as ASTM or Federal Specification number
5. Identification of deviations from the contract drawings and specifications
6. Contractor's stamp, initialed or signed, certifying:
  - a. Dimensional compatibility of the product with the space in which it is intended to be used
  - b. Review of submittals for compliance with contract requirements
  - c. Compatibility of the product with other products with which it is to perform or which will be next to it
7. If multiple samples are submitted and the Project Manager is requested to make a choice, each sample shall have a unique identification number attached to it so the returned transmittal can state the identification number of the accepted sample and the Contractor will know which one it is.

### PART 3 - EXECUTION

#### 3.1 CONTRACTOR RESPONSIBILITIES

- A. Verify field measurements, catalog numbers and similar data.
- B. The Contractor shall not start work for which submittals are required until a transmittal has been received by the Contractor showing acceptance or acceptance as noted by the Project Manager.
- C. Before making submittals ensure that products will be available in the quantities and at the times required by the contract.
- D. Submit final, corrected, electronic drawings of contract and shop and working drawings showing the Work as actually installed, placed, erected and applied. Refer to Technical Specification Section 01700 - Contract Closeout.

#### 3.2 REVIEW BY THE CITY

- A. One electronic copy of the marked-up shop and working drawing and one electronic copy of the product data will be returned to the Contractor by the Project Manager. Only the transmittal form, appropriately marked, and two samples will be returned on sample submittals. Contractor shall maintain one approved sample onsite for the duration of the project.
- B. Contractor's responsibility for errors and omissions in submittals for compatibility will not be reduced, waived or otherwise limited by the review and acceptance of submittals by the City.

### PART 4 - MEASUREMENT AND PAYMENT

#### 4.1 MEASUREMENT

- A. No separate measurement shall be made for work under this Section.

4.2 PAYMENT

- A. No separate payment will be made for work under this Section. The cost of the work described in this Section shall be included in the Contract price.

END OF SECTION 01340

PART 1 - GENERAL

## 1.1 DESCRIPTION

- A. The Work specified in this Section consists of preparing and submitting the Schedule of Values (“Schedule”) as referenced in the General Conditions. The Schedule will be built upon a breakdown of the Work using specification sections and milestones. The Work also includes the preparing and submitting of updated copies of the Schedule if the Schedule is affected by change orders.
- B. A Schedule of Stored Material is a detailed cost breakdown for permanent materials that will be temporarily stored prior to their being installed and for which the Contractor seeks partial payments. The Schedule of Stored Material will be incorporated as a part of the Schedule of Values.
- C. Within fourteen (14) calendar days of issuance of the Notice to Proceed, the Contractor shall submit the Schedule of Values including the Schedule of Stored Material if applicable. The Schedule of Values and Schedule of Stored Material used to prepare the work/cost breakdown for the Schedule will be used for the Contractor's billings.
- D. Any contract allowances shall be included in the Schedule. Expenditure of allowances shall be done through the use of the Allowance Authorization form. Use of this form does not increase or decrease the contract value.
- E. Reference Contract General Conditions, GC 902, GC 903, GC 906.

## 1.2 RELATED DOCUMENTS

- A. Technical Specifications Section 01300 Submittals
- B. Technical Specifications Section 01340 Shop and Working Drawings, Product Data and Samples
- C. Technical Specifications Section 01999 Standard Forms

## 1.3 SUBMITTAL

- A. The Schedule shall be submitted in a format approved by the Project Manager.
- B. The Schedule shall identify each item of work. Work items in the Schedule shall represent all work and shall be referenced with the Technical Specifications section numbers, specification subparagraph, specification section title and the bid item number used for the Schedule of Prices and Quantities when applicable. The Schedule shall address the subcontractor, fabricator or supplier furnishing the materials and or labor for each work item.
- C. Upon request by the City, the Contractor shall support values given with the data which will substantiate the correctness of the values.
- D. The Schedule will be utilized only as a basis for review of the Contractor's application for



progress payment.

#### 1.4 REVIEW AND RESUBMITTAL

- A. If review by the City indicates that changes to the Schedule are required, the Contractor shall revise and resubmit the Schedule.

### PART 2 - PRODUCTS (NOT USED)

### PART 3 - EXECUTION

#### 3.1 PREPARING SCHEDULE OF VALUES

- A. Breakdown of the items used in the Schedule shall include costs as follows:
  - 1. Delivered cost of product with applicable taxes paid
  - 2. Total installation cost with overhead and profit
  - 3. Breakdown costs of each lump sum item with a list of products and major operations for which the Contractor seeks to receive progress payments to recover his costs for that bid Item
  - 4. Each unit price item as listed in the bid Schedule of Prices and Quantities shall list products and major operations for which the Contractor seeks to receive progress payments for that bid item.

#### 3.2 PREPARING SCHEDULE OF STORED MATERIAL

- A. The Contractor shall submit with the Schedule an indication of whether products will be stored on or off the worksite. The Schedule of Stored Material shall show quantities and types of products that will be stored.
- B. Material allowances consist of only the net cost of the product, the cost of delivery and unloading at the storage site, the cost of applicable sales taxes and all discounts.
- C. In no case will the cost paid for a permanent material be greater than ninety percent (90%) of the contract price for the work in which they are included.

#### 3.3 PAYMENT FOR STORED MATERIALS

- A. Only materials that are described in the specifications and on the drawings will be considered permanent materials. Permanent materials are materials that will be left in the work after the contract is completed.
- B. Nothing in these specifications shall be interpreted as requiring the City to pay for stored materials. The Project Manager shall decide on a case-by-case basis whether stored materials shall be paid for. No payment will be made for stored materials which have not been submitted and accepted.
- C. The Contractor must, at all times, store permanent materials in accordance with manufacturer's recommendations. Any material not properly stored will not be paid for. Amounts will be deducted from payments for any stored permanent material previously paid for and

subsequently found to be improperly stored or not present, based upon a physical inventory of stored permanent material.

- D. Only the neat line quantity of material needed for the finished product may be paid for.
- E. All requests for stored permanent material payment must be accompanied by paid invoices clearly showing the quantity of permanent material, the type of permanent material and discounts or rebates and the net amount paid to the supplier along with a certificate stating that the permanent material is free of any liens or judgments preventing its use by the City.
- F. All permanent material stored off site, for which payment is being requested must be insured and stored in bonded, insured warehouses.
- G. Any permanent material on which payment is requested must be in such a form that it cannot be used on work other than this contract, or stored in a manner acceptable to the Project Manager to ensure that the permanent material cannot be used on work other than this contract.

#### 3.4 ALLOWANCE AUTHORIZATION AND PAYMENT

- A. Contractor shall request written approval for expenditure of any contract allowances PRIOR TO performing the Work involved. List work to be performed and estimated cost in the requesting correspondence.
- B. Original copies of all invoices and receipts must be submitted with the Allowance Authorization as part of the request for payment.
- C. Using the format provided by the City, the Contractor's request for payment of all contract allowances shall be included in the Schedule of Values.

### PART 4 - MEASUREMENT AND PAYMENT

#### 4.1 MEASUREMENT

- A. No separate measurement shall be made for work under this Section.

#### 4.2 PAYMENT

- A. No separate payment will be made for work under this Section. The cost of the work described in this Section shall be included in the Contract price.

END OF SECTION 01370

PART 1 - GENERAL

## 1.1 DESCRIPTION

- A. This Section identifies the Quality Control activities to be performed during all phases of the contract by the Contractor.
- B. The Contractor shall have in place his Quality Control Program as necessary to ensure that all materials and work are completed in compliance with contract documents. The Contractor is solely responsible for Quality Control with the exception of those tests and/or audits that will be conducted by the City as defined in the contract documents.
- C. Test schedules and/or testing requirements for materials used on this project are included in the technical specifications. Laboratory and field testing identified in the technical specifications shall be conducted by an Independent Testing Agency (ITA) retained by the Contractor.

## 1.2 LEVEL OF CONTROL

- A. The intent of this section is to enable the Contractor to establish a necessary level of control that will:
  - 1. Adequately provide for the production of acceptable quality materials
  - 2. Provide sufficient information to ensure both the Contractor and the Project Manager that the specification requirements are being met
  - 3. Allow the Contractor as much latitude as possible to develop his or her own standards of control.

## 1.3 SUBMITTALS

- A. Refer to Technical Specification Section 01300 and Technical Specifications Section 01340, and Technical Specification 01402 Quality Assurance for submittal requirements.
- B. Quality Control Plan: Within ten (10) days after Notice to Proceed, the Contractor shall submit a Quality Control Plan for review and acceptance. Acceptance by the Project Manager does not relieve the Contractor of compliance with the contract requirements. The Contractor Quality Control Plan shall address the following as a minimum:
  - 1. Provide a general description of Quality Control monitoring to be performed until final acceptance by the City. Include monitoring activities of Work and the worksite during times no construction activity is scheduled to take place.
  - 2. The Contractor shall designate an employee as the Quality Control Manager qualified to perform quality control monitoring of the Work. The designated individual shall have the authority to direct work changes required to bring the Work into conformance with contract requirements including stopping non-conforming work in progress.

3. The Quality Control Plan shall address each technical specification division's requirements for quality control. The Contractor shall identify each item requiring submittal and approval/acceptance prior to installation of work. Also, the Contractor shall identify each item of work requiring testing by the independent testing agency.
4. The Quality Control Plan shall address and establish controls and documentation format to ensure that items or materials that have been accepted through receiving inspection are used or installed. Identification and traceability shall be provided throughout all inspections, test activities and records. For stored items, provisions shall be made for the control of item/material identification, consistent with the expected duration and type of storage.
5. Provide methodology of monitoring, testing and exercising of all equipment, valves and/or assemblies to ensure the Work installed is in proper working order.
6. The Contractor shall submit a list of suppliers and subcontractors. This list shall include items to be supplied by each supplier and/or subcontractor and shall identify work to be performed by each subcontractor. The list shall be updated and resubmitted as required.
7. Provide emergency contact information including name, company, title, work phone number, home phone number and other means of contact. The Emergency Contact list shall include at least four individuals. The Emergency Contact list shall be maintained on a daily basis. In the event there is any change in any of the information, the Contractor shall forward the updated list to the Project Manager. The Emergency Contact list shall include the project number, project title and date of issue.

C. Daily Quality Control Report:

1. The Daily Quality Control Report shall be submitted daily in the format detailed in Technical Specifications Section 01999. The report shall address as a minimum the following: identify number of workers on site each day by trade, identify notifications and discussions with/by DIA Quality Assurance Inspectors and other agency inspectors, identify quality of work placed that day and any deviations and/or corrections required to bring the Work into conformance with the contract. Daily reporting may be computerized or typed, but must contain an electronic signature. Legible, hand written reports on the approved form shall be accepted. Scanned copies of daily reports are acceptable.
2. Submit one electronic copy of the Daily Quality Control Report to the Project Manager the day following the work. The report shall be signed by the Contractor's Quality Control Representative and the Contractor's Superintendent.

D. Corrective Action Report (CAR)

1. Conditions adverse to quality will be reviewed by the Contractor to determine the cause and to recommend a corrective action that will preclude recurrence. The condition, its cause and the corrective action planned shall be reported to the Project Manager prior to implementation. Follow-up action shall be taken to verify implementation of the corrective action. The Contractor will document the corrective action and a copy of the Corrective Action Report (CAR) will be transmitted to the Project Manager.

1.4 DOCUMENTATION

- A. The Contractor shall not change or alter approved submittals, procedures, specifications, drawings or other pertinent documentation without the Project Manager's written authorization.
- B. All records and documents that are quality related shall be prepared, identified and maintained by the Contractor and shall be made available to the City upon request. Records shall be protected from damage, deterioration or loss. A copy of the records and documents shall be maintained at the Work site at all times unless the Project Manager has approved other locations in writing. Retention time for all quality records shall be not less than three years from date of Final Acceptance of the contract.
- C. The Contractor shall maintain records at the actual worksite and at Contractor's office to show the inspection status of materials and items installed in order to ensure that the required inspections and tests have been performed in a timely and correct manner.

#### 1.5 INSPECTIONS AND TESTS

- A. Inspections, tests and system shut down requests, conducted by persons or agencies other than the Contractor, shall not in any way relieve the Contractor of his responsibility and obligation to meet all specifications and the referenced standards. The Contractor's designated Quality Control Representative shall inspect the work and shall ensure the work complies with the contract requirements prior to any requests for inspection or testing.
- B. When the specifications, laws, ordinances, rules, regulations or orders of any public agency having jurisdiction require the Project Manager's surveillance of inspections or tests, the Contractor shall notify the Project Manager of the place, date and time forty-eight (48) hours prior to the inspection and/or test. The Contractor shall be responsible for notifying and requesting inspection by other agencies including but not limited to the Denver Building Inspection Division, Denver Fire Department and Denver Water Department. Prior to request for other agency inspections, the Contractor shall meet and plan inspection times with the Project Manager and or the Project Manager's designated representative.
- C. Special inspections or tests may be required by the technical specifications, City, State and/or Federal Agencies in addition to those tests already performed. The Contractor shall notify the Project Manager at least 48 hours in advance of the additional inspections or tests.

#### 1.6 INSPECTION PLAN

- A. The Contractor shall utilize the following six-point inspection plan to ensure the conformance of the Work performed by the Contractor meets the requirements of the contract drawings and specifications, the referenced codes and standards and the approved submittals:
  - 1. Pre-work Coordination: Prior to the start of construction work on the contract and prior to the start of work under each separate specification section and prior to the start of work where a change in a construction operation is contemplated by the Contractor and prior to a new subcontractor starting work, a coordination meeting will be held with the Contractor's superintendent, Quality Control and Safety representative(s), and the ITA representative,. Supervisory, Safety and Quality Control, representatives of all applicable subcontractors will also attend. The Contractor's Quality Control Representative shall chair, prepare and distribute minutes of Quality Control

meetings. Meeting minutes shall be electronically distributed within 24 hours of the meeting.

2. The purpose of the meeting is to ensure that the Contractor's personnel have no misunderstandings regarding their safety and quality procedures as well as the technical requirements of the contract. The following items shall be presented and reviewed by the Contractor:
  - a. Contract requirements and specifications
  - b. Shop drawings, certifications, submittals and as-built drawings
  - c. Testing and inspection program and procedures
  - d. Contractor's Quality Control program
  - e. Familiarity and proficiency of the Contractor's and subcontractor's workforce to perform the operation to required workmanship standards including certifications of installers
  - f. Safety, security and environmental precautions to be observed
  - g. Any other preparatory steps dependent upon the particular operation
  - h. The Contractor's means and methods for performing the Work.
3. Initial Inspection: Upon completion of a representative sample of a given feature of the Work and no later than two weeks after the start of a new or changed operation, the Project Manager and/or the Project Manager's designated representatives will meet with the Contractor's Quality Control representative and applicable subcontractor's supervisor and their Quality Control representatives to check the following items, as a minimum:
  - a. Workmanship to established quality standards
  - b. Conformance to contract drawings, specifications and the accepted shop drawings
  - c. Adequacy of materials and articles utilized
  - d. Results of inspection and testing methods
  - e. Adequacy of as-built drawings maintained daily.
4. Once accepted, the representative sample will become the physical baseline by which ongoing work is compared for quality and acceptability. To the maximum practical extent, approved representative samples of work elements shall remain visible until all work in the appropriate category is complete. Acceptance of a sample does not waive or alter any contract requirements or show acceptance of any deviation from the contract not approved in writing by the Project Manager.
5. Follow-up Inspection: The Contractor's Quality Control representative will monitor the work to review the continuing conformance of the work to the workmanship standards established during the preparatory and initial inspections.
6. Completion Inspection: Forty-eight (48) hours prior to the completion of an item or segment of work and prior to covering up any work, the Contractor will notify the Project Manager who will verify that the segment of work is substantially complete, all inspections and tests have been completed and the results are acceptable. The purpose of this inspection is to allow further corrective work upon, or integral to, the completed segment of work. **THIS IS NOT AN ACCEPTANCE INSPECTION.** If any items are determined to be deficient, need correction or are non-conforming, a Deficiency List will be prepared and issued to the respective Contractor for correction, repair or replacement of any deficient or non-conforming items. The Project Manager

and Contractor's Quality Control representative will verify the correction of the deficient and/or non-conforming items prior to the start of the next operation.

7. Pre-Final Acceptance Inspection: Prior to requesting a Pre-Final Acceptance Inspection by the City, all work and operational systems to be inspected shall be satisfactorily completed and tested by the Contractor. The Contractor's written request for this inspection shall be made seventy-two (72) hours in advance. With the request shall come a list of any known deficiencies and when they will be corrected. If the list is too large or contains too many significant items, in the opinion of the Project Manager, no inspection will be held because of the incompleteness of the work.
8. The Project Manager will schedule the Pre-Final Acceptance Inspection and will prepare a list of deficient items (punch list) discovered during the inspection. If during the inspection the list becomes too large or too many significant items are on the list, the inspection will be canceled. After the inspection is completed, the Deficiency List will be transmitted to the Contractor for correction of the deficient items.
9. Final Acceptance Inspection: After the Contractor has completed all items on the Deficiency List (generated from the Pre-Final Acceptance Inspection) he shall request a Final Acceptance Inspection. The request shall be made in writing at least 72 hours in advance of the inspection. All areas must be cleaned and ready for turnover prior to this inspection. The Project Manager, the design consultant, a representative of the funding agency (if applicable) and other interested parties will inspect the subject Work to ensure that all deficiencies have been satisfactorily attended to and that no new deficiencies have appeared and that all systems are completely functional. Any outstanding or additional deficient items will be noted and handled per the requirements of the Pre-Final Acceptance Inspection noted above until the Work is acceptable to the Project Manager.

#### 1.7 SAMPLES

- A. The Contractor shall maintain at the worksite a copy of all samples submitted and accepted by the City. Samples shall be made available to the designer or the Project Manager's designated representatives for review and comparison in the field. The Project Manager prior to use on the project must accept all items and materials.
- B. The installed work will be compared to the samples and if any of the work is not of the same quality, material, finish, color, texture or appearance as the sample, that portion that is not the same will be considered defective and in nonconformance.
- C. Contractor selection of samples will only be considered if taken at random. The Contractor shall permit representatives of the City to witness the selection of samples. Inspection or tests of items or materials that fail shall be sufficient cause to terminate further inspections/tests of the same brand, make or source of that product.
- D. The Contractor is obligated to correct any item deemed deficient.

#### PART 2 - PRODUCTS (NOT USED)

#### PART 3 - EXECUTION

### 3.1 REQUIREMENTS

- A. All materials required for the contract shall be new except where specified otherwise. The Project Manager may elect to perform additional inspections and/or tests at the place of the manufacture, the shipping point or at the destination to verify conformance to applicable specifications. Inspections and tests performed by the City shall not relieve the Contractor from the responsibility to meet the specifications, nor shall such inspections/tests be considered a guarantee for acceptance of materials that will be delivered at a later time.
- B. The Contractor is obligated to correct or remove non-conforming materials, whether in place or not. If necessary, the Project Manager will send written notification to the Contractor to correct or remove the defective materials from the project. If the Contractor fails to respond, the Project Manager may order correction, removal and/or replacement of defective materials by others, in which case the Contractor shall bear all costs incurred by such actions.
- C. Materials accepted on the basis of a Certificate of Compliance may be sampled and inspected/tested by the City Project Manager or it's Designer at any time. The fact that the materials were accepted on the basis of such certification shall not relieve the Contractor of his responsibility to use materials that conform to the specifications.
- D. The Contractor shall impose upon his suppliers the same quality control requirements, including inspection and test procedures, as imposed upon him by the specifications and referenced standards. The Contractor shall apply appropriate controls, designed to ensure that all materials supplied meet the requirements and specifications.

## PART 4 - MEASUREMENT AND PAYMENT

### 4.1 MEASUREMENT

- A. No separate measurement shall be made for work under this Section.

### 4.2 PAYMENT

- A. No separate payment will be made for work under this Section. The cost of the work described in this Section shall be included in the Contract price. If the City is required to re-inspect work or conduct a special test because a previous inspection, requested by the Contractor, showed that the work was defective or not in conformance, the Manager or authorized representative may deduct from the contract value the cost of re-inspection at the rate of \$75.00 per man-hour.

END OF SECTION 01400



PART 1 - GENERAL

## 1.1 DESCRIPTION

- A. This Section identifies inspection activities to be performed by inspectors employed by the City and working under the direction of the City Project Manager.
- B. Inspection and tests, conducted by persons or agencies other than the Contractor, shall not in any way relieve the Contractor of his responsibility and obligation to meet all specifications and the referenced standards.
- C. The inspection and approval of work by other agencies above does not constitute inspection or acceptance of work required by the City. Technical specifications may contain requirements more stringent than Building Inspection Division or other code agency requirements.
- D. Reference Contract General Conditions, GC 1701, GC 1702, GC 1703, GC 1704, GC 1705, GC 1706

## 1.2 RELATED DOCUMENTS

- A. Technical Specifications Section 01400 – Contractor Quality Control
- B. Technical Specifications Section 01300 – Submittals
- C. Technical Specifications Section 01340 – Shop and Working Drawings, Product Data and Samples

PART 2 - PRODUCTS (NOT USED)PART 3 - EXECUTION

## 3.1 CONTRACTOR'S QUALITY CONTROL SYSTEM

- A. The Contractor is responsible for quality control of the Construction. All acquisition of materials, sequence of construction (except as otherwise indicated), and means and methods of construction shall be the responsibility of the Contractor. Establish system to perform sufficient inspection and tests of all items of work, including that of subcontractors, to ensure conformance to Contract Documents for materials, workmanship, construction, finish, functional performance and identification.
  - 1. Control System: Establish for all construction except where Contract Documents provide for specific compliance tests by testing laboratories and engineers employed by the City.
  - 2. Control System: Specifically include all testing required by various sections of Specifications.

3. Quality Control System: Means by which Contractor assures himself that construction complies with requirements of Contract Documents.
  - a. Controls: Adequate to cover all construction operations and keyed to proposed construction schedule.
- B. The Contractor shall be responsible for assuring compliance with the quality standards as indicated in the Contract Documents. In addition, the Contractor shall be responsible for:
  1. Review of submittals prior to their being forwarded to the Designer and the City Project Manager for review. The Contractor shall mark submittals with comments and shall indicate the date and party conducting the Contractor's review of each submittal.
  2. Final inspection of the project prior to calling for the Designer and City to conduct a final inspection. The Contractor shall provide his inspection comments to the Designer and City prior to the scheduled final inspection.
  3. Verification of completion of punch-list items prior to calling for verification inspection by the Designer and the City.
- C. Records: Maintain correct records on appropriate form for all inspections and tests performed, instructions received from the Designer and actions taken as result of those instructions.
  1. Records: Include evidence that required inspections or tests have been performed (including type and number of inspections or tests, nature of defects, causes for rejection, etc.) proposed or directed remedial action, and corrective action taken.
  2. Document inspections and tests as required by each section of Specifications.
- D. The Contractor is responsible for complying with the requirements of the Contract Documents. Testing performed by the City's Agents shall not be relied upon by the Contractor as sufficient to assure compliance with the Contract Documents. The Contractor shall procure and pay for testing necessary to assure that the construction is in compliance with the Contract Documents.
- E. Quality Control Plan: Submit with proposed Schedule of Values and Construction Progress Schedule. Plan shall include:
  1. Personnel, procedures, instructions, and records to be used.
  2. List of control tests which Contractor understands he and his subcontractors are to perform.
  3. Procedures for reviewing and approving shop drawings, product data, samples and other submittals before submission to the Designer and City Project Manager. Include procedures for obtaining field measurements.
  4. Method of documenting quality control operation, inspection and testing including samples of proposed forms.

### 3.2 STANDARDS

- A. Generally accepted Construction Industry standards for materials, products, quality, and workmanship shall supplement the Specifications.
  1. Where industry standards are less than the Specifications and Drawings require, the

Contract Documents shall govern.

2. The Contractor shall provide materials and products which conform to industry standards of quality.
- B. Construction tasks shall be performed by craftsmen skilled and experienced in the trades required. Work shall be subject to review by the City and the Designer.
- C. Work and/or materials which fail to meet accepted industry standards of performance, quality, and/or appearance will be rejected and shall be brought into compliance or replaced by the Contractor at no additional cost to the City.

### 3.3 MATERIAL AND WORKMANSHIP

- A. Unless otherwise specified, or indicated on the Drawings, material shall be new, of best quality, and without flaws, and delivered upon completion in an undamaged condition.
- B. Workmanship shall be the best of its respective kind. Labor shall be performed in a thorough workmanlike manner by qualified, efficient, and skilled mechanics, acceptable to the City, Designer and other trades involved on the job requiring acceptable substrate for the performance of their work.

### 3.4 TESTING – GENERAL

- A. Testing Laboratory and/or Engineering services are required for quality control in portions of the work identified in other sections of these specifications.
- B. Tests required by these Specifications shall be performed in strict accordance with referenced testing methods, procedures, and conditions. Pertinent data shall be included in clear, comprehensive written forms according to the Designer's or Engineer's requirements.
- C. Contractor: Provide equipment and facilities as required for testing at no additional cost, subject to City's review, for conducting field tests and for collecting and forwarding samples.
  1. Do not use materials or equipment represented by samples until tests, if required, have been made and materials or equipment found to be acceptable.
  2. Do not incorporate any product into work which becomes unfit for use after acceptance thereof.
- D. Testing: Materials or equipment proposed to be used may be tested at any time during their preparation or use. Furnish required samples without charge and give sufficient notice of placing of orders to permit testing. Products may be sampled either prior to shipment or after being received at site of work.
- E. Tests: Made by accredited testing laboratory selected by City. Except as otherwise provided, sampling and testing of materials and laboratory methods and testing equipment shall be in accordance with latest standards and tentative methods of ASTM.
  1. Specific information concerning testing methods, sample sizes, etc., is included under applicable sections of Specifications.
  2. Any modification of, or elaboration on, these test procedures included for specific ma-

materials under their respective sections in Specifications shall take precedence over these procedures.

### 3.5 COST OF TESTING

- A. Unless indicated otherwise, City's testing shall be performed by the City's authorized agents, at the City's expense.
- B. Costs for re-testing of non-complying work shall be borne by the Contractor.
- C. According to the judgment of the City and/or Designer, ANY portion of the work in this contract may be tested at any time for any reason. Costs for such testing shall be borne by the Contractor only if such tests indicate that work does not meet Contract Document requirements.

### 3.6 OTHER TESTING

- A. Following Testing: Performed at expense of Contractor:
  - 1. Any additional tests required because of any tests that fail subject to following conditions:
    - a. Quantity and Nature of Tests: Determined by the Designer.
    - b. Tests: Taken in presence of the City and/or the Designer.
    - c. Proof of Noncompliance: Contractor liable for corrective action which the City and/or the Designer feels is required including complete removal and replacement of defective material.
  - 2. Material Substitution: Any tests of material or equipment offered as substitute for specified item on which test may be required in order to prove its compliance with Specifications.
- B. Contractor: May have tests performed on material and equipment for his own information and job control so long as the City does not assume responsibility for costs or for giving them consideration when appraising quality of materials.

### 3.7 EQUIPMENT TESTING

- A. Equipment testing shall be as determined appropriate by the City to assure proper performance according to the manufacturer's specifications for each equipment item.
- B. After all utility connections to equipment are completed, the Contractor shall conduct final tests of equipment in presence of the City and the Designer.
- C. Unless waived in writing by the City, the requirements of this section shall apply to all installed equipment items having utility connections.

### 3.8 NOTIFICATION

- A. The Contractor shall be responsible for notifying the City and Designer at least three (3) working days prior to commencing work which is identified as requiring testing.
- B. The Contractor shall be responsible for scheduling and coordinating all required testing

with the City and the City's Independent Testing Agency.

### 3.9 TEST REPORTS

- A. Test reports, whether performed for the City or the Contractor, shall be submitted to the City and Contractor as soon as results are available. Reports shall be clear, concise, comprehensive written forms containing required test results.
- B. Reports of tests made by testing laboratories shall be distributed by testing laboratory as follows: 1 Copy – City Project Manager, 1 Copy – Contractor, 1 Copy - Applicable Supplier or Subcontractor; 1 Copy – Designer and Applicable Engineer;

### 3.10 MANUFACTURING AND FABRICATION INSPECTIONS

- A. The Project Manager may elect to perform additional inspections and/or tests at the place of the manufacture, the shipping point or at the destination to verify conformance to applicable specifications. Inspections and tests performed by the City shall not relieve the Contractor from the responsibility to meet the specifications, nor shall such inspections/tests be considered to be a guarantee for acceptance of materials that will be delivered at a later time.
- B. The Project Manager or his authorized representative may inspect at its source any material or assembly to be used in the Work. Manufacturing plants may be inspected from time to time for the purpose of determining compliance with specified manufacturing methods or materials to be used in the Work and to obtain samples for testing and further inspection.
- C. Should the Project Manager conduct plant inspections the following conditions shall exist:
  - 1. The Project Manager shall have the cooperation and assistance of the Contractor and the producer with whom the Contractor has contracted for materials.
  - 2. The Project Manager shall have full access during scheduled production or warehousing working hours to parts of the plant that are concerned with the manufacture, production, storage or shipping of materials being furnished.
  - 3. The Contractor shall arrange for adequate office or working space that can reasonably be needed for conducting a plant inspection. Office or working space shall be conveniently located with respect to the plant and/or warehouse as required by the Project Manager.
- D. It is understood and agreed that the City shall have the right to re-test at the City's expense any materials that have been tested and accepted at the source of supply after it has been delivered to the site.

## PART 4 - MEASUREMENT AND PAYMENT

### 4.1 MEASUREMENT

- A. No separate measurement shall be made for work under this Section.

### 4.2 PAYMENT

- A. No separate payment will be made for work under this Section. The cost of the work described in this Section shall be included in the Contract price.

END OF SECTION 01402

PART 1 - GENERAL

## 1.1 DESCRIPTION

- A. The Work specified in this Section consists of furnishing, installing, operating, maintaining and removing temporary construction barriers, enclosures and field facilities including the Contractor's construction offices, staging areas, yards, storage areas, electrical power, telephone, water, fire protection and sanitary service.
- B. Construction Office, Yards and Storage Areas
1. Temporary facilities which the Contractor desires to locate in staging areas adjacent to the Work or within the project limits are subject to approval by the Project Manager.
  2. Contractor Field Office
    - a. The Contractor shall provide a field office for this Project.
    - b. The Contractor shall acquire all necessary permits for installation and construction work related to the Contractor's field office and fencing.
    - c. The Contractor shall provide, as part of his on-site field office, a conference room for weekly meetings. The conference room shall have one available telephone.
    - d. Jack the mobile office unit off its wheels and provide support.
    - e. Install tie downs in compliance with code.
    - f. Provide access to the field office and easily accessible space for parking six full size passenger automobiles at a minimum. Grade the field office site, access roadway and parking area for drainage, and surface with gravel paving or crushed stone.
    - g. Water and sewer lines to the field office, if installed, shall be installed so they will not freeze.
- C. Electrical Service
1. Reference Contract General Conditions, GC 327.
  2. Provide lighting and power for field offices, storage facilities and other construction facilities and areas.
  3. Provide power centers for electrically operated and controlled construction facilities including tools, equipment, testing equipment, interior construction lighting, heating, cooling and ventilation equipment.
  4. Provide night security lighting at secured areas within construction limits at offices, storage facilities, temporary facilities and excavated areas.
  5. Provide battery operated or equivalent emergency lighting facilities at construction areas where normal light failures would cause employees to be subjected to hazardous conditions. Test such facilities monthly and maintain a record of these tests for the Project Manager's review.

6. Bear all costs of temporary electric and water service permits, fees and deposits required by the governing authorities, and connection charges and temporary easements including installation, maintenance and removal of equipment.
- D. Telephone Service
1. The Contractor shall furnish, install and maintain at least two telephones in his main field office. These phones shall be manned at all times by the Contractor's personnel or by an answering machine.
- E. Internet Service
1. The Contractor shall furnish, install and maintain at least one computer with email in his main field office. This computer should be able to access all email and FTP as part of project submittal process.
- F. Water Service
1. The Contractor shall make all connections and extensions required and shall make use of water in direct support of the Work. The Contractor shall install an approved Water Department tap at the City's water source prior to obtaining any water. The Contractor shall arrange and pay for its supply/distribution system from the City's point of connection. The location and alignment of the Contractor's temporary supply/distribution system must be approved by the Project Manager prior to its installation. The Contractor shall leave in place all above ground and underground water distribution facilities unless otherwise directed by the Project Manager.
  2. The Contractor shall not use in place fire hydrants or standpipes as sources for construction water or potable water.
- G. Fire Protection
1. Furnish, install and maintain temporary portable fire protection equipment throughout the construction period at all buildings (including the project site), maintenance shops, and fuel storage on all large construction equipment and at the location of any flammable materials or construction materials.
- H. Sanitary Service
1. Furnish, install and maintain temporary sanitary facilities and services throughout the construction period.
  2. Ensure that separate or single user toilets shall be provided to ensure privacy between the sexes.
  3. Provide general washing facilities adequate for the number of employees.
  4. Provide special washing facilities adequate for the number of employees engaged in the application of paints, coating and other volatile or hazardous materials.

## 1.2 QUALITY CONTROL

- A. Provide products for, and the execution of, the Work of this Section that will satisfy the requirements of the NEC, OSHA and local codes. Provide products that satisfy requirements of NEMA and are UL listed.



### 1.3 SUBMITTALS

- A. Refer to Technical Specifications Sections 01300 and 01340 for submittal procedures.
- B. Submit a shop drawing within five days of the Notice to Proceed that shows the following:
  - 1. Temporary facilities equipment and materials (include manufacturer's literature)
  - 2. Details and layout of temporary installations including fences, roads, parking, buildings, storage areas and drainage plans.
  - 3. Lighting plan showing temporary lighting facilities, electrical service panel location, electrical circuit diagram and anticipated light level on the working roadway, pathway or construction surface.

## PART 2 - PRODUCTS

### 2.1 ELECTRICAL SERVICE

- A. Provide temporary power and lighting equipment consisting of fixtures, transformers, panel boards, groundings, lamps, switches, poles, conduits and wiring sized and capable of continuous service and having adequate capacity to ensure a complete operating system. Comply with NEMA.
- B. Provide temporary extension cords to supply tools not longer than 200 feet, except that additional length may be used if equipment will be grounded within 200 feet of tool or power.
- C. Portable power generators shall be grounded.

### 2.2 DRINKING WATER SERVICE

- A. Provide sanitary materials and equipment that satisfies the requirements of codes and regulations pertaining to temporary water systems. Bottled products may be used if those products comply with codes. Clearly label portable containers having a dispensing tap and used only for drinking water. Provide single service disposable cups and a sanitary container for dispensing cups. A trash receptacle shall be provided and maintained beside each portable water supply.

### 2.3 FIRE PROTECTION

- A. Fire extinguishers shall be UL rated and shall comply with the current City fire code.

### 2.4 SANITARY SERVICE

- A. Provide materials and equipment adequate for the intended purposes, which will neither create unsanitary conditions nor violate the codes applicable to temporary sanitary facilities. Enclosures for toilet and washing facilities shall be weatherproof, sight proof, ventilated and sturdy.
- B. Provide portable type toilet facilities that satisfy the requirements of OSHA.
- C. Provide washing facilities as needed. Furnish soap, single-service paper towels, towel dis-

penser and towel receptacle. If paints, coatings and other volatile or hazardous materials injurious to humans will be applied as part of the contract, provide washing facilities with warm water of approximately 120 degrees F.

### PART 3 - EXECUTION

#### 3.1 ELECTRICAL SERVICE

- A. The approximate location of primary power lines is shown on the Construction Drawings. The Contractor shall locate electrical service where it will not interfere with equipment, storage spaces, traffic, and prosecution of the Work or the work of others. Installation shall present a neat and orderly appearance and shall be structurally sound. Maintain service in a manner that will ensure continuous electrical service and safe working conditions.

#### 3.2 TELEPHONE SERVICE

- A. Install temporary telephone service in a neat and orderly manner and make structurally and electrically sound to ensure continuous service. Modify, relocate and extend as work progress requires. Place conduit and cable where those products will not interfere with traffic, work areas, materials, handling equipment, storage areas and the work of other contractors. Service lines may be aerial.

#### 3.3 WATER SERVICE

- A. Install the systems in a neat and orderly manner. Make them structurally and mechanically sound. Provide continuous service. Modify, relocate and extend the systems as the work progresses.
- B. Locate systems where they will be convenient to work stations, sanitary facilities and first aid station but will not interfere with traffic, work areas, materials handling equipment, storage areas or the work of other contractors.
- C. Install vacuum breakers, backflow preventers and similar devices in a manner and location which will prevent temporary water from returning to the water mains.
- D. Do not incorporate any part of temporary water distribution system into the permanent water distribution system.

#### 3.4 FIRE PROTECTION

- A. Install products in conformance with the requirements of the applicable Denver Fire Department and OSHA regulations.
  - 1. Provide functional fire extinguishers that are clearly identified for fire and an accessible supply of water during the period of construction. These fire extinguishers shall remain in place until permanent fire protection systems are functional.
  - 2. Furnish not less than one 20-pound fire extinguisher, type 2A-20ABC within ten feet of cutting and welding operations.
  - 3. Provide 20-pound fire extinguishers, type 2A-20ABC no further then 100 feet apart in

buildings.

4. Provide not less than one 20-pound fire extinguisher, type 2A-20ABC on any equipment of 75 horsepower or more.
- B. Instruct construction personnel as to location and use of temporary fire protection equipment.
- C. Fire extinguishers shall be located for easy access. Their location shall be clearly marked so that they can be seen at least 75 feet away.

### 3.5 SANITARY SERVICE

- A. Place temporary sanitary (and washing) facilities in a neat and orderly manner within the limits of the work and convenient to the work stations. Make these facilities structurally and mechanically sound. Modify, relocate and extend the facilities as required by progress of the work.
- B. Service toilets at those time intervals which will minimize the accumulation of wastes and prevent creation of unsanitary conditions, but not less than once a week.
- C. The waste from the sanitary and wash facilities shall be disposed of in accordance with all applicable rules, regulations and laws and with the least environmental impact.

### 3.6 FENCING

- A. Contact all utility service companies prior to planning fence location and post locations for certification of current utilities. Locate pothole posts planned within 5 feet of known utilities. Submit fencing plan and typical details to Project Manager at least seven days before planned execution for review and acceptance.

### 3.7 SIGNAGE

- A. Contractor shall not provide any signage for temporary facilities without prior approval from the Project Manager.

### 3.8 REMOVAL

- A. The Contractor shall locate all temporary facilities including the underground utilities so they can be completely removed without damaging permanent work or the worksite of other contractors.
- B. The Contractor shall remove all temporary facilities, including all underground utilities, and restore the site to the condition in which the City initially provided it to the Contractor.

## PART 4 - MEASUREMENT AND PAYMENT

### 4.1 MEASUREMENT

- A. No separate measurement shall be made for work under this Section.

4.2 PAYMENT

- A. No separate payment will be made for work under this Section. The cost of the work described in this Section shall be included in the Contract price.

END OF SECTION 01500

PART 1: GENERAL

- 1.1 RELATED DOCUMENTS: Please refer to Wastewater Management Divisions Revised Section 208 Erosion Control Specifications:

<http://www.denvergov.org/Portals/496/documents/SECTION%20208%20-%20070111.doc>

The General Contract Conditions, Drawings, and other Division - 1 Specification sections apply to Work of this section.

PART 2: PRODUCTS:

- 2.1 Please refer to Wastewater Management Divisions Revised Section 208 Erosion Control Specifications

PART 3: EXECUTION

- 3.1 Please refer to Wastewater Management Divisions Revised Section 208 Erosion Control Specifications the project area.

END OF SECTION 01565

PART 1: GENERAL

- 1.1 RELATED DOCUMENTS: The General Contract Conditions, Drawings and other Division-1 Specification sections apply to Work of this section.
- 1.2 SUMMARY: This section includes administrative and procedural requirements governing the Contractor's selection of products for use in the project.
- 1.3 DEFINITIONS: Definitions used in this Article are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties," "systems," "structure," "finishes," "accessories," and similar terms. Such terms are self-explanatory and have well-recognized meanings in the construction industry.
- A. Products: Are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "Product" includes the terms "material", "equipment", "system" and terms of similar intent.
  - B. Named Products: Are items identified by manufacturer's product name, including make or model designation, indicated in the manufacturer's published product literature, that is current as of the date of the Contract Documents.
  - C. Materials: Are products that are substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
  - D. Equipment: Is a product with operational parts, whether motorized or manually operated, that requires service connections such as wiring or piping.
- 1.4 SUBMITTALS:
- A. Product List: A list of products is included in each appropriate specification division. Prepare a schedule in tabular form showing each product listed. Include the manufacturer's name and proprietary product names for each item listed.
    - 1. Coordinate product list with the Contractor's Construction Schedule and the Schedule of Submittals.
    - 2. Form: Prepare product list with information on each item tabulated under the following column headings:
      - a. Related Specification Section number.
      - b. Generic name used in Contract Documents.
      - c. Proprietary name, model number, and similar designations.
      - d. Manufacturer's name and address.
      - e. Supplier's name and address.
      - f. Installer's name and address.
      - g. Projected delivery date or time span of delivery period.
    - 3. Initial Submittal: Within 30 days after date of commencement of the Work, submit 3 copies of an initial product list. Provide a written explanation for omissions of data and for known variations from Contract requirements.

4. Completed List: Within 60 days after date of commencement of the Work, submit 3 copies of the completed product list. Provide a written explanation for omissions of data and for known variation from Contract requirements.
5. Action: The Project Manager will respond in writing to Contractor within 2 weeks or receipt of the completed product list. No response within this period constitutes no objection to listed manufacturers or products, but does not constitute a waiver of the requirement that products comply with Contract Documents. The Project Manager's response will include a list of unacceptable product selections, containing a brief explanation of reasons for this action.

#### 1.5 QUALITY ASSURANCE:

##### A. Source Limitations:

1. To the fullest extent possible, provide products of the same kind from a single source.
2. Substitutions to the specified products will only be allowed in accordance with General Condition 406.

##### B. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on surfaces of products that will be exposed to view in occupied spaces or on the exterior.

1. Labels: Locate required product labels and stamps on concealed surfaces or, where required for observation after installation, on accessible surfaces that are not conspicuous.
2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface that is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:
  - a. Name of product and manufacturer.
  - b. Model and serial number.
  - c. Capacity.
  - d. Speed.
  - e. Ratings.

#### 1.6 PRODUCT DELIVERY, STORAGE AND HANDLING:

##### A. Deliver, store, and handle products according to the manufacturer's recommendations, using means and methods that will prevent damage, deterioration and loss, including theft.

1. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to assure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to the site in an undamaged condition in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting and installing.

4. Inspect products upon delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
5. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.
6. Store products subject to damage by the elements above ground, under cover in a weathertight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

#### 1.7 GENERAL PRODUCT REQUIREMENTS:

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, new at the time of installation.
  1. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for a complete installation and the intended use and effect.
  2. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.
- B. It is the responsibility of the Contractor and his Installers, as experts, to notify the Project Manager of any specified product that to his knowledge will not meet the requirements or is unsuited to the application indicated or specified.
- C. The use of manufacturer's and trade names is intended only to establish standards of quality and performance and not to limit competition.
- D. Substitution of Materials and Equipment: All bids are to be based on those materials and equipment specified in the Contract Documents. Substitutions after the bid will be made in accordance with the provisions of Title 406 of the General Contract Conditions.

### PART 2: PRODUCTS

- 2.1 PRODUCT SELECTION PROCEDURES: The Contract Documents and governing regulations govern product selection. Procedure governing product selection include the following:
  - A. Proprietary Specification Requirements: Where Specifications name only a single product or manufacturer, provide the product indicated. No substitutions will be permitted.
  - B. Semiproprietary Specification Requirements:
    1. Where Specifications name two or more products or manufacturers, provide 1 of the products indicated. No substitutions will be permitted.
    2. Where Specifications specify products or manufacturers by name, accompanied by the term "or equal" or "or approved equal," comply with the Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.



- C. Nonproprietary Specifications: When Specifications list products or manufacturers that are available and may be incorporated in the work, but do not restrict the Contractor to use of these products only, the Contractor may propose any available product that complies with Contract requirements. Comply with Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.
- D. Descriptive Specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.
- E. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements and are recommended by the manufacturer for the application indicated. Manufacturer's recommendations may be contained in published product literature or by the manufacturer's certification of performance.
- F. Compliance with Standards, Codes and Regulations: Where Specifications only require compliance with an imposed code, standard, or regulation, select a product that complies with the standards, codes, or regulations specified.
- G. Visual Matching:
  - 1. Where Specifications require matching an established Sample, the Project Manager's decision will be final on whether a proposed product matches satisfactorily.
  - 2. Where no product available within the specified category matches satisfactorily and complies with other specified requirements, comply with provisions of the Contract Documents concerning "substitutions" for selection of a matching product in another product category.
- H. Visual Selection: Where specified product requirements include the phrase "...as selected from manufacturer's standard colors, patterns, textures..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Project Manager will select the color, pattern, and texture from the product line selected.

### PART 3: EXECUTION

- 3.1 INSTALLATION OF PRODUCTS: Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other work. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

END OF SECTION 01600

PART 1 - GENERAL

1.1 DESCRIPTION

- A. The Work specified in this Section consists of providing storage and protection of the materials, products and supplies which are to be incorporated into the construction and indicating such storage areas on the working drawings with the location and dates when such areas will be available for each purpose.
- B. Reference Contract General Conditions, GC 803

1.2 SUBMITTALS

- A. Refer to Technical Specifications Sections 01300 and 01340 for submittal procedures. Submit concurrently with submittals required in Section 01050.
- B. Submit working drawings showing locations of storage areas not indicated on the Contract Drawings.
- C. Submit descriptions of proposed methods and locations for storing and protecting products.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Materials required for the storage and protection of the items specified shall be durable, weatherproof and either factory finished or painted to present an appearance acceptable to the City. Storage facilities shall be uniform in appearance with similar materials used to the maximum extent possible.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS OF EXECUTION

- A. Palletize materials, products and supplies which are to be incorporated into the construction and stored off the ground. Store these items in a manner which will prevent damage and which will facilitate inspection. Leave seals, tags and labels intact and legible. Maintain access to products to allow inspection. Protect products that would be affected by adverse environmental conditions.
- B. Periodically inspect stored products to ensure that products are being stored as stipulated and that they are free from damage and deterioration.
- C. Do not remove items from storage until they are to be incorporated into the Work.

- D. The Contractor shall ensure that all protective wrappings and coverings are secure and ballasted to prevent any items from deterioration and/or subsequent dislodgment. All items on the worksite that are subject to becoming windborne shall be ballasted or anchored.

### 3.2 HANDLING AND TRANSPORTATION

#### A. Handling

1. Avoid bending, scraping or overstressing products. Protect projecting parts by blocking with wood, by providing bracing or by other approved methods.
2. Protect products from soiling and moisture by wrapping or by other approved means.
3. Package small parts in containers such as boxes, crates or barrels to avoid dispersal and loss. Firmly secure an itemized list and description of contents to each container

#### B. Transportation

1. Conduct the loading, transporting, unloading and storage of products so that they are kept clean and free from damage.

### 3.3 STORAGE

- A. Store items in a manner that shall prevent damage to the owner's property. Do not store hydraulic fluids, gasoline, liquid petroleum, gases, explosives, diesel fuel and other flammables in excavations, except one day's supply of diesel fuel may be stored in open excavations.
- B. Provide sheltered weather-tight or heated weather-tight storage as required for products subject to weather damage.
- C. Provide blocking, platforms or skids for products subject to damage by contact with the ground.
- D. All material shall be stored according to the manufacturer's recommendations. Any material that has to be stored within specified temperature or humidity ranges shall have a twenty-four (24) hour continuously written recording made of the applicable condition. Should the recording show that the material was not stored within the recommended ranges the material shall be considered defective and in nonconformance. If a certification from the manufacturer's engineering design representative is provided stating that the actual variations are acceptable and will in no way harm the material or affect warranties, then the deficiency will be considered corrected.
- E. Store hazardous material separately, with all material marked with a label showing the hazard and how to treat exposure to the material.

### 3.4 LABELS

- A. Storage cabinets and sheds that will contain flammable substances and explosive substances shall be labeled **FLAMMABLE--KEEP FIRE AWAY** and **NO SMOKING** with conspicuous lettering and conforming to OSHA requirements.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. No separate measurement shall be made for work under this Section.

4.2 PAYMENT

A. The cost of the Work described in this Section shall be included in the Contract price. See Technical Specifications Section 01370 for additional requirements for the possible payment of stored material.

END OF SECTION 01620

PART 1 - GENERAL

## 1.1 DESCRIPTION

- A. The Work specified in this Section consists of submitting for the approval of a different material, equipment or process then is described in the Contract Documents.
- B. If the substitution changes the scope of work, contract cost or contract time, a change order is required. As-built drawings and specifications must include all substitutions even if a change order is not issued.
- C. Reference Contract General Conditions, GC 406.

## 1.2 QUALITY CONTROL

- A. The substitution must provide the same quality as what it is replacing. The level of quality is defined by:
  - 1. Maintenance and operating cost
  - 2. Reliability
  - 3. Durability
  - 4. Life expectancy
  - 5. Ease of cleaning
  - 6. Ability to be upgraded as needed
  - 7. Ease of interacting with other systems or components
  - 8. Ability to be repaired
  - 9. Availability of replacement parts
  - 10. Established history of use in similar environments
  - 11. Performance equal or superior to that which it is replacing.

## 1.3 SUBMITTAL

- A. Refer to Technical Specifications Sections 01300 and 01340 for submittal procedures.
- B. A complete Request for Substitution using the form in Section 01999 must be made at least sixty (60) days prior to when an order needs to be placed or a method needs to be changed.
- C. The submittal shall contain, as appropriate, detailed product data sheets for the specified items and the substitution. Samples and shop drawings shall also be submitted of the substitution as applicable. The submittal shall contain all the data required to be submitted for acceptance of the originally specified item or process.
- D. The submittal shall contain all the applicable information required in Technical Specifica-

tions Section 01630, paragraph 2.01 below.

- E. A signed statement as outlined in Technical Specifications Section 01630, paragraph 2.03.B below must accompany the Request for Substitution.

## PART 2 - EXECUTION

### 2.1 INFORMATION

- A. Provide the following information as applicable with the Request for Substitution on the item or process that is being requested to be substituted:
  - 1. A complete description of the item or process
  - 2. Utility connections including electrical, plumbing, HVAC, fire protection and controls
  - 3. The physical dimensions and clearances
  - 4. A parts list with prices
  - 5. Samples of color and texture
  - 6. Detailed cost comparisons of the substitution and the contract specified item or process
  - 7. Manufacturer warranties
  - 8. Energy consumption over a one-year period
  - 9. What local organization is certified to maintain the item
  - 10. Performance characteristics and production rates
  - 11. A list of any license fees or royalties that must be paid
  - 12. A list of all variations for the item or method specified
  - 13. A list of at least three other projects of similar nature to this contract where the products or methods have been in use for at least one year including telephone number and name of the person to contact at these other projects
  - 14. An analysis of the effect of the substitution on the schedule and contract cost and on the overall project as it relates to adjoining work.

### 2.2 SUBSTITUTION REQUEST

- A. The formal Request for Substitution will be evaluated by the Project Manager and the Designer of Record based on the following criteria:
  - 1. Compatibility with the rest of the project
  - 2. Reliability, ease of use and maintenance
  - 3. Both initial and long term cost
  - 4. Schedule impact
  - 5. The willingness of the Contractor to share equally in any cost savings
  - 6. The ability of the item or process to meet all applicable governing regulations, rules

and laws along with funding agency requirements

7. The cost of evaluating the substitution.
- B. Based upon the above evaluation the Project Manager will make a final determination of what is in the best interest of the City and either approve, disapprove or approve as noted the requested substitution.

## 2.3 CONDITIONS

- A. As a condition for submitting a Request for Substitution the Contractor waives all rights to claim for extra cost or change in contract time other than those outlined in the request and approved by the Project Manager. The Contractor, by submitting a Request for Substitution, also accepts all liability for cost and scheduling impact on other contractors or the City due to the substitution.
- B. Included with the Request for Substitution shall be the following statement:
  1. "The substitution being submitted is equal to or superior in all respects to the contract-required item or process. All differences between the substitution and the contract-required item or process are described in this request along with all cost and scheduling data."
- C. The statement shall be signed and dated by the Contractor's Superintendent.

## PART 3 - EXECUTION (NOT USED)

## PART 4 - MEASUREMENT AND PAYMENT

### 4.1 MEASUREMENT

- A. No separate measurement shall be made for work under this Section.

### 4.2 PAYMENT

- A. No separate payment will be made for work under this Section. The cost of the work described in this Section shall be included in the Contract price.

END OF SECTION 01630

PART 1 - GENERAL

## 1.1 DESCRIPTION

- A. Work specified in this Section includes procedures required prior to Final Acceptance of the Work in addition to those specified in General Conditions Title 20 and Technical Specifications Section 01720.
- B. Reference Contract General Conditions, GC906, GC 909, GC 2003.

## 1.2 PREPARATION FOR FINAL INSPECTION

- A. Before requesting inspection for Final Acceptance of the Work by the City, inspect, clean and repair the Work as required.

## 1.3 FINAL INSPECTION

- A. When the Contractor considers that the Work is complete, he shall submit written certification that:
  - 1. All punch list items have been completed.
  - 2. All clean up at the project site has been accomplished.
  - 3. Work has been inspected by the Contractor for compliance with contract documents.
  - 4. Work has been completed in accordance with contract documents.
  - 5. Work is ready for final inspection by the City.
  - 6. All as-built required documents have been submitted and accepted.
  - 7. All damaged or destroyed real, personnel, public or private property has been repaired or replaced.
  - 8. All operation and maintenance manuals have been submitted and accepted and all training has been completed.
- B. The Project Manager will inspect to verify the status of completion with reasonable promptness after receipt of such certifications. The inspection of the work will be done in accordance with the General Conditions.
- C. If the Project Manager finds incomplete or defective work:
  - 1. The Project Manager may, at the Project Manager's sole discretion, either terminate the inspection or prepare a punch list and notify the Contractor in writing, listing incomplete or defective work.
  - 2. The Contractor shall take immediate steps to remedy stated deficiencies and send a second written certification to the Project Manager that Work is complete.
  - 3. The Project Manager will then re-inspect the Work.



#### 1.4 REINSPECTION FEES

- A. Should the Project Manager perform re-inspection due to failure of the Work to comply with the claims of status of completion made by the Contractor:
  - 1. The Contractor shall compensate the City for such additional services at the rate of \$75.00 per man-hour.
  - 2. The City shall deduct the amount of such compensation from the final payment to the Contractor.

#### 1.5 FINAL ADJUSTMENT OF ACCOUNTS

- A. Submit a Final Statement of Accounting to the Project Manager.
- B. The Final Statement of Accounting shall reflect all adjustments to the contract amount and shall include the following:
  - 1. The original contract amount.
  - 2. Additions and deductions resulting from:
    - a. Previous change orders.
    - b. Allowances.
    - c. Final quantities for unit price items. Along with this statement shall be detailed backup for the quantities.
    - d. Deductions or corrected work.
    - e. Penalties.
    - f. Deductions for liquidated damages.
    - g. Deductions for re-inspection payments.
    - h. City resurveys required due to the Contractor.
    - i. Other adjustments.
  - 3. Total contract amount, as adjusted.
  - 4. Previous payments.
  - 5. Sum remaining due.
- C. If required, the Project Manager will prepare a final change order, reflecting approved adjustments to the Contract sum which were not previously made by change orders.

#### 1.6 FINAL APPLICATION FOR PAYMENT

- A. The Contractor shall submit the final application for payment in accordance with the procedures and requirements stated in the General Conditions Title 20.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. No separate measurement shall be made for work under this Section.

4.2 PAYMENT

A. No separate payment will be made for work under this Section. The cost of the work described in this Section shall be included in the Contract price.

END OF SECTION 01700

PART 1 - GENERAL

## 1.1 DESCRIPTION

- A. The Work specified in this section consists of maintaining a clean, orderly, hazard free worksite during construction, and final cleaning for the City's Final Acceptance. Failure to maintain the worksite will be grounds for withholding monthly payments until corrected to the satisfaction of the Project Manager.
- B. Reference Contract General Conditions, GC 325, GC 326, GC 803, GC 2001

## 1.2 JOB CONDITIONS

## A. Safety Requirements

- 1. Maintain the worksite in a neat, orderly and hazard-free manner in conformance with all federal, state and local rules, codes, regulations and orders, including all OSHA requirements, until Final Acceptance of the Work. Keep catwalks, underground structures, worksite walks, sidewalks, roadways and streets, along with public and private walkways adjacent to the worksite, free from hazards caused by construction activities. Inspect those facilities regularly for hazardous conditions caused by construction activities.

## B. Hazards Control

- 1. Store volatile wastes in covered metal containers and remove those wastes from work-site daily.
- 2. Do not accumulate wastes which create hazardous conditions.
- 3. If volatile and noxious substances are being used in spaces that are not naturally ventilated, provide artificial ventilation.
- 4. Hazard controls shall conform to the applicable federal, state and local rules and regulations.
- 5. Provide appropriate waste receptacles in all areas in which employees are working. Waste receptacles shall be kept covered at all times. All materials on site shall be anchored and covered to prevent any objects from becoming wind-borne.

## C. Access

- 1. Maintain the worksite to permit access by other City contractors as required and to allow access by emergency personnel.

## 1.3 SUBMITTALS

PART 2 - PRODUCTS

## 2.1 CLEANING MATERIALS

- A. Utilize the type of cleaning materials recommended by the manufacturer for the surfaces to be cleaned.
- B. Maintain current Material Safety Data Sheets (MSDS) on site for all chemicals.
- C. Ensure proper disposal of all wastes generated from the use of these materials. Must ensure compliance with all environmental regulations.

## PART 3 - EXECUTION

### 3.1 INTERIM CLEANING

- A. Clean the worksite every shift/workday for the duration of the construction contract. Maintain structures, grounds, storage areas and other areas of worksite, including public and private properties immediately adjacent to worksite, free from accumulations of waste materials caused by construction operations. Place waste materials in covered metal containers. All hard concrete, steel, wood and finished walking surfaces shall be swept clean daily.
- B. Remove or secure loose material on open decks and on other exposed surfaces at the end of each workday or more often in a manner that will maintain the worksite hazard free. Secure material in a manner that will prevent dislodgment by wind and other forces.
- C. Sprinkle waste materials with water or acceptable chemical palliative to prevent blowing of dust.
- D. Promptly empty waste containers when they become full and legally dispose of the contents at dumping areas off the City's property.
- E. Control the handling of waste materials. Do not permit materials to be dropped or thrown from structures.
- F. Immediately remove spillage of construction related materials from haul routes, work site, private property or public rights of way.
- G. Clean only when dust and other contaminants will not precipitate upon newly painted surfaces.
- H. Cleaning shall be done in accordance with manufacturer's recommendation.
- I. Cleaning shall be done in a manner and using such materials as to not damage the Work.
- J. Clean areas prior to painting or applying adhesive.
- K. Clean all heating and cooling systems prior to operations. If the contractor is allowed to use the heating and cooling system it shall be cleaned prior to testing.
- L. Clean all areas that will be concealed prior to concealment.

### 3.2 FINAL CLEANING

- A. Inspect interior and exterior surfaces, including concealed spaces, in preparation for completion and acceptance.
- B. Remove dirt, dust, litter, corrosion, solvents, discursive paint, stains and extraneous markings.
- C. Remove surplus materials, except those materials intended for maintenance.
- D. Remove all tools, appliances, equipment and temporary facilities used in the construction.
- E. Remove detachable labels and tags. File them with the manufacturer's specifications for that specific material for the City's records.
- F. Repair damaged materials to the specified finish or remove and replace.
- G. After all trades have completed their work and just before Final Acceptance, all catch basins, manholes, drains, strainers and filters shall be cleaned; roadway, driveways, floors, steps and walks shall be swept. Interior building areas shall be vacuum cleaned and mopped.
- H. Final cleanup applies to all areas within and adjacent to the site.

### PART 4 - MEASUREMENT AND PAYMENT

#### 4.1 MEASUREMENT

- A. No separate measurement shall be made for work under this Section.

#### 4.2 PAYMENT

- A. No separate payment will be made for work under this Section. The cost of the work described in this Section shall be included in the Contract price.

END OF SECTION 01710

PART 1 - GENERAL

1.1 DESCRIPTION

- A. The Work specified in this Section consists of maintaining, marking, recording and submitting contract record documents which include shop drawings, warranties, contract documents and contractor records.
- B. Reference Contract General Conditions, GC 324 and Technical Specification Section 02810 – Irrigation Systems.

1.2 SUBMITTALS

- A. Each submittal of record documents shall contain the following information:
  - 1. Date
  - 2. Project title and numbers
  - 3. Contractor's name and address
  - 4. Title and number of each record document
  - 5. Certification that each document as submitted is complete and accurate
  - 6. Signature of the Contractor or his authorized representative.
- B. At the completion of this contract, deliver all record documents including the following:
  - 1. As-built shop drawings, diagrams, illustrations, schedules, charts, brochures and other similar data
  - 2. Warranties, guarantees and bonds
  - 3. Contract documents
  - 4. Contractor records.

1.3 QUALITY CONTROL

- A. Record documents shall be prepared to a high standard of quality, such as that set forth in MIL STD 100, ANSI Standard Drafting Manual Y14 or other relevant lower tier specification defining equal drafting quality for microfilming, except for daily reports.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 MAINTENANCE OF DOCUMENTS

- A. The Contractor shall maintain at the worksite on a current basis one record copy of all drawings, specifications, addenda, change orders, approved shop drawings, working drawings, product data and samples in good order and marked currently to record all changes made during construction.
- B. Maintain at the field office one copy of the following record documents:
  - 1. Contract Documents
    - a. Contract drawings with all clarifications, requests for information, directives, changes and as-built conditions clearly posted.
    - b. Contract specifications with all clarifications, requests for information, changes, directives and record of manufacturer actually used along with product trade name.
    - c. Reference Standards in accordance with Technical Specifications Section 01091.
    - d. One set of drawings to record the following:
      - 1) Horizontal and vertical location of underground utilities affected by the Work.
      - 2) Location of internal utilities; include valves, controls, conduit, duct work, switches, pressure reducers, size reducers, transitions, crosses, tees, filters, motors, heaters, dampers, regulators, safety devices, sensors, access doors and appurtenances that are concealed in the construction shall be shown with dimensions given from a visible and recognizable reference to the item being located in all three dimensions. The drawing shall also reference the applicable submittal for the item being located.
      - 3) Field changes of dimensions and details including as-built elevations and location (station and offset).
      - 4) Details not on original contract drawings but obtained through requests for information or by other communications with the City.
  - 2. Contractor Records
    - a. Daily QC Reports
    - b. Certificates of compliance for materials used in construction
    - c. Nonconformance Reports (NCRs)
    - d. Remedial Action Requests (RARs)
    - e. Completed inspection list
    - f. Inspection and test reports
    - g. Test procedures
    - h. Qualification of personnel
    - i. Approved submittals
    - j. Material and equipment storage records
    - k. Safety Plan
    - l. Erosion, sediment, hazardous and quality plans
    - m. Hazardous material records
    - n. First report of injuries

### 3.2 RECORDING

- A. Keep record documents current daily.

- B. Legibly mark copies of the contract drawings to record actual construction.
- C. Legibly mark up each Section of the technical specifications and contract drawings to record:
  - 1. Changes made by change orders, requests for information, substitutions and variations approved by submittals.

### 3.3 DOCUMENT MAINTENANCE

- A. Maintain Documents in a clean, dry and legible condition, which shall be turned over to the City prior to final acceptance.
- B. Do not use record documents for construction purposes.
- C. Make documents available for inspection by the Project Manager and any others having jurisdiction.

### 3.4 MONTHLY REVIEW

- A. Prior to any application for payment, the Project Manager or his designated representative will inspect the record documents to ensure that they are being maintained and contain the most current correct data with particular attention to as-built drawings.
- B. If, during the inspection, the Project Manager determines that the documents are not being maintained and kept current as to as-built conditions, an amount may be withheld from the payment request and deducted from the contract value to cover the City's cost of collecting and recording the as-built contract data. This cost will be determined on the basis of \$75.00 per man-hour of effort.

## PART 4 - MEASUREMENT AND PAYMENT

### 4.1 MEASUREMENT

- A. No separate measurement shall be made for work under this Section.

### 4.2 PAYMENT

- A. No separate payment will be made for work under this Section. The cost of the work described in this Section shall be included in the Contract price.

END OF SECTION 01720



PART 1 - GENERAL

## 1.1 DESCRIPTION

- A. The Work specified in this Section consists of preparing and submitting operation and maintenance data for mechanical, electrical and other specified equipment.

## 1.2 SUBMITTALS

- A. Refer to Technical Specifications Section 01300 and 01340 for submittal procedures.
- B. Submit one (1) electronic copy and two (2) bound hard copy of the proposed Operation and Maintenance Data Manual format including a table of contents not less than ninety (90) days prior to acceptance tests and final inspection.
- C. Submit one (1) electronic copy and two (2) bound hard copy of Operation and Maintenance Data Manual within ten days after system startup is complete. These copies shall incorporate any comments made on the previous submittals, along with final readings on all settings and gauges taken while the system is in fully satisfactory operation.

## 1.3 CONTINUOUS UPDATING PROGRAM

- A. Furnish one electronic copy of the Contractor's letter indicating that suppliers have been notified to provide updated operation and maintenance data, service bulletins and other information pertinent to the equipment, as it becomes available.

PART 2 - PRODUCTS

- A. The following products are the requirements of hard copies:
- B. PAPER SIZE 8-½ inches x 11 inches.
- C. PAPER White bond, at least 20 pound weight.
- D. TEXT typewritten.
- E. PRINTED DATA Manufacturer's catalog cuts, brochures, operation and maintenance data. Clear reproductions thereof will be acceptable. If this data is in color, all final manuals must contain color data.
- F. DRAWINGS 8-½ inches x 11 inches, bound with the text. Larger drawings are acceptable provided they are folded to fit into a pocket inside the rear cover of the manual. Reinforce edges of large drawings.
- G. PRINTS OF DRAWINGS black ink on white paper, sharp in detail and suitable for making reproductions.

- H. FLYSHEETS Separate each portion of the manual with colored, neatly prepared flysheets briefly describing the contents of the ensuing portion.
- I. COVERS Provide 40 to 50 mil, clear plastic, front and plain back covers for each manual. The front covers shall contain the information required in paragraph 3.02 below.
- J. BINDINGS Conceal the binding mechanism inside the manual; lockable 3 ring binders shall be provided.

### PART 3 - EXECUTION

#### 3.1 GENERAL

- A. Assemble each operation and maintenance manual using the manufacturer's latest standard commercial data.

#### 3.2 COVER

- A. Include the following information on the front cover and on the inside cover sheet:
  - 1. OPERATION AND MAINTENANCE INSTRUCTIONS
  - 2. (TITLE OF STRUCTURE OR FACILITY)
  - 3. (TITLE AND NUMBER OF CONTRACT)
  - 4. (CONTRACTOR'S NAME AND ADDRESS)
  - 5. (GENERAL SUBJECT OF THE MANUAL)
  - 6. (Leave spaces for signatures of the City representatives and acceptance date)

#### 3.3 CONTENTS OF THE MANUAL

- A. An index of all volumes in each volume of multiple volume systems.
- B. An index in front of each volume. List and combine the literature for each system in the sequence of operation.
- C. Name, address and telephone numbers of Contractor, suppliers and installers along with the manufacturer's order number and description of the order.
- D. Name, address and telephone numbers of manufacturer's nearest service representatives.
- E. Name, address and telephone number of nearest parts vendor and service agency.
- F. Copy of guaranties and warranties issued to, and executed in the name of, the City.
- G. Anticipated date City assumes responsibility for maintenance.
- H. Description of system and component parts including theory of operation.
- I. Pre operation check or inspection list.

- J. Procedures for starting, operating and stopping equipment.
- K. Post operation check or shutdown list.
- L. Inspection and adjustment procedures.
- M. Troubleshooting and fault isolation procedures for on-site level of repair.
- N. Emergency operating instructions.
- O. Accepted test data.
- P. Maintenance schedules and procedures.
- Q. Test procedures to verify the adequacy of repairs.
- R. One copy of each wiring diagram.
- S. One copy of each piping diagram.
- T. Location where all measurements are to be made.
- U. One copy of each duct diagram.
- V. One copy of control diagram.
- W. One copy of each accepted shop drawing.
- X. One copy of software programs imputable or changeable on site.
- Y. Manufacturer's parts list with catalog names, numbers and illustrations.
- Z. A list of components which are replaceable by the City.
- AA. An exploded view of each piece of the equipment with part designations.
- BB. List of manufacturer's recommended spare parts, current prices and recommended quantities for two years of operation.
- CC. List of special tools and test equipment required for the operation, maintenance, adjustment, testing and repair of the equipment, instruments and components.
- DD. Scale and corrosion control procedures.
- EE. Disassembly and re-assembly instructions.
- FF. Troubleshooting and repair instructions.
- GG. Calibration procedures.
- HH. Ordering information.

- II. Training course material used to train City staff, including slides and other presentation material.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. No separate measurement shall be made for work under this Section.

4.2 PAYMENT

- A. No separate payment will be made for work under this Section. The cost of the work described in this Section shall be included in the Contract price.

END OF SECTION 01730

PART 1 - GENERAL

1.1 DESCRIPTION

- A. The Work specified in this Section consists of preparing and submitting warranties and bonds required by these specifications.
- B. Reference Contract General Conditions: GC 111, GC 1501, GC 1502, GC 1503, GC 1801, GC 1802.

1.2 SUBMITTALS

- A. Refer to Technical Specifications Section 01300 for submittal procedures.
- B. Submit executed warranties and bonds.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 WARRANTIES AND BONDS

- A. Execute the warranties and bonds required by the Contract Documents. Prepare and submit a list of all warranties and bonds on the form provided by the City. Reference Technical Specifications Section 01999.
- B. Provide warranties or bonds for the materials, labor and time period set forth in the sections of these specifications requiring such documents. All warranties shall be in accordance with the Contract General Conditions. Refer to the technical specifications for all specific items requiring longer warranty periods.
- C. Provide all warranties and bonds that the manufacturer or supplier furnishes at no additional cost in regular commercial trade. All warranties shall be in accordance with the Contract General Conditions. Refer to the technical specifications for all specific items requiring longer warranty periods.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. No separate measurement shall be made for work under this Section.

4.2 PAYMENT

- A. No separate payment will be made for work under this Section. The cost of the work described in this Section shall be included in the Contract price.

END OF SECTION 01740

PART 1 - GENERAL

## 1.1 FORMS

- A. The forms listed below and appended to this Section will be used for performance of the Work as indicated. This is not a complete listing of all required forms. The Contractor may be permitted to recreate some of the forms so that they are compatible with the Contractors Project Management system. However, Contractor must achieve prior approval from the Project Manager before using modified forms. The Contractor shall properly complete all forms required by the contract or the Project Manager. The Project Manager shall review and approve all submitted forms. If submitted forms are not acceptable the Contractor shall resubmit forms in an acceptable format.

## 1.2 APPENDICES

- B. Attached to this Technical Specifications Section are the following (Sample) forms:

1. Daily Quality Control Report (Sample Attached)
2. Request for Information (Sample Attached)
3. Submittal Transmittal Form (Sample Attached)
4. Document Transmittal Form (Sample Attached)
5. Contractor Warranty (Reference the Contract General Conditions)
6. Contractor/Subcontractor Warranty (Reference the Contract General Conditions)
7. Contractors Certification of Payment (Included within the Bid Documents)
8. Pay Application Form (Reference the Contract General Conditions)
9. Subcontractor Partial Lien Release Form (Included within the Bid Documents)
10. Subcontractor Final Lien Release Form (Included within the Bid Documents)
11. Request for Substitution (Sample Attached)
12. Non-Conformance Report (Sample Attached)

PART 2 - PRODUCTS (NOT USED)PART 3 – EXECUTION

## 3.1 COMPLETING FORMS

- A. All documents are to be filled digitally by the Contractor using the format provided by the Project Manager or using Adobe Acrobat 8 or newer. It is at the discretion of the Project Manager if other forms or formats will be accepted.

## 3.2 SIGNING FORMS

- B. Original hand written signatures are acceptable for all documents. The Contractor is to fill out the document as indicated above prior to signing the hard copy. If the form is to

be submitted digitally to the Project Manager the document shall be scanned and saved as an Adobe Acrobat file.

- C. Digital signatures are acceptable for all documents. The Contractor is to fill out the document digitally in the format provided by the Parks Project Manager or Adobe Acrobat 8 or newer. The file must be signed using Adobe Acrobat 8 or newer and submitted digitally to the Project Manager.
  - 1. Add digital signatures must contain the name of signer in plain text and the time and date the signature is executed.

#### PART 4 – MEASUREMENT AND PAYMENT

##### 4.1 MEASUREMENT

- A. No separate measurement shall be made for work under this Section.

##### 4.2 PAYMENT

- A. No separate payment will be made for work under this Section. The cost of the work described in this Section shall be included in the Contract price.

END OF SECTION 01999



PART 1: GENERAL

- 1.1 RELATED DOCUMENTS: The General Contract Conditions, Drawings, and Division - 1 Specification sections apply to Work of this section.
- 1.2 SUMMARY: The work of this section consists of retention and protection of trees during the construction of the project.
- 1.3 GENERAL REQUIREMENTS:
- A. There should be daily supervision of field crews by the City Forestry Staff or Appointee during the critical phases of the project: for example, demolition of existing concrete; root pruning; construction of retaining walls and construction of new curb or sidewalk in tree protection areas. City Forester may require a consulting arborist be hired to oversee the project.
  - B. If it appears that the completion of the construction may cause damage to the branches of any tree, the Contractor shall contact the City Forester's Office. The Forester will make a determination as to whether such damage is eminent.
  - C. To prevent or minimize soil compaction, designated routes for equipment and foot traffic by work crews shall be determined prior to commencing construction activities, and shall be indicated in the tree protection plan to be submitted by Contractor. These routes shall be marked at the site, prior to commencement of construction, with tree protection fencing and signage as specified in Paragraphs 3.6 and 3.7 of this section. A Tree Protection Plan shall be submitted for approval by the City Forester.
  - D. Motorized equipment and trailers, including tractors, bobcats, bulldozers, rubber tired excavators, tracked excavators, trucks, cars, and carts shall not be allowed access within tree protection areas. Should access be necessary within designated tree protection areas, the existing grade shall be covered with 12" of wood mulch with overlapping ¾" plywood on top to help distribute the weight of equipment and to minimize soil compaction and rutting. Plywood and/or mulch is not acceptable bridging material for driving over exposed tree roots. Exposed tree roots shall not be driven over. The City Forester or Project Consulting Arborist shall be notified and shall approve of the access and driving surface prior to its use.
  - E. Materials and supplies shall not be stockpiled or stored within the tree protection area. Should temporary storage be necessary within designated tree protection areas, the existing grade shall be covered with double, overlapping sheets of ¾ inch thick plywood and 12" of wood mulch to help distribute the weight of materials or supplies and to minimize soil compaction.
  - F. Under no circumstances shall any objects or materials be leaned against or supported by a tree's trunk, branches, or exposed roots. The attachment or installation to trees of any sign, cable, wire, nail, swing, or any other material that is not needed to help support the natural structure of the tree is prohibited. Standard arboricultural techniques such as bracing or cabling that are performed by professional arborists are acceptable upon

approval by the City Forester or Project Consulting Arborist.

- G. Appropriate tree pruning and/or removal permits must be secured prior to beginning work.

1.4 DEFINITIONS:

A. TREE PROTECTION AREA:, The tree protection area should consist of the ground encompassing from 1.5 (minimum) to 2.0 times the distance between the trunk and dripline, or one linear foot away from the trunk base for every inch diameter of the trunk, whichever is greater. (See section below). Areas of ground covered by pavement, buildings, or other permanent structures where the presence of roots is minimal or negligible, are excluded. The area under or within the tree's dripline is also referred to as the "Critical Root Zone" (see below).

1. With groups of trees or where an array effect is present, there may be discontinuous (non-overlapping) perimeters of tree protection areas, which result in difficult to maintain or ineffective tree protection fencing. In these cases, even though tree protection areas do not overlap, they should be treated as though they do if the distance between the perimeters of such areas is less than thirty (30) feet. In effect, this will artificially enlarge the area of tree protection, but will result in a more clearly defined, manageable area.

B. DRIPLINE: The outermost edge of the tree's canopy or branch spread. The area within a tree's dripline is all the ground under the total branch spread.

C. CRITICAL ROOT ZONE: Shall be defined as the tree protection area encompassing from 1.5 (minimum) to 2.0 times the distance between the trunk and dripline, or one linear foot away from the trunk base for every inch diameter of the trunk, whichever is greater.

D. DIAMETER (CALIPER): The size (in inches) of a tree's trunk is measured at:

Trunk Size	Where Measured
< 4"	6" above grade
4" – 8"	12" above grade
> 8"	54" above grade

Note: All measurements should be rounded up to the nearest inch.

E. HIGH-VALUE SHRUB: Any specimen shrub with an appraised value of \$100.00 or more.

F. PROJECT CONSULTING ARBORIST: An independent consultant with a degree in a horticulture ,arboriculture, and/or ISA Certified Arborist, and at least five years field experience in tree preservation or on-site monitoring of public works or construction projects involving tree retention and protection. The Consultant should be an active member in the American Society of Consulting Arborists and/or International Society of Arboriculture.

## 1.5 REFERENCE STANDARDS AND GUIDELINES:

- A. Contractor shall comply with applicable requirements and recommendations of the most current versions of the following standards and guidelines. Where these conflict with other specified requirements, the more restrictive requirements shall govern.
  - 1. ANSI Z133.1-2006: American National Standard for Tree Care Operations
  - 2. ANSI A300: Tree, Shrub, and Other Woody Plant Management – Standard Practices
  - 3. Guide for Plant Appraisal-Current Edition: Authored by the Council of Tree and Landscape Appraisers; published by the International Society of Arboriculture

## PART 2: PRODUCTS - Not applicable

## PART 3: EXECUTION

- 3.1 CONSTRUCTION REQUIREMENTS: This section provides standards and guidelines for the retention and protection of trees and high-value shrubs for any proposed construction project.
- 3.2 DEMOLITION OF EXISTING CONCRETE: Caution should be used during removal of existing street, curb, gutter, sidewalk, drain inlets, and other concrete and asphalt demolition, to minimize injury to tree root systems. The following procedures should be used when removing existing concrete.
  - A. Breaking of the existing concrete and asphalt for removal should be done in a manner that will minimize ground disturbance and vibration.
  - B. Curbs and sidewalks within designated tree protection areas and critical root zones shall be removed by hand. When removing existing sidewalks and curbs, care should be taken to avoid injury to roots located under, over, or adjacent to paved surfaces.
  - C. Roots and root-trunk flares growing over curbs should not be injured during breaking of curbs and removal of debris. Wood and bark tissues shall not be injured by striking tissues with equipment.
  - D. During the removal of concrete, all root systems and soil areas exposed shall not be disturbed.
  - E. Motorized equipment and trailers, including but not limited to tractors, skid steers, bulldozers, rubber tired excavators, tracked excavators, trucks, cars, and carts are to be limited to access on the existing paved street only. Access is not allowed behind the curb within tree protection areas.
  - F. Should access be necessary within designated tree protection areas, the existing grade shall be covered with double, overlapping sheets of ¾” thick plywood and 12” of wood mulch to help distribute the weight of equipment and to minimize soil compaction and rutting. Plywood and/or mulch is not acceptable bridging material for driving over

exposed tree roots. Exposed tree roots shall not be driven over. The City Forester or Project Consulting Arborist shall be notified and shall approve of the access and driving surface prior to its use.

3.3 CONSTRUCTION OF SIDEWALKS, CURBS, CONCRETE, ASPHALT PAVING AND DRAINAGE INLETS: The following procedures shall be used when constructing sidewalks, curbs, concrete, asphalt paving, and drainage inlets.

- A. Keep all materials and equipment within the street bounded by existing curbs.
- B. Protect exposed roots from contamination by stabilization materials and concrete.
- C. Locate concrete washout areas away from roots and tree protection areas.
- D. When excavating for the construction of inlets, excavated soil shall be deposited in trucks and hauled off or deposited temporarily on  $\frac{3}{4}$  inch thick plywood outside the critical root zone. Excavated and fill soil shall not be deposited, even temporarily, on unprotected natural grade.
- E. After proper pruning, as needed, cover exposed roots within 30 minutes to minimize desiccation. Roots may be covered with soil, mulch, or moistened burlap (7 ounce or equivalent), and shall be kept moist during the period until the final grade is established.
- F. Where possible, construction should be relocated to prevent damage to existing roots. Where relocation of walks is not possible, walks should be constructed in a manner with the least amount of impact/damage to roots including but not limited to raised, narrowed, curbed, ramped, bridged, cantilevered, use of pylons, root break out zones, root channeling, structural cells to prevent cutting and removing major roots (e.g. roots greater than two inches in diameter).
- G. Place a sheet of 6 mil or thicker plastic over the grade within affected portions of tree protection areas prior to pouring concrete sidewalks, curbs, inlets, ramps, and driveway approaches. The plastic will assist in providing a non-leaching barrier between the concrete, soil and roots.
- H. Construct new sidewalks on, or above, the existing grade instead of excavating into root zones. The new grade shall not interfere with sheet-flow drainage.
- I. Grading within the critical root zone shall consist of the ground encompassing from 1.5 (minimum) to 2.0 times the distance between the trunk and dripline, or one linear foot away from the trunk base for every inch diameter of the trunk, whichever is greater. Grading within the critical root zone shall be performed by hand. Any fill material that needs to be placed in the critical root zone shall be limited to a maximum of 1" of fill material over the critical root zone area. Fill should consist of sandy loam topsoil. Clay soils shall not be used as fill. When using fill soil, the existing surface to receive fill should be scarified by hand to a maximum depth of 1" from the finished grade prior to placing fill material., to ensure proper incorporation of fill material. Any filling operation should not occur during water saturated soil conditions.
- J. Existing soil may be used as a form for back of curb and gutter, with or without the use

of a thin masonite-type form, although a masonite form is preferred. This will minimize excavation in the critical root zone and prevent undue injury to the roots. This method is unnecessary in areas outside the critical root zone. Place a layer of Typar BioBarrier between the curb and tree roots to help inhibit root growth that may exploit small cracks in the curb. Where appropriate, use curbs with discontinuous footings to maintain natural grade near the base of trees adjacent to the curbing, and to minimize injury to roots and root flares.

- K. Provide for easy concrete removal and replacement where an obvious raised root may cause sidewalk cracking in the future. This can be accomplished by installing an expansion joint on either side of the root or by etching the concrete on either side of the root to allow that particular section to be broken out and replaced. Compaction rating for the replacement walkway should not exceed 80% Proctor density. Tree roots will continue to slowly add girth every year; therefore, the base material needs to be malleable (e.g. suitable subgrade aggregates, crushed granite, or compacted sand) to prevent a fulcrum or pressure point which can crack or heave the walkway.
- L. Where appropriate, and under the direction of the City Forester or Appointee, root restricting barriers can be installed with a minimal amount of disturbance away from sidewalks, curbs and streets. Materials include:
  - 1. Stiff nylon woven fabric – Style 899 nylon fabric with extra firm finish as manufactured by Jason Mills, Westwood, NJ;
  - 2. 8 Mesh Copper (.028” or greater) wire screen;
  - 3. Typar BioBarrier as manufactured by Reemay, Inc. Old Hickory, TN; or
  - 4. approved equal.
- M. In areas where roots have to be removed for construction of drain inlets, roots shall be severed prior to excavation to eliminate unnecessary tearing of roots by equipment, refer to Root Pruning in Paragraph 3.5. Excavate soil by hand at the construction cut limit to a depth of 30” or to the depth of the required root cut, whichever is less. Prune roots as specified in Paragraph 3.5 of this section. Protect exposed roots as specified in Subparagraph 3.3E of this section.
- N. Concrete or chemicals spilled within tree protection areas should be completely removed. Contamination soil shall be completely removed at the time of the spill and removed by hand and/or air spade tool without disturbance to root systems. Appropriate soil should be added as necessary to restore the grade. Contact the City Forester immediately in the event of a spill within a tree protection area.

### 3.4 IRRIGATION OR UTILITY INSTALLATION:

- A. PROTECTION OF TREES AND HIGH-VALUE SHRUBS: Contractor shall protect all trees and high-value shrubs from injury due to irrigation related work. All injuries to trees and high-value shrubs shall be mitigated to the satisfaction of the Owner, and, if appropriate in accordance with guidelines established in the "Guide for Plant Appraisal". All costs of such mitigating shall be charged to and paid by the Contractor. See Paragraph 3.9 of this section for definition of high value.
  - 1. All irrigation lines shall be indicated on construction plans and pre-approved by the City Forester or Parks Project Manager. No irrigation lines shall be located

within 10' of any existing tree trunk, without prior approval of City Forester or Parks Project Manager.

- B. **EXISTING TREES:** The City Forester or Project Consulting Arborist shall be notified prior to any trenching or excavation known or suspected to disturb more than ten percent (10%) of the critical root zone.
- C. Where it is necessary to excavate within the critical root zone of existing trees, the Contractor shall use all possible care to avoid injury to trees and tree roots. Where more than 10% of the critical root zone area is to be disturbed the Contractor shall notify the City Forester or Project Consulting Arborist to review the conditions. Final approval must be provided by City Forester or Project Consulting Arborist prior to excavation work. In areas where tunneling or boring are to occur all exposed roots shall be covered with moistened burlap to prevent drying of roots.
- D. When trenching or excavation within the critical root zone is to occur care shall be taken not to disturb roots contained within the structural root plate of the tree. The structural root plate shall be determined based on the following guidelines:

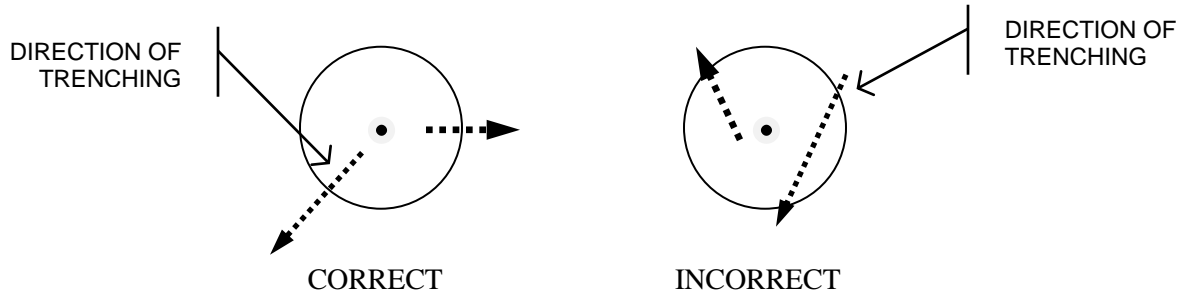
<b>Tree Diameter (in inches)</b>	<b>Structural Root Plate (in feet)</b>
< 5	3
5	3.75
10	6
15	7.5
20	9
25	10
> 30	12

If trenching or excavation is to occur the following procedures shall apply:

1. If excavation, trenching or utility installation only occurs on one side of the tree or within a six (6") inch linear distance from the trunk base for every one (1") inch of trunk diameter, horizontal directional boring (auger tunneling), shall be used for irrigation or utility line installations.
  2. If excavation, trenching or utility installation will occur on two or more sides of a tree (e.g. N,S,E, or W) or is within one foot (1') foot linear distance from the trunk base for every One (1") inch of trunk diameter, then horizontal directional boring (auger tunneling) shall be used.
- E. All trenching or other work within the dripline of any tree shall be done by hand or other methods approved by the City Forester or Parks Project Manager, which will prevent breakage or other injury to branches and roots.
  - F. Wherever a trenching machine exposes roots extending through the trench wall, those roots shall be hand pruned immediately, refer to Root Pruning in Paragraph 3. All trenches within critical root zones shall be closed within twelve (12) hours; if this is not possible, the trench walls shall be covered with burlap and kept moistened. Prior to backfilling, the Contractor shall contact the City Forester, Project Consulting Arborist or Parks Project Manager to inspect the condition and treatment of roots injured by

trenching.

- G. Trenching within critical Root Zone shall be done perpendicular to the radial center of the tree and not through the critical root zone.



### 3.5 ROOT PRUNING:

- A. Tree roots shall not be pruned or cut unless their removal is unavoidable or absolutely necessary. The City Forester or Parks Project Manager shall be notified prior to any operation known or suspected to involve cutting of more than:
1. The City Forester or Project Consulting Arborist shall be notified immediately in the event that roots in excess of one-half ( $\frac{1}{2}$ ) the diameter of the tree, as measured per Section 1.4.D, are cut, torn, ripped, or otherwise injured.
- B. Upon approval by the City Forester, prior to any excavation, removal of sidewalk, or other activity that will result in removal of soil and tree roots, all tree roots within a designated area will be pruned to a depth of 14" inches. Pruning shall occur with a Dosko Root Pruner, or equivalent, in accessible areas, and by hand in areas inaccessible to the root pruning machine. All other root pruning shall be done by hand with approved tools.
- C. Removal of roots greater than one-half ( $\frac{1}{2}$ ) the diameter of the tree, as measured per Section 1.4.D, or parts of roots that are injured or diseased should be performed as follows:
1. Preserve the root bark ridge (similar in structure and function to a branch bark ridge). Directional root pruning technique shall be used during hand excavation around tree roots. Roots are similar to branches in their response to pruning practices. With directional root pruning, objectionable and severely injured roots are properly cut to a lateral root  $\frac{1}{3}$  the size of the root being cut, if possible, that is growing downward or in a favorable direction.
  2. All roots needing to be pruned or removed shall be cut cleanly with sharp hand tools, with oversight by the City Forester or Project Consulting Arborist. No wound dressings shall be used.
  3. Recommended root pruning tools:
    - a. Scissor-type lopper.
    - b. Scissor-type pruner.
    - c. Large and small hand saws.

d. Wound scribe.

D. Root Pruning Near Sidewalks

1. Root pruning should be done carefully, by hand, to achieve the objective of reducing future sidewalk problems as well as preserving the trees. Removing anchoring roots or causing injuries in anchoring roots and root flares can cause future decay and potential hazards. Indiscriminate cutting of vigorous roots results in their regeneration so that several more new roots may grow from the cut end, back under the sidewalk, thereby reducing the time between sidewalk repairs. Roots can be managed in the ground without significant harm to trees, if care is taken to avoid injuries that lead to root and trunk decay.
2. Directional root pruning is recommended because it considers the tree's response to root pruning and decay. With directional root pruning, roots are cut to a lateral 1/3 the size of the root being cut, if possible, that is growing downward or in a more favorable direction. The pruned root ends will be less likely to regenerate, since a large lateral can assume the new terminal role of the root.
3. Proper removal of selected roots or parts of roots can direct roots away from sidewalks in the future. Procedures for root pruning directly next to sidewalks are as follows:
  - a. Hand dig a trench six (6") to eight (8") inches in depth at the edge of the planting strip and sidewalk.
  - b. Remove all roots less than two (2") inches in diameter in this trench back to a desirable lateral root, preserving the root bark ridge. If careful excavation does not reveal a desirable lateral root within twelve (12") inches of the exposed root in question, then the exposed root shall be pruned properly so that a minimal amount of root is removed.
  - c. Small root bundles, the source of future sidewalk problems, should also be removed at this time.

E. All roots one-half (1/2) the diameter of the tree caliper as measured per Section 1.4.D shall be examined by the City Forester or Project Consulting Arborist in terms of their role in anchoring the tree.

1. All roots that contribute significantly to anchorage should be preserved. Remove all other roots in this size range to sound, downward growing lateral roots that are at least 1/3 the size of the root being removed.
2. All roots larger than one-half (1/2) the diameter of the tree caliper as measured per Section 1.4.D diameter are to be preserved unless their removal is absolutely necessary and approved by the City Forester. Preservation of large roots may require:
  - a. reducing the sidewalk width near the root flare; and/or
  - b. curving or relocating walk around root/root flare
  - c. ramping or bridging the sidewalk over the roots to allow for root growth
  - d. use of cantilever/pylon technology
  - e. establish root break out zones
  - f. root channeling
  - g. structural cells

F. Tree guying subsequent to root pruning: Upon review of on-site root pruning and



constructing grading limits, the City Forester shall determine if existing trees subject to root pruning should be guyed or otherwise stabilized. Contractor shall retain a qualified tree service company to complete tree guying and stabilization in accordance with Tree Care Industry Association standards. Tree service company shall be licensed by the City and County of Denver, through the City Forester's Office.

3.6 TREE PROTECTION FENCING:

- A. Tree protection fencing should be installed one (1') foot behind the existing curb in areas where the street surface will be removed and replaced. Tree protection areas shall be designated on construction documents, and fencing locations should be staked for approval by the Construction Manager and City Forester or Project Consulting Arborist.
- B. Tree protection fences should be constructed of one of the following:
  - 1. Galvanized chain-link – 6' in height. Posts should be installed no less than 10' centers, at a depth of 36" minimum. Installation of post shall not result in injury to tree surface roots; root flares or branches.
  - 2. Colored (orange), molded plastic construction fencing-four 48" in height.
- C. Fencing should be installed to completely surround the limits of tree protection areas, and should extend at least 10' beyond the designated construction limits.
- D. Tree protection fencing shall be installed prior to any site activity and shall remain until its removal is authorized by the City Forester or the Parks Project Manager.

3.7 TREE PROTECTION SIGNAGE: A standard Denver Forestry Tree Protection sign shall be mounted on tree protection fencing at 50' foot intervals warning construction personnel and the public to keep out of the tree protection areas. Signs may be picked up at the Denver Forestry office in the Webb Building at 201 W. Colfax Ave.

3.8 PROJECT SITE MONITORING: As determined by the City Forester for projects of sufficient size to warrant such, a Project Consulting Arborist shall be retained to enforce and monitor the Tree Retention and Protection objectives. The project site should be monitored a minimum of two (2) times weekly (more frequently at the start of the project) until all procedures and specifications are understood and properly executed by all parties. Specific monitoring schedules should be developed at preconstruction meetings and modified as deemed necessary by the appropriate parties. Schedules shall be relayed to the City Forester and the Parks Project manager along with reports of site visits.

3.9 INJURIES TO EXISTING PLANTS - DAMAGE PENALTIES:

- A. Tree and High-Value Shrub Appraisal: All trees and high-value shrubs will be evaluated and appraised by the City Forester or Forestry Appointee, and a list of all tree values for the project will be on file in the Construction Manager's office. Any tree or other plant requiring retention or protection that is not on the list shall be appraised by the City Forester or Project Consulting Arborist as necessary to comply with this damage penalty.
- B. Documentation for appraisals will consist of :
  - 1. measurement of plant size;

2. identification by common and botanical names;
  3. current condition (overall health, injuries, overt hazard status, etc.); and
  4. location factors as described in the most current addition of "Guide for Plant Appraisal". Photographs may be taken of certain trees and shrubs to document debilitating condition factors.
- C. The threshold level for plants to be appraised shall be \$100.00; only those trees and shrubs estimated to have a monetary value greater than \$100.00 shall be appraised.
- D. Trees and other plants designated as requiring retention or protection shall be identified and located on construction plans. Loss of, or partial injury to, any of these plants due to Contractor neglect or improper construction activities will result in a penalty of up to three times the damages of the assessed value of the tree as determined by the City Forester or Forestry Appointee as described in Chapter 57 of Denver Revised Municipal Code.
- E. Trees determined as requiring "general protection" or "special protection" in the construction areas and in other key locations should be clearly identified by the City Forester or Forestry Appointee. Loss or partial injury to any of these trees due to Contractor neglect or improper construction activities will result in a penalty of up to treble damages for the assessed value of the trees as determined by the City Forester or Project Consulting Arborist as described in Chapter 57 of Denver Revised Municipal Code. Injury to a portion of these trees will be assessed by the City Forester or Project Consulting Arborist and a corresponding portion of the liquidated damages will be assessed to the Contractor.
- F. A fine of one-thousand dollars (\$1,000.00) will be levied against the Contractor for each incident of construction damage (including construction traffic) within designated tree protection areas. Any fine shall be independent of any applicable damages for the assessed value of the tree or tree part.
- G. Trees or roots visibly and unnecessarily injured will cause the Owner to withhold from the Contractor an assessed amount conforming to the requirements stipulated above, for a period of one full year. After that period the impact of the injury to any tree will be assessed by the City Forester or the Forestry Appointee.

### 3.10 SUBMITTALS:

- A. Proposed methods and schedule for effectuating tree and other plant protection shall be submitted for approval. Contractor shall submit construction schedule which includes a time frame for work near existing plants. Approval of such shall be obtained from the City Forester prior to commencement of construction near tree protection areas.
- B. Proposed methods, materials, and schedule for root pruning, branch pruning, and other tree maintenance shall be submitted for approval. The City Forester or Forestry Appointee shall mark the location of root pruning lines in the field prior to the operation. If possible, root pruning should occur between autumnal leaf fall and spring foliage. Root pruning during the growing season shall require approval of the City Forester or Forestry Appointee.

3.11 TREE AND OTHER PLANT MAINTENANCE DURING AND AFTER COMPLETION OF CONSTRUCTION.

- A. Proper maintenance should include, but without limitation to: structural and remedial pruning; watering; mulching; remediating soil compaction; fertilization; insect and disease control; soil and tissue analysis; aeration; and wound treatment.
- B. The timing duration and frequency of necessary maintenance practices should be determined and approved by the City Forester or Forestry Appointee, based on factors associated with the site and affected plants.
- C. Submit maintenance schedule to City Forester for approval prior to work beginning.

PART 4: MEASUREMENT AND PAYMENT

- 4.1 Measurement: Measurement for Tree Retention and Protection will not be measured, but will be a lump sum item, in accordance with the Drawings and as directed by the Parks Project Manager.
- 4.2 Payment: Payment shall be made at the lump sum price and shall include full compensation for the protection of trees in accordance with the Drawings and Specifications. The lump sum price shall include all material, labor and equipment required to establish tree protection, and remove the tree protection at the end of the project. The lump sum price should also include the maintenance of the tree protection throughout the duration of the project as well as the labor, materials and equipment required to restore the site to its original condition.

END OF SECTION 02150

PART 1 - GENERAL

1.1 RELATED DOCUMENTS: The General Contract Conditions, Drawings, and Division-1 Specification sections apply to Work of this Section.

1.2 SUMMARY:

- A. Work of this Section consists of installation of an underground irrigation system including the following:
1. Trenching, stockpiling excavation materials, refilling and compacting trenches.
  2. Complete irrigation system including but not limited to piping, valves, fittings, heads and wiring, and final adjustments to insure complete coverage.
  3. Water connections.
  4. Replacement of unsatisfactory materials.
  5. Cleanup, inspections, and approval.
  6. Tests.
- B. Related Work:
1. Tree Retention and Protection: Section 02150
  2. Sodding, Seeding and Surfacing: Section 02935

1.3 REFERENCES

- A. Conform to requirements of reference information listed below except where more stringent requirements are shown or specified in Contract Documents.
1. American Society for Testing and Materials (ASTM) - Specifications and Test Methods specifically referenced in this Section.
  2. Underwriters Laboratories (UL) - UL Wires and Cables.
  3. National Sanitation Foundation (NSF) – Piping and backflow prevention.
  4. American Water Works Association – Piping and backflow prevention.

1.4 QUALITY ASSURANCE

- A. Irrigation Contractor Qualifications – Irrigation Contractor shall have had considerable experience and demonstrate ability in the installation of irrigation system(s) of specific type(s) in a neat, orderly and responsible manner in accordance with recognized standards of workmanship. To demonstrate ability and experience necessary for this Project, submit if requested by Parks Project Manager, prior to contract award the following:
1. List of 3 projects completed in the last 2 years of similar complexity to this project. Description of projects shall include:
    - a. Name of project.
    - b. Location.
    - c. Owner.
    - d. Brief description of Work and project budget.

B. Special Requirements.

1. Work involving substantial plumbing for installation of copper piping, backflow preventer(s), and related Work shall be executed by licensed and bonded plumber(s). Secure a permit at least 48 hours prior to start of installation.
2. Tolerances - Specified depths of mains and laterals and pitch of pipes are minimums. Settlement of trenches is cause for removal of finish grade treatment, refilling, compaction, and repair of finish grade treatment.
3. Coordination With Other Contractors - Protect, maintain, and coordinate work with work under other Sections.
4. Damage To Other Improvements - Contractor shall replace or repair damage to grading, soil preparation, seeding, sodding, or planting done under other Sections during Work associated with installation of irrigation system at no additional cost to the City.
5. Water Delivery Interruption – When working on an existing irrigation system, the Irrigation Contractor shall contact the Parks Project Manager and inform him 72 hours in advance of any water interruption that is required.
6. Contractor shall post signage in visible locations on site indicating “IRRIGATION TESTING AND MAINTENANCE IN PROGRESS” when Work (construction or warranty) requires irrigation system operation between the hours of 10AM to 6 PM.
7. Work involving high voltage electrical wiring, grounding and related Work shall be executed by licensed and bonded electrician(s). Secure a permit at least 48 hours prior to start of installation
8. Coordination with other contractors: Irrigation installer shall protect, maintain, and coordinate his work with other work under this contract.
9. Refer to maintenance requirements for water during construction, 1.9.B.1.

C. Pre-Construction Conferences and site meetings:

1. Contractor shall schedule and conduct a pre-construction conference to review in detail quality control and construction requirements for equipment and materials used to perform the Work. Conference shall be scheduled not less than 10 days prior to commencement of Work. All parties required to be in attendance shall be notified no later than 7 days prior to date of conference. Contractor shall notify qualified representatives of each party concerned with that portion of Work to attend conference, including but not limited to the Parks Project Manager, Contractor's Superintendent, and Installer.
2. Prior to commencement of Work, Contractor shall schedule an on-site conference with Parks Project Manager, Parks Forestry and any other parties designated by Parks Project Manager to discuss tree protection requirements, marshalling locations, traffic control, and equipment access. Provide a minimum of 7 days notice prior to date of conference.
3. Contractor shall schedule weekly on-site conferences with Parks Project Manager and any other parties designated by Parks Project Manager to review project progress.
4. Contractor or Consultant as designated by Parks shall record Minutes of each conference and distribute to all parties in attendance within five (5) days of conference.

1.5 SUBMITTALS - Prepare and make submittals in accordance with conditions of the Contract prior to installation of any irrigation equipment:

- A. Material List: Submit a complete list of materials, indicating manufacturer, model number and description of all materials and equipment to be used. Show appropriate dimensions and adequate detail to accurately portray intent of construction.
- B. Shop Drawings: If applicable, submit shop drawings indicating electrical wiring design and assembly of backflow preventer, including plumbing and foundation/support system if the installation differs from the manufacturer's recommended installation.
- C. Samples:
  - 1. Valve clusters: Provide a completely built electrical valve cluster. This mock-up, to include three electric valves, quick coupler, angle valve, and manifold and riser, may be incorporated into the work toward the end of the project.
  - 2. Swing joints: Provide a pre-manufactured or constructed swing joint assembly as per detail.
- D. Operation and Maintenance Data: Coordinate scheduling/precipitation instructions with the City's maintenance personnel. Submit three (3) bound brochures to Parks Project Manager including:
  - 1. Winterization and spring start-up procedures.
  - 2. Cut sheets of products.
  - 3. Manufacturer's maintenance and checking instruction for irrigation controller.
  - 4. Manufacturer's maintenance and operation instruction for weather station and any other water conservation equipment.
  - 5. Manufacturer's maintenance and checking instruction for backflow preventer (if applicable).
  - 6. Manufacturer's maintenance and operation instruction for pump station (if applicable).
- E. Warranty: Submit one year written warranty, in accordance with Paragraph 1.8 below.
- F. Record Drawings (As-Built):
  - 1. At onset of irrigation installation, Contractor will secure Xerox copies of original irrigation design from Parks Project Manager. Contractor to revise hard copy drawings in red ink as Work progresses to show any deviations from the design. Record Drawings shall be brought up-to-date at the close of the working day every Friday by a qualified draftsman. A print of Record Drawings shall be available at Project Site for review. Updated Record Drawings shall be available for review at all times.
  - 2. Record Drawings shall encompass entire scope of work including any altered existing equipment and altered zones. For systems that are altered less than 50 % of entire site size, the record drawing shall encompass the scope of work, and notate the controller zone number, type of irrigation, GPM, operating PSI for any altered or added zone.
  - 3. Preparation of Record Drawings (As-Built): Dimension from two permanent points of reference (building corners, sidewalk, road intersections or permanent structures) the location of the following items:
    - a. Point of connection.

- b. Routing of sprinkler pressure lines. Provide dimensions for each 100 L.F. (maximum) along each routing and for each change of direction.
  - c. Routing of non-pressure lateral lines, layout and size.
  - d. Sprinkler control valves.
  - e. Quick coupling valves.
  - f. Drain valves
  - g. Master valves
  - h. Flow sensors
  - i. Rain sensors/weather station
  - j. Wire splice boxes
  - k. Control wire routing if not with pressure mainline.
  - l. Gate valves.
  - m. Air relief valves.
  - n. Sleeves.
  - o. Flush valves.
  - p. Power service drop.
  - q. Other related equipment as directed.
4. Make dimensions accurately at the same scale used in the original drawings, or larger. Notes and dimension lettering must be legible.
  5. The irrigation legend must be changed to accurately reflect the irrigation equipment installed, if such equipment is not the same as originally specified on the contract documents. This includes flow rates, effective spray diameter/radius and operating pressure of all sprinkler heads.
  6. Parks Project Manager will not certify any pay request submitted by the Contractor if the As-Built Drawings are not current, and processing of pay request will not occur until As-Built Drawings are updated.
  7. Final Submittal: Upon completion of Project, prior to final acceptance, secure digital copy of irrigation design from Parks Project Manager and record As-Built information that reflects all changes made over the course of the construction project, prepared by a qualified draftsman. As-Built Drawings shall include details, including any revisions as per actual installation. Deliver and submit to Parks Project Manager for review one 3 mil. Mylar prints of As-Built, and digital As-Built drawing on disk in both PDF and CAD format (include any related X-ref files, plot files and pen settings.) Make any additional changes to the file as directed by the Parks Project Manager prior to final submittal and approval.
  8. Request for final payment will not be certified or processed until all As-Built prints and digital files have been received and approved.

G. Controller Zone Maps and Programming Schedule:

1. Do not prepare zone maps and programming schedules until record drawings have been reviewed and approved by the Parks Project Manager. Project Manager shall provide an example of Controller Charts required.
2. Provide one controller zone map for each automatic controller installed.
  - a. Chart shall be reproduction of record drawing, one page sized 11" by 17". If photo reduction prints are required, keep reduction to maximum size possible to retain full legibility.
  - b. Chart shall be print of actual record drawing of the system, showing the entire area covered by that controller on one sheet.
  - c. Identify controller, all remote valves and lateral lines of each remote

control valve, using a distinctly different color for each zone. Include the entire area of the controller's coverage. Provide a legend.

3. Provide one zone map for the entire project.
  - a. Chart shall be reproduction of record drawing, one page maximum 36" by 48", photo reduced to maximum size and legibility.
  - b. Identify all controllers, remote valves and lateral lines using different colors to distinguish adjacent zones.
4. Provide one controller programming schedule for each automatic controller installed, one page maximum, 8-1/2" by 11". Project Manager shall provide an example of Controller Programming Schedule required.
5. Following review of charts and schedules by Parks Project Manager, provide two additional color duplicates of controller charts and controller schedules. One set of controller charts and schedules shall be laminated between two layers of 3 mil. plastic sheet. Provide digital copies of charts and schedules in pdf format.
6. Charts and controller schedules shall be completed and reviewed prior to final review of irrigation system.
7. Request for final payment will not be certified or processed until all prints and files for controller charts and schedules have been received and approved.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

##### A. Packing and Shipping:

1. Deliver all components to job site in original unopened packaging containers prominently displaying manufacturer's name, volume, quantity, contents, instructions, and conformance to local, state, and federal law. Remove and replace cracked, broken, or contaminated items or elements prematurely exposed to moisture, inclement weather, snow, ice, temperature extremes, fire, or jobsite damage.
2. Handling, storage and delivery of PVC pipe:
  - a. Exercise care in handling, loading and storage of PVC pipe.
  - b. Provide 48 hours advance notice of delivery to Parks Project Manager for observation of unloading and handling of PVC materials during delivery.
  - c. All PVC pipe shall be transported in a vehicle which allows length of pipe to lie flat so as not to subject it to undue bending or concentrated external loads. All sections of pipe that have been dented or damaged shall be discarded, and if installed, shall be replaced with new piping.

##### B. Storage and Protection:

1. Deliver, unload, store, and handle materials, packaging and bundling products in dry, weatherproof condition in manner to prevent damage, breakage, deterioration, intrusion, ignition, and vandalism.

#### 1.7 JOBSITE CONDITIONS:



A. Existing Conditions:

1. Soil Conditions: Investigate the type of soil and conditions in which lines are to be installed and allow for same in proposal. No extra payment will be allowed due to difficulty in trenching, unless approved by the Parks Project Manager.
2. Contractor is responsible for understanding the scope of related operations as specified and indicated in the Drawings and Specifications before beginning Work under this Section.
3. Report unsatisfactory conditions in writing to the Parks Project Manager. Commencement of installation means acceptance of existing conditions by the Contractor

B. Protection of Property:

1. Preserve and protect all trees, plants, monuments, structures, and paved areas from damage due to Work of this Section. In the event damage does occur, all damage to inanimate items shall be completely repaired or replaced to satisfaction of the Parks Project Manager, and all injury to living plants shall be repaired or replaced by the City. All costs of such repairs shall be charged to and paid by Contractor.
2. Protect buildings, walks, walls, and other property from damage. Erect and maintain barricades, warning signs and lights, and provide guards as necessary or required to protect all persons on the site. Damage caused to asphalt, concrete, or other building material surfaces shall be repaired or replaced at no cost to the City. Restore disturbed areas to original condition.

C. Protection of Existing Trees:

1. Consult with Parks' Forestry as requested by Project Manager prior to trenching or boring within tree drip-lines. All trenching or work under limb spread of any and all evergreens or low branching deciduous material shall be done by hand or by other methods so as to prevent damage to limbs or branches.
2. Where it is necessary to excavate adjacent to existing trees, use all possible care to avoid injury to trees and tree roots. Excavation in areas where 2-inch and larger roots occur shall be done by hand. Roots 2 inches or larger in diameter, except directly in the path of pipe or conduit, shall be tunneled under and shall be heavily wrapped with burlap to prevent scarring or excessive drying. Where a trenching machine is operated close to trees having roots smaller than 2 inches in diameter, wall of trench adjacent to tree shall be hand trimmed, making clean cuts through roots. Trenches adjacent to trees shall be closed within 24 hours, and when this is not possible, side of trench adjacent to tree shall be kept shaded with moistened burlap or canvas.
3. Directional micro-boring is permitted within TPA (tree protection area) must occur below 36 inches deep in the soil and may not take place anywhere within the area from the outermost edge of the drip line to the trunk of any tree. Any exception must be agreed upon by the City Forester or a representative of the City Forester.

D. Protection and Repair of Underground Lines:

1. Request proper utility company to stake exact location (including depth) of all underground electric, gas, sewer, and telephone lines. Take whatever precautions are necessary to protect these underground lines from damage. If damage does occur, all damage shall be repaired by Utility Owner. All costs of such repairs shall be paid by Contractor unless other arrangements have been made.
2. Request City, in writing, to locate all private utilities (i.e., electrical service to outside lighting) before proceeding with excavation. If, after such request and necessary staking, private utilities which were not staked are encountered and damaged by Installer, they shall be repaired by the City at no cost to Installer. If Contractor damages staked or located private utilities, they shall be repaired by Utility Owner at Contractor's expense unless other arrangements have been made.

E. Replacement of Paving and Curbs:

1. Where trenches and lines cross existing roadways, paths, curbing, etc., damage to these shall be kept to a minimum and shall be restored to original condition.

1.8 WARRANTY/GUARANTY:

- A. Provide one year written warranty for material and installation from date of Substantial Completion.
- B. Expenses due to vandalism before Substantial Completion shall be borne by Contractor.
- C. Settling of backfilled trenches which may occur during guaranty period shall be repaired at no expense to the City, including complete restoration of damaged property.
- D. City will maintain turf and planting areas during warranty period, so as not to hamper proper operation of irrigation system, unless maintenance by Contractor is specified by contract. Contractor is responsible to monitor and coordinate controller scheduling and maintenance with Parks maintenance staff for any seeding, sodding or planting areas under Contractor's warranty.
- E. The City and County of Denver Department of Parks and Recreation reserves the right to make temporary repairs during the warranty period as necessary to keep systems in operating condition without voiding the Contractor's warranty, nor relieving Contractor of his responsibilities.
- F. Contractor shall make repairs and replacement promptly when notified, within three days of notification. If Contractor fails to make repairs within three days, City may make such repairs at Contractor's expense.

1.9 MAINTENANCE:

- A. Where applicable, furnish the following maintenance items to City prior to Final Acceptance:
  1. Two sprinkler heads for each size and type specified. Two nozzles for each type of head.
  2. Two wrenches for each type of head cover. Two wrenches for removing and installing each type of head.
  3. Two valve keys for operating each type of manual valve.
  4. Two keys for valve markers.
  5. Two keys for valve box covers.
  6. Two valve keys and hose swivels for each type of quick coupling valve, four controller cabinet keys, and one remote control device for each project.

1.10 Maintenance During Project Construction:

- A. Contractor shall fence, water and keep weed free any turf and planting areas within active phases of construction. Coordinate controller scheduling and maintenance operations with Parks maintenance staff and Parks Project Manager for portions of Park property unaffected by current phases of construction. Turf and plants affected by mainline Work or irrigation water service shutdown during irrigation season shall receive watering per Parks' schedule, with no interruption of watering greater than 72 hours.
- B. Additional Maintenance During Warranty Period:
  - a. Make repairs and replacements needed due to defective workmanship and materials.
  - b. Winterization – include cost in bid for winterizing complete system at conclusion of irrigation season (during which system received final acceptance) within 3 days notification by the City. System shall be voided of water using compressed air or similar method accepted by Parks Project Manager. Reopen, operate and adjust system malfunctions accordingly during April of following season within 3 days of notification by City.

PART 2 - PRODUCTS

2.1 GENERAL:

- A. Equipment must have performance characteristics to operate per the design conditions indicated. If any discrepancy or conflict exists between the quantities of equipment listed in the schedule and quantities shown on the Drawings, the Drawings shall govern.
- B. All material shall be of the highest grade possible and where applicable, shall be marked accordingly. All material shall be new.

2.2 PIPE AND PIPE FITTINGS:

- A. Main and Lateral Lines:
  - 1. Main Lines (pressurized, downstream of backflow prevention units):
    - a. Class 200 PVC BE (size 1-1/2" through 2-1/2")
    - b. Class 200 PVC RT (size 3" and larger).
    - c. Velocities in PVC mainline shall not exceed 5 FPS.
    - d. All PVC pipe will conform to the requirements of the United States Department of Commerce commercial standard Type 1-ASTM-D-2241.
    - e. HDPE pipe, pressure rating DR 9 (200 PSI) may be used by approval of Project Manager for portions of mainline that require boring such as below trees and paving. HDPE requires fusion butt weld transition to PVC mainline using ISCO Industries IPS Bell MJ Adapter with kit, model #ISMFMJ03IPSBELL.
  - 2. Lateral Lines: 100 PSI High Density NSF Polyethylene Piping - 1" minimum diameter.
    - a. Velocity of water flow in polyethylene pipe shall not exceed 7-1/2 feet per second.
  - 3. Main line water flow velocity shall not exceed five (5) feet per second.

- B. Sleeving:
1. Horizontal sleeves under paved surfaces: Class 200 PVC.
  2. Vertical sleeves for access to drains and valves: Class 200 PVC.
  3. Horizontal sleeving for boring applications: HDPE
- C. Brass Pipe and Fittings:
1. Brass Pipe - 85% red brass, ANSI Schedule 40 screwed pipe.
  2. Fittings - Medium brass, screwed 125 pound class.
- D. Plastic Pipe and Fittings:
1. Identification Markings: Identify all pipe with following indelible markings:
    - a. Manufacturer's name.
    - b. Nominal pipe size.
    - c. Schedule of class.
    - d. Pressure rating.
    - e. NSF (National Sanitation Foundation) seal of approval.
    - f. Date of extrusion.
  2. Gasketed End Pipe (Pressurized main line 3" and larger) – Manufactured from virgin Polyvinyl Chloride compound in accordance with ASTM D2241 and ASTM D1784; cell classification 1254-B, Type 1, Grade 1.
    - a. All fittings and service tees (3" and larger) – Harco or Leemco ductile iron, grade 70-55-05 in accordance with ASTM A-536. Fittings shall have deep bell push-on joints with factory installed gaskets meeting ASTM F-477.
    - b. Lubricant – As recommended by manufacturer of pipe fittings.
    - c. Pipe Restraints on all fittings and service tees and pipe to pipe restraints: Harco or Leemco, installation as recommended by manufacturer. Joint Restraint shall be used on all Valves and Ductile Iron Fittings where there is a change of direction (such as a bend or tee) or flow area (such as a reducer, cap/plug). Each fitting bell shall be restrained to the pipe inserted in it per manufacturer's recommendations. See Manufacturer catalog for appropriate selection or chart supplied on plans.
  3. SDR21-200 PVC pipe (Pressurized main line 2-1/2" and under).
    - a. Pipe will be assembled with Schedule 80 PVC fittings using ASTM-F-656 purple primer followed with heavy bodied ASTM-D-2564 glue.
    - b. Fittings shall be installed with thrust blocks as per Detail.
  4. Flexible Plastic Pipe (non-pressure lateral lines):
    - a. Manufactured from virgin polyethylene in accordance with ASTM D2239, designated as PE 3408. Maximum size 2"; minimum size 1".
    - b. Fittings - Manufactured in accordance with ASTM D2609; PVC Type 1 cell classification 12454-B.
    - c. Clamps - All stainless steel worm gear screw clamps. Use 2 clamps per joint on all insert fittings.
    - d. Risers for Pop-up Heads - Shall be swing pipe, 0.49 ID, operating pressure of 80 PSI, manufactured by Rainbird or equal.

## 2.3 VALVES:

### A. Gate Valve or Isolation Valve:

1. Valve for 3" and larger mainline: Shall be cast iron body, push-on, left-hand opening, square nut operated, rubber resilient seated, mechanical joint AWWA gate valve with clear waterway equal to full diameter of pipe. Able to withstand continuous working pressure of 150 PSI. Wheel type handle is unacceptable.
2. Valve for 2-1/2" and smaller mainline (solvent-weld): Shall be Matco-Norca 10RS resilient wedge gate valve with threaded ends and non-rising stem.

### B. Automatic Control Valve:

1. Automatic Valve for Potable Water System: Rain Bird PEB-PRS-D Series Valve having manual flow adjustment and manual bleed nut. PRS-D may be eliminated if pressure at the head is less than ten pounds greater than optimal pressure.
2. Automatic Valve for Non-Potable Water System: Rain Bird PESB-PRS-D Series Valve. PRS-D may be eliminated if pressure at the head is less than ten pounds greater than optimal pressure.
- 3.
4. Manifold: Manifold to be constructed out of Schedule 80 PVC pipe, fittings, and nipples, with ductile iron riser nipple and angle valve Champion brass body 200RS angle valve with brass unions as per details and plans.

### C. Manual Drain Valve:

1. Drain Valve: Mueller Oriseal #H-10283 or MacDonald AY 1" 3061 with brass swing joint assembly.

### D. Quick Coupling Valves:

1. Buckner "Wing Thing" Q44LCAR10 brass two-piece body with winged stabilizer, designed for working pressure of 150 PSI; 1" FIP. Equip quick coupler with locking rubber cover, key and brass swivel. Size as shown on Drawing
2. All Quick Coupling Valves to be used for winterization shall be constructed of all brass swing joint and fittings.

### E. Master Valve:

1. Mainline 2" and larger Master Valve shall be Bermad 410 normally open valve.
2. Mainline smaller than 2" Master Valve shall be Superior 3100 normally open valve.

### F. Flow Sensor Assembly:

1. Mainline 1-1/2" – 4" and with flow greater than .5 feet per second, flow sensor shall be Data Industrial 228-PV, sized according to mainline size.
2. Mainline larger than 4", flow sensor shall be Data Industrial 220-B mounted with Harco tapping saddle sized according to mainline size.
3. Mainline 1" with flow less than .5 feet per second, flow sensor shall be Data Industrial 4000

G. Valve Boxes:

1. All valve boxes will have a stainless steel hex bolt locking system.
2. Isolation Valves, Quick Coupling Valves, Drain Valves, Wire Splices and Ground Rods - Carson Brooks 10" round box,
  - a. brand lids: Isolation/Gate Valve with "GV", Quick Coupler Valve with "QC", Manual Drain Valve with "DV", Air Relief Valve with "AR", Master Valve with "MV", Flow Sensor with "FS" and Wire Splice Box with "SB".
3. Electric Control Valve Box: Shall have locking cover branded with the zone number.
  - a. Single valve location only, 3/4 inch through 2 inch: Carson Brooks #1220 jumbo box with 910-4 bolt down T-cover.
  - b. Multiple valve clusters, 3/4 inch through 2 inch, max. three (3) control valves per box: Carson Brooks #1730-18 box with 910-4 bolt down T-cover or Rain Bird VB Max.
4. Box Color for valves shall be green for potable systems, purple for non-potable systems.
5. Gravel Leveling Bed and Drainage Sump in Valve Boxes: 3/4" crushed gravel lined in geo-textile, as indicated on Drawings.

H. Backflow Preventer:

1. High hazard, reduced pressure type, approved by USC or other approved testing laboratory; fully ported, ball-type gate valves on units 2" or smaller, resilient gate valves on units larger than 2"; as manufactured by Febco or approved equal.
2. Backflow Preventer Cover: Guardshack enclosure of appropriate size, equipped with Lock Shield Brackets, manufactured by BPD, phone: 800-266-5411. Color: forest green.
3. For devices 2" and smaller, install Sentry SC75-200 locking device.
4. Concrete Pad: Comply with Section 02520.

I. Air Relief Valve:

1. On systems 3" or larger, as per plan: Bermad 4415 (all cast iron) 2" double purpose vacuum air release valve or equal.

J. Pressure Reducing Valve:

1. Watts commercial grade or equal required where system pressures exceed 100PSI.

2.4 SPRINKLER HEADS:

- A. Heads: Provide fabricated riser units of the type and size as indicated on the Drawings. Heads of a specific type or function in the system shall be of the same manufacturer and shall be marked with the manufacturer's name and identification in such a position that they can be identified without being removed from the system.

1. Pop-Up Sprinkler Heads in turf areas: Rain Bird 1804 SAM-PRS or 1806 SAM-PRS.
2. Pop-Up Sprinkler Heads in native grass areas and flower bed areas: Rain Bird 1812 SAM-PRS.
3. Pop-Up Sprinkler Nozzles shall be Rain Bird U-Series nozzle. Strip series, rotary, MPR and VAN nozzles may be used for specific approved applications.
4. Gear Driven Heads: Hunter I-20, I-25, I-40 or Rain Bird 3500, 5000 Plus, 5500, or 8005 series with stainless steel risers, SAM, PRS and MPR options as available.

B. Flexible Connectors to Lateral Pipe:

1. Pop-up Heads: Shall be Rain Bird Swing Pipe, 1/2" SPX Series, connected to lateral pipe with Rain Bird SBE-050 spiral barbed ell PVC insert fittings.
2. Gear Driven Heads: Shall be field constructed swing joints as per detail, connected to lateral pipe with PVC insert fittings.

## 2.5 LOW VOLUME IRRIGATION

- A. Valve – Rain Bird XCZ 100 B Com for reuse water and XCZ 150 Com for potable water. Valves shall be installed in Carson Brooks #1220 jumbo box or approved equal with 910-4 bolt down T-cover. Brand lid with zone number.

1. All low volume irrigation shall be zoned independently from turf, and product applications may not be mixed within zone.

- B. Lateral pipe – Flexible polyethylene pipe as per specifications 2.2.D.4. See Drawings for installation depth.

- C. Sub-surface irrigation – Netafim Techline CV, 0.26 or .4 GPH emitter with 12" or 18" spacing. See Drawings for installation and depth of pipe.

1. Requires Netafim 120 mesh filter in Carson 1419-12 valve box with corner hex bolt down cover. Brand lid with "FIL".
2. Flush valve in Carson round 10" valve box with bolt down T-cover as per Drawings. Brand lid with "FV".

- D. Tree/Shrub Bubblers – Rain Bird SQ nozzle installed as per Drawings. Rain Bird 1400 series Tree and Shrub Bubbler may be used for shrubs, and per approval by forestry for tree applications.

1. Discharge rate must not exceed soil infiltration rate.
2. Top of bubbler or nozzle shall not exceed 2" height above mulch/soil surface.

## 2.6 AUTOMATIC CONTROL SYSTEM:

- A. Automatic Controller:

1. Central Control systems shall be Toro Sentinel special build central control with wireless output boards. Update to Sentinel central control is required on all

projects unless a variance is granted by Denver Parks Water Conservation.

- a. Sentinel satellite controller in prefabricated enclosure with pedestal is available exclusively through C.P.S. Distributors. Contractor shall purchase fully assembled enclosure including back panel, terminal strips, power supply unit, interior fused disconnect with 120 volt duplex outlet, heavy duty transient surge protection boards, antenna(s) with cable, louvers and fan kit. Enclosure and pedestal shall be stainless steel with factory applied powder coating finish, color #6005 Tiger Drylack color chart. Enclosure shall have a heavy duty hasp for locking. Model number is per plan as specified by Toro.
  - b. Provide one hand-held remote control unit for each project specified or as specified per plan.
  - c. 450 MHz radio communication shall be fully compatible with Denver Parks and Recreation frequency required by the Operations District.
2. If variance is granted, Controller must have the following minimum characteristics:
- a. Solid state, 14-day clocks, with multiple programming capabilities.
  - b. Capable of opening normally closed electric solenoid type valve.
  - c. Automatic Timing: Capable of incremental units from 3 to at least 60 minutes per station.
  - d. Water Budgeting: Capable of global program run time changes in percentage increments.
  - e. Ability to provide repeat and/or syringe cycle capabilities and ability to eliminate or isolate one station without disturbing remaining controller features.
  - f. Flow sensing capability with automatic shut-down or alarm signal.
  - g. Minimum 40 VA transformer rating.
  - h. Controller cabinets shall be stainless steel Strongbox or Hoffman enclosure with factory-applied Federal Green powder-coat finish and heavy duty locking hasp. Size cabinet per specification from manufacturer.
  - i. Controller and cabinet require grounding per manufacturer recommendations, outside disconnect, inside fused disconnect, interior duplex GFI outlet.
3. Controller and remote control equipment: Manufacturer and Model shall be noted on Drawing.
4. Contractor shall provide concrete pad, 120V electrical power, conduits, grounding and control wire connections to terminal surge strips .
5. Concrete Pad: Comply with plan detail and Section 02520.

B. Electrical Control Wiring:

1. Low Voltage:
  - a. Electrical Control Wire for 24VAC solenoid – Golf Course Sprinkler Wire - #14 to #10 AWG UL approved direct burial solid conductor copper wiring with polyethylene insulation .045” thickness.
  - b. Electrical Common Wire – Golf Course Sprinkler Wire - #12 AWG UL approved direct burial solid conductor copper wiring with polyethylene insulation .045” thickness.
  - c. Data Wires – Paige 7171D-A direct burial shielded and armored signal



- cable with polyethylene jacket.
  - d. Wire Colors: Consistent color system throughout.
    - 1) Control Wires – Black.
    - 2) Common Wires – White.
    - 3) Spare Control Wires – Red.
    - 4) Spare Common Wires – Purple.
    - 5) Data Wires – Green and Blue
    - 6) Tracer Wire – Yellow
  - e. Control Wire connections and splices shall be made with 3M DBM direct bury splice, or similar UL listed dry splice methods.
- 2. Splice Box: Carson Brooks 10” round box, branded “SB.”
  - 3. Mainline Tracer Wire – Install one continuous AWG UL No. 10 tracer wire as detailed above all mainline. Loop wire into control box. Color shall be yellow.
  - 4. High Voltage – Type required by local codes and ordinances, of proper size to accommodate needs of equipment serviced.

## 2.7 MISCELLANEOUS MATERIALS:

- A. Rain Sensor: Hunter wireless Rain Klik with by-pass or Mini-Klik (wired) with Sensor Guard or approved equal. Rain sensor shall be installed per manufacturer’s recommendations.
- B. Concrete Thrust Blocks as per plan for all 2-1/2” and smaller PVC solvent weld mainline: Minimum of one cubic foot of cast-in-place concrete in compliance with Section 03300 and 3.3.C below.

## PART 3 – EXECUTION

### 3.1 PREPARATION:

- A. Utility Locates: Contact Utility Notification Center of Colorado at or 8-1-1 or 1-800-922-1987 prior to any excavation, for the marking of underground member utilities. The indication of utilities on the Drawings does not relieve the Contractor of the responsibility for utility location. Route trenches to avoid existing utilities. Verify with the Parks Project Manager any required relocation prior to installation.
- B. Landscape Plan Review and Coordination: Contractor will be held responsible for coordination between landscape and irrigation system installation. Landscape material locations shown on the Landscape Plan shall take precedence over the irrigation system equipment locations. If irrigation equipment is installed in conflict with the landscape material locations shown on the landscape plan, the Contractor will be required to relocate the irrigation equipment, as necessary, at Contractor’s expense.
- C. Pressure Verification: Contractor shall field verify the tap size, static pressure and verify Gallons Per Minute flow at the project site, prior to commencing Work or ordering irrigation materials, and submit findings in writing to Parks Project Manager. If Contractor fails to verify tap size, static water pressure and flow prior to commencing Work or ordering irrigation materials, Contractor shall assume responsibility for all costs required to make system operational and the costs required to replace any damaged landscape material. Damage shall include all required material costs, design costs, labor costs and plant replacement costs.

- D. Inspection: Examine areas and conditions under which Work of this Section is to be performed. Do not proceed with Work until unsatisfactory conditions have been corrected.
  - 1. Grading operations, with the exception of fine grading, shall be completed and approved by Parks Project Manager before staking or installation of any irrigation system begins.
- E. Layout: Lay out and stake system before beginning installation. Staking shall occur as follows:
  - 1. Mark, with paint, routing of pressure supply line and flag heads for all new zones. Contact Parks Project Manager 48 hours in advance and request review of staking. Parks Project Manager will advise installer as to the amount of staking to be prepared. Parks Project Manager will review staking and direct changes if required. Review does not relieve installer from coverage problems due to improper placement of heads after staking.
  - 2. Valve boxes and mainline will not be located in ball fields, and multi-use sport fields, recovery zones, or below playground equipment.
  - 3. If project has significant topography, freeform planting beds, or other amenities which could require alteration of irrigation equipment layout as deemed necessary by Parks Project Manager, do not install irrigation equipment in these areas until Parks Project Director has reviewed equipment staking.
  - 4. Parks Project Manager may request Parks Forestry approval of proposed trenching prior to start of trenching.
  - 5. Review backflow prevention device location and operation with Parks Project Manager prior to mainline installation.

### 3.2 EXCAVATION AND BACKFILL:

- A. Install mainline pipe and wire sleeving under existing asphalt paving, concrete walks and critical root zones by directional boring. Pot-hole existing utilities for location and depth in advance of boring operations. When pot-holing in cross streets: include all permits, traffic control, backfill, compaction and surface restoration as required by the City and County of Denver Transportation Engineering Standards and Specifications. Compact backfill around end of sleeves to 95% compaction in landscape areas.
- B. Excavation:
  - 1. Trenching:
    - a. Trench excavation shall follow, as much as possible, layout shown on Drawing. Dig trenches straight and support pipe continuously on bottom of trench. Trench bottom shall be clean and smooth with all rock and organic debris removed. Comply with OSHA standards for all trenching and excavation.
    - b. Trenching under limb spread of existing trees: Accomplish by hand or other method that will not damage limbs or branches. Keep trenches at least 6 feet from trunk of existing trees. Refer to Section 02150: Tree Retention and Protection for additional precautions.
  - 2. Clearances:

3. Main pressure line: Make trenches of sufficient width to properly assemble and position pipe in trench. Clearances:
  - a. Piping 3" and Larger: Minimum clearance of piping 3" or larger shall be 5 inches horizontally on both sides of the trench.
  - b. Piping 2-1/2" and Smaller: Trenches shall have a minimum width of 4 inches.
  - c. Line Clearance: Provide min. 6 inches of clearance between each line, and min. 12 inches of clearance between lines of other trades.
  - d. Lateral pipe: Trenches shall have a minimum width of 4 inches.
  - e. Line Clearance: Provide not less than 6 inches of clearance between each line, and not less than 12" of clearance between lines of other trades.
4. Pipe and Wire Depth to finish grade:
  - a. Pressure Supply Piping within Parks – 30 inches from top of pipe (maximum variation 2").
  - b. Pressure Supply Piping within Right-of-Way – 24 inches from top of pipe (maximum variation 2").
  - c. PVC Sleeving – at specified pipe or wire depth.
  - d. Non-pressure Piping (gear driven heads) – 18 inches from top of pipe (maximum variation 2").
  - e. Non-pressure Piping (pop-up heads) – 18 inches from top of pipe (maximum variation 2").
  - f. Control Wiring – Side of pressure main when installed in the same trench; 24 inches from top of wire bundle where installed separately from mainline trench.
5. Boring will be permitted only where pipe must pass under obstruction(s) which cannot be removed. In backfilling bore, final density of backfill shall match that of surrounding soil. It is acceptable to use sleeves of suitable diameter installed first by jacking or boring, and pipe laid through sleeves. Observe same precautions as though pipe were installed in open trench.
6. Vibratory Plow: Not permitted without written authorization of Parks Project Manager.

3.3 INSTALLATION OF IRRIGATION EQUIPMENT: Locate all equipment as near as possible to locations designated. Deviations shall be reviewed and approved by Parks Project Manager prior to installation.

A. Sleeving:

1. Install sleeving under asphalt paving and concrete walks prior to concreting and paving operations to accommodate piping and wiring.
2. Minimum depth to top of pipe shall be determined by depth of mainline and lateral lines.
3. Lay sleeve to drain at minimum grade of 3" per 100'.
4. Sleeving located under areas where asphalt or concrete paving will be installed shall be bedded with sand (a layer 6" below pipe and 6" above pipe).
5. Compact backfill material in 6" lifts at 95% maximum density determined in accordance with ASTM D1557, using manual or mechanical tamping devices.
6. Sleeving under existing walks or concrete pavement shall be done by jacking,

boring or hydraulic driving, but where cutting of asphalt and/or concrete is necessary, it shall be done and replaced at no cost to the City. Obtain permission to cut walks from Parks Project Manager.

7. Do not allow sleeves to become filled with soil or other undesirable material. Tape ends of sleeves until commencement of pipe installation.
8. Mark sleeves as per plans in a manner to ensure easy location in the future.

B. Installation of Piping:

1. PVC Mainlines:

- a. Snake pipe in trench as much as possible to allow for expansion and contraction. Place manual drain valves at low points and dead ends of pressure supply piping to insure complete drainage of system. When pipe laying is not in progress, or at end of each day, close pipe ends with tight plug or cap. Perform Work in accordance with good practices prevailing in piping trades.
- b. Slope pipe at minimum 3" per 100' to manual drain valve and drainage sump. Field adjust as needed.
- c. Solvent Weld PVC Pipe (all pipes 2-1/2" and smaller): Lay pipe and make all plastic to plastic joints in accordance with manufacturer's recommendations. Do not install pipe when air temperature is below 40 degrees (F).
- d. Gasketed End Pipes: Lay pipe and make pipe-to-fitting or pipe-to-pipe joint, following OR70 recommendations (Johns-Manville Guide for Installation of Ring-Tite Pipe), or pipe manufacturer's recommendations. Install Harco or Leemco fittings and pipe restraints on all fittings and adjacent pipe runs per manufacturer's recommendations.

C. Thrust Blocks on 2-1/2" and smaller PVC mainline: Construct thrust blocks as per plans.

1. Contact Parks Project Manager prior to placing thrust blocks, for observation of thrust block excavation and initial placement. Size thrust blocks per plan:

2.	<u>Soil Type</u>	<u>lbs./SF</u>
a.	Mulch, Peat, etc.	0
b.	Soft Clay	500
c.	Sand	1,000
d.	Sand and Gravel	1,500
e.	Sand and Gravel with Clay	2,000
f.	Sand and Gravel Cemented with Clay	4,000
g.	Hard Pan	5,000

D. Flexible Plastic (Polyethylene) Pipe –

1. Lay pipe and assemble fittings according to manufacturer's recommendations.

E. Control Wiring - Low Voltage Wiring:

1. Bury control wiring between controller and electric valves in pressure supply line trenches, strung as close as possible to main pipe lines with such wires to be consistently located below and to one side of pipe, or in separate trenches.

2. Install tracer wire as per plan detail.
3. Bury control wiring between controller and electric valves in pressure supply line trenches, strung as close as possible to main pipe lines with such wires to be consistently located below and to one side of pipe, or in separate trenches.
  - a. Bundle all 24 volt wires at 10 foot intervals and lay with pressure supply line pipe to one side of the trench.
4. Provide an expansion loop at every pressure pipe angle fitting, every electric control valve location (in valve box), and every 500 feet. Form expansion loop by wrapping 24" of wire around a 3/4 inch pipe and withdrawing pipe.
5. Make all splices and E.C.V. connections using 3M DBY & DBR connectors or similar UL listed dry splice method.
6. Install all control wire splices not occurring at control valve in a separate Carson Industries Model #910-10 body with 910-4 bolt down T-cover wire splice valve box with branded with WS in 1" high letters minimum.
7. Install one control wire for each control valve.
8. Run five (5) spare #14 AWG UFUL control wires and one (1) spare common wire from controller pedestal to the end of each and every leg of mainline. Label spare wires at controller and wire stub box.

F. High Voltage Wiring for Automatic Controller:

1. Provide 120 volt power connection to automatic controller.
2. All electric work shall conform to local codes, ordinances, and authorities having jurisdiction. All high voltage electrical work shall be performed by licensed electrician.

G. Installation of Valves:

1. Electric Control Valves: Install electric control valves as detailed on the Drawings.
2. Quick Coupling Valves: Install quick coupling valves as detailed on the Drawings.
3. Drain Valves: Install manual drain valves as detailed on the Drawings.
4. Install manual drain valves at all low points in pressure supply line, whether indicated on the drawing or necessitated by actual conditions, to ensure proper drainage of the mainline.
5. Isolation/Gate Valves: Install as detailed in locations shown on Drawings.
6. Valve Boxes: Install one valve box for each type of valve installed as detailed. Install gravel compaction and leveling bed after compaction of subgrade and prior to setting of valve box.
  - a. Install valve boxes flush with finish grade and square to adjacent surface features.
  - b. When valve boxes are grouped together, allow at least 24 inches between valve box sides.
  - c. Cutting of valve box to give clearance for piping or valves will not be allowed.
7. Backflow Prevention Device: Contractor must meet all applicable laws, rules and codes, including but not limited to Uniform Building codes, Plumbing Codes and State Water Regulations. Assemblies must be installed per the manufacturer's specifications. Backflow devices shall not be installed within the public right-of-way.

- a. Install in strict accordance with current requirements of Denver Water. Connections to the Denver Water System are to have an approved assembly for the type protection they provide, either isolation or containment.
- b. Successful Testing of backflow assembly by a certified Backflow Prevention Assembly Tester is Contractor's responsibility. Test reports shall be forwarded to Denver Water in accordance with the State of Colorado regulations. Copies of the report, the tester's certification and the certification of the testing equipment used are to be forwarded to Parks Project Manager.
- c. Request for final payment will not be certified or processed until certification reports have been filed with Denver Water and received by Parks Project Manager.

H. Installation of Sprinkler Heads:

1. Install sprinkler heads where designated after Parks Project Manager has approved Staking. Set to finish grade as detailed.
2. Spacing of heads shall not exceed the maximum indicated on Drawing unless re-staked as directed by Parks Project Manager. In no case shall the spacing exceed maximum recommended by manufacturer.
3. Install gear driven heads on swing-joint risers as detailed. Angled nipple relative to non-pressure line shall be no more than 45 degrees or less than 10 degrees.
4. Install pop-up heads on swing pipe as detailed.
5. Adjust part circle heads for proper coverage. Adjust heads to correct height after sod is installed. Plant placement shall not interfere with intended sprinkler head coverage, piping, or other equipment. Parks Project Manager may request nozzle changes or adjustments without additional cost to the City.

I. Backfilling:

1. Do not begin backfilling operations unless authorized by Parks Project Manager and all required systems tests have been completed. Backfilling shall not be done in freezing weather unless authorized by Parks Project Manager. Leave trenches slightly mounded to allow for settlement after backfilling is completed. Trenches shall be finish graded prior to walk-through of system by Parks Project Manager.
2. Materials - Excavated material is generally considered satisfactory for backfill purposes. Backfill material shall be free of rubbish, vegetable matter, frozen materials, and stones larger than 1 inch in maximum dimension. Do not mix subsoil with topsoil. Material not suitable for backfill shall be hauled away. Contractor shall be responsible for providing suitable backfill if excavated material is unacceptable or not sufficient to meet backfill, compaction, and final grade requirements.
3. Do not leave trenches open for a period of more than 48 hours. Open excavations shall be protected in accordance with OSHA regulations.
4. Compact backfill to 90% S.P.D., determined in accordance with ASTM D698 utilizing the following methods in landscape areas:
  - a. Mainline Pipe: Backfill and mechanically compact in three uniform lifts

- to a 95% compaction.
- b. Secondary Pipe: Backfill in two uniform lifts and hydraulically or mechanically compact each.
- c. Puddling or ponding and/or jetting is prohibited within 20 feet of building or foundation walls.

J. Sleeving:

1. Sleeving shall be installed at mainline or lateral pipe depth.
2. Provide for a minimum cover of 24 inches between the top of the sleeve and the bottom of the aggregate base for all pressure and non-pressure piping installed under asphaltic concrete or concrete paving.
3. Sleeving located under areas where asphalt or concrete paving will be installed shall be bedded with sand (a layer 6" below pipe and 6" above pipe).
4. Compact backfill material in 6" lifts at 95% S.P.D. determined in accordance with ASTM D698 using manual or mechanical tamping devices under pavement.
5. Sleeving under existing walks or concrete pavement shall be done by directional boring. Where cutting or breaking of walks and/or concrete is necessary, it shall be done and replaced at no cost to the City. Obtain permission to cut or break walks and/or concrete from Parks Project Manager.
6. Set in place, cap and pressure test all piping under paving, in presence of Parks Project Manager prior to backfilling and paving operations.
7. Sleeve Size Requirements for wire and pipe (control wire shall be placed in sleeving separate from pipe sleeving):
  - a. 3/4"-1 - 1/4" Pipe: 2" PVC (1)
  - b. 1-1/2" - 2" Pipe: 4" PVC (1)
  - c. 2-1/2" - 3" Pipe: 6" PVC (1)
  - d. 4" Pipe: 8" PVC (1)
  - e. 1-25 Control Wires: 2" PVC (1)
  - f. 26-50 Control Wires: 3" PVC (1)

K. Automatic Control System:

1. Sentinel Central Control:
  - a. Contractor is to arrange and pay for C.P.S. Distributors to conduct a signal test and survey to maximize signal quality of any antenna and each Sentinel controller installed, and maximize layout for flow sensing. Contact Brandon Gully, C.P.S. Site Survey is to be conducted or verified prior to construction during summer full tree leaf-out. Design is based on field test. Contractor is responsible to coordinate optimization of central control with Toro and C.P.S.
2. Install controller and controller enclosure in accordance with the Drawings and with the manufacturer's instructions. Concrete pad, 120v electrical power, conduits, grounding and control wire connections to terminal surge strips shall be by contractor.
3. Provide controller to earth ground as per manufacturer recommendation. Central Control Satellite: Provide controller to earth ground in accordance with Article 250 of the National Electrical Code (NEC). Earth ground shall be 10 OHMS or less as measured by a Megger® or similar instrument, or as per manufacturer

recommendation. Contractor shall arrange and perform testing in presence of Denver Parks and Recreation representative or consultant.

- a. Ground rods are to have a minimum diameter of 5/8" and a minimum length of 8 feet. Copper wire shall be connected to the ground rod by the installer using a Cadweld GR1161G "One-Shot Plus" welding kit.
4. Install above ground wiring in rigid conduit in accordance with applicable codes.
- L. Coordinate installation with electrical work to insure electrical power supply line(s) are provided to controller location(s).
  - M. Wire control valves in a logical zone sequence.
    1. Permanently engrave date of installation and Xcel service pole number inside controller enclosure.
  - N. Miscellaneous Items:
    1. Rain Sensor: Install in accordance with manufacturer's instructions, located as per Drawing.

#### 3.4 FIELD QUALITY CONTROL:

- A. Flushing: After piping, risers, and valves are in place and connected, but prior to installation of sprinkler heads, quick coupler assemblies, and hose valves, thoroughly flush piping system under full head of water pressure from dead end fittings. Maintain flushing for 5 minutes through furthest valves. Cap risers after flushing.
- B. Testing pressurized mainline: Conduct tests in presence of Parks Project Manager. Arrange for presence of Parks Project Manager 48 hours in advance of testing. Supply force pump and all other test equipment.
  1. Set in place, cap and pressure test all piping under paving, in presence of Parks Project Manager prior to backfilling and paving operations.
  2. After backfilling and installation of all control valves, fill pressure supply line with water, and pressurize to 40 PSI over the designated static pressure or 120 PSI, whichever is greater, for a period of 2 hours.
  3. Leakage, Pressure Loss: Test is acceptable if less than 2 pounds of pressure is evident during the test period.
  4. Leaks: Detect and repair leaks. Replace defective PVC pipe with new full length pipe section. No pipe splices will be accepted within pipe sleeve. No PVC pressure couplings or slip-fix repair couplings will be allowed.
  5. Retest system until test pressure can be maintained for duration of test.
  6. Before final acceptance, pressure supply line shall remain under pressure for a period of 48 hours with no evidence of leaks or failures.
- C. Testing Controller Operations:
  1. Functional test of the control system shall be performed and demonstrate that all parts of the control system function as specified or intended, as per Parks **Central Control Certification Checklist**. The functional test for each system shall consist



of not less than 30 days of continuous, satisfactory operation of the complete system serviced by a controller.

- a. Contractor to coordinate with Parks Project Manager to arrange Central Control Certification meeting.
  - b. Required attendees are representatives from Toro, Operations District, Water Conservation and Project Manager.
2. Any materials determined to be faulty as part of the installation shall be replaced or corrected by the Contractor at his expense in a manner respective to the Plans, Details and other sections of this Specification. In the event of a system failure due to faulty installation, programming or workmanship, the 30 day period will be repeated until testing is complete.

D. System Operations Orientation:

1. System Operation Training Session: A training and orientation session for Parks staff shall be required.
  - a. The Contractor, the irrigation subcontractor, a representative of the manufacturer or distributor, and representatives of Parks maintenance and Water Conservation shall be present. The date and time of the session and attendees present shall be subject to approval by a Parks representative.
  - b. The completed Record Drawings, Controller Zone Maps and Controller Program Schedule shall be reviewed for approval by Parks Water Conservation Unit.
  - c. Controller features, flow sensing, alarms and programming will be reviewed.
  - d. Hand held operation of field units will be demonstrated.

E. Walk-Through for Substantial Completion:

1. Arrange for Parks Project Manager's presence 48 hours in advance of walk-through.
2. Entire system shall be completely installed and operational and trenches shall be finish graded prior to scheduling of walk-through.
3. Electrically operate each zone in its entirety for Parks Project Manager at time of walk-through. Project inspection by Parks Project Manager shall include:
  - a. Review operation, coverage, head/nozzle adjustment, and system adjustment per specifications.
  - b. Open all valve boxes to confirm materials, gravel bedding, compaction, elevation, workspace access within boxes, clearance from lid and bedding, locking mechanisms, and zone branding. Interior of boxes should be free of visible soil. All valves must be tagged with zone identification and valve box lids must be branded with zone valve identification. Verify connections in all zone valve and wire splice boxes.
  - c. Contractor shall resistance test all spare common and hot wires for continuity in the presence of Parks Project Manager.
  - d. Confirm irrigation heads are at specified elevation and distance from paved surfaces and curbs, plumb and soil compacted.
  - e. Inspect concrete size and elevation of pads for backflow assemblies, master valves, and enclosure pads. Confirm quality of concrete, finish, access, spare conduit/sleeving as required for wiring.

- f. Confirm quality of controller enclosure and mounting (there must be no gap between controller and concrete), grounding, high voltage installation, low voltage wiring, ID tagging of wires in controller, and communication set up. Each controller must have a color-coded zone chart and programming chart as per specifications.
      - g. Contractor shall submit written certification for testing that proper grounding for all controllers has been installed to Owner.
      - h. Review trench and related excavation repair including backfill, compaction, fine grade, seed and sod installation.
      - i. Review appropriate use of purple valve lids and other product as required for reuse water applications.
    - 4. Certify Central Control Operation: Central control operation will be verified by Parks Certification of Central Control Checklist.
      - a. Generate a punch list of items to be corrected prior to Final Completion.
      - b. Furnish all materials and perform all work required to correct all inadequacies of coverage due to deviations from Contract Documents.
- F. Walk-Through for Final Completion:
- 1. Arrange for Parks Project Manager's presence 48 hours in advance of walk-through.
  - 5. Show evidence to Parks Project Manager that the City has received all accessories, charts, record drawings, and equipment and backflow certification reports and controller grounding assembly certificates as required before Final Completion walk-through is scheduled.
  - 6. Operate each zone, in its entirety for Parks Project Manager at time of walk-through to insure correction of all incomplete items.
  - 7. Items deemed not acceptable by Parks Project Manager shall be reworked to complete satisfaction of Parks Project Manager.
  - 8. If after request to Parks Project Manager for walk-through for Final Completion of irrigation system, Parks Project Manager finds items during walk-through which have not been properly adjusted, reworked, or replaced as indicated on punch list from previous walk-through, Contractor shall be charged for all subsequent walk-throughs. Funds will be withheld from final payment and/or retainage to Contractor, in amount equal to additional time and expenses required by Parks Project Manager to conduct and document further walk-through meetings as deemed necessary to ensure compliance with Contract Documents.

### 3.5 ADJUSTING:

- A. Upon completion of installation, "fine-tune" entire system by regulating valves, adjusting patterns and break-up arms, and setting pressure reducing valves at proper and similar pressure to provide optimum and efficient coverage. Flush and adjust all sprinkler heads for optimum performance and to prevent overspray onto walks, roadways, and buildings as much as possible. Heads of same type shall be operating at same pressure +/- 7%.
- B. If it is determined that irrigation adjustments will provide proper coverage and improved water distribution as determined by the Parks Project Manager, Contractor shall make such adjustments prior to Final Acceptance as directed, at no additional cost to the City. Adjustments may also include changes in nozzle sizes, degrees of arc, and control valve

throttling.

- C. All sprinkler heads shall be set perpendicular to finish grade unless otherwise designated.
  - D. Areas that do not conform to designated operation requirements, due to unauthorized changes or poor installation practices, shall be immediately corrected at no additional cost to the City.
- 3.6 CLEANING - Maintain continuous cleaning operation throughout duration of Work. Dispose of, off-site at no additional cost to the City, all trash, excess soil or debris generated by installation of irrigation system.

END OF SECTION 02810

PART 1: GENERAL

- 1.1 RELATED DOCUMENTS: The General Contract Conditions, Drawings and Division - 1 Specification sections apply to Work of this section.
- 1.2 SUMMARY:
- A. Work Included: Furnish and install bluegrass sod to restore disturbed areas around valve boxes and along mainline trenches and broadcast and rake in bluegrass seed along all secondary pipe and wire trenches, and maintain sodded and seeded areas until Final Acceptance.
  - B. Related Work:
    - 1. Irrigation System - Section 02810
- 1.3 SUBMITTALS
- A. Quality Control Submittals:
    - 1. Certificates: State, Federal and other inspection certificates shall accompany the invoice for materials showing source or origin. Submit to Project Manager prior to acceptance of material.
    - 2. At least 10 working days before anticipated date of sod delivery, submit list of varieties contained in sod for approval by Project Manager.
  - B. Contract Closeout Submittals:
    - 1. Warranty: At completion of work, furnish written warranty to Owner based upon requirements as specified.
- 1.4 QUALITY ASSURANCE
- A. Source Quality Control:
    - 1. Sod Materials: Subject to inspection and acceptance. Project Manager reserves the right to reject at any time or place prior to acceptance, any work and sod which in the Project Manager's opinion fails to meet these specification requirements.
    - 2. Inspection: Primarily for quality; however, other requirements are not waived even though visual inspection results in acceptance. Notify Project Manager of intended sod farm prior to cutting for inspection. Inspection at growth site shall not preclude the right of rejection at project site.
    - 3. Promptly remove rejected sod from site.
    - 4. Inspection will be made periodically during sodding, at completion and at end of warranty period by Project Manager.
  - B. Sod Standards:

1. General: Healthy, thick turf having undergone a program of regular fertilization, mowing and weed control; free of objectionable weeds; uniform in green color, leaf texture and density; healthy, vigorous root system; inspected and found free of disease, nematodes, pests and pest larvae by the entomologist of the State Department of Agriculture.
2. Each piece of Sod: Sandy-loam soil base that will not break, crumble or tear during sod installation.
3. Thickness: Minimum 3/4" thick, excluding top growth and thatch.
4. Thatch: Not to exceed 1/2" uncompressed.
5. Size: Cut in strips 18" wide no more than 24 hours prior to delivery.

#### 1.5 DELIVERY, STORAGE AND HANDLING

- A. Sod: Deliver on pallets properly loaded on vehicles and with root system protected from exposure to sun, wind, and heat in accordance with standard practice and labeled with botanical and common name of each grass species in accordance with Federal Seed Act. Sod that has been damaged by poor handling or improper storage is subject to rejection by the Project Manager.
1. Protect from dehydration, contamination, freezing and heating at all times. Keep stored sod moist and under shade or covered with moistened burlap.
  2. Do not drop sod rolls from carts, trucks or pallets.
  3. Do not deliver more sod than can be installed within 48 hours.
  4. Do not stack sod more than 2 feet deep.
- B. Fertilizer: None required.

#### 1.6 PROJECT/SITE CONDITIONS

- A. Existing Conditions:
1. Import and place any fill material required to adjust the fine grade to meet drainage requirements or to match hard surface finish grades.
  2. Vehicular accessibility on site shall be as directed by Project Manager. Repair damage to prepared grounds and surfaces caused by vehicular movement during work under this section to original condition at no additional cost to Owner.
- B. Environmental Requirements:
1. If possible install sod between spring and fall: April 15 - October 1 or anytime irrigation is available daily for one month and once a week for several months (especially for fall/winter sodding).
  2. Do not install sod on saturated or frozen soil.
  3. Schedule work for periods of favorable weather. Sod placement on days which, in the opinion of the Project Manager, are too hot, dry or windy for optimal installation may be prohibited.

#### 1.7 MAINTENANCE

A. Substantial Completion:

1. The Project Manager will inspect all work for Substantial Completion upon written request of the Contractor. The request shall be received at least ten calendar days before the anticipated date of inspection.
2. Acceptance of material by the Project Manager will be for general conformance to specified requirements, and shall not relieve the Contractor of responsibility for full conformance to the Contract Documents.
3. Upon completion and reinspection of all repairs or renewals necessary in the judgment of the Project Manager, the Project Manager will recommend that the Work of this Section be provisionally accepted.

B. Maintenance:

1. General: The maintenance period shall begin immediately after each area is sodded and continue until final acceptance of entire project or a minimum of 30 days, whichever is later. During this time, Contractor shall be responsible for watering, mowing, spraying, weeding, aerating, fertilizing, and all related work as necessary to ensure that sodded areas are in a vigorous growing condition. Furnish all supervision, labor, material and equipment to maintain turf areas.
2. Materials: Conform to specification or otherwise be acceptable to Project Manager.
3. Watering: Initially water sod upon completion of convenient work areas until installation is complete and the irrigation system can be operated under full control. Water sod sufficiently to moisten subsoil at least 4" deep in a manner not to cause erosion or damage to adjacent finished surfaces. Water shall be free of substances harmful to plant growth. Be responsible for furnishing water from underground sprinkler system, quick couplers or other source.
4. Fertilizing: None required.
5. Mowing and Trimming: Mow and Trim around trees (keeping mulch in saucers and beds), walls, fences, etc., maintaining turf at 2½-2-¾" height. Do not remove more than 33% of grass leaf in single mowing. Remove grass clippings from pavement areas.
6. Resodding: Resod spots larger than 1 sq. ft. not having healthy, uniform stand of grass.
7. Weed Control: As required, using selective herbicides approved by Project Manager.
8. Insect and Disease Control: As required, using insecticides and fungicides approved by Project Manager.

- C. Final Acceptance:
1. At the end of the Maintenance Period, the Project Manager will, upon written notice of end of Maintenance Period, inspect the work for Final Acceptance. Request shall be received at least ten calendar days before the anticipated date for Final Inspection.
  2. Upon completion and reinspection of full repairs or replacements necessary in the judgement of the Project Manager at that time, the Project Manager will recommend that Final Acceptance of the Work of this Section be given.
  3. Sod areas will be accepted when in compliance with all the following conditions:
    - a. Roots are thoroughly knit to the soil.
    - b. Absence of visible joints.
    - c. All areas show a uniform stand of specified grass in healthy condition, free of weeds, diseases and other visible imperfections.
    - d. At least 30 days have elapsed since the completion of Work under this Section.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Sod: Colorado grown Kentucky Bluegrass blend having a healthy, vigorous root system. Blend shall contain a minimum of 3 improved varieties.
- B. Water: Free of substances harmful to plant growth. Be responsible for furnishing water from underground sprinkler system, quick couplers or other source.
- C. Fertilizer: None required.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. General - Verify that existing site conditions are as specified and indicated before beginning work under this section.
  1. Layout: Verify layout of sodded areas as indicated prior to starting operations.
  2. Grades: Verify that grades are within 0.04 ft. of grades indicated and specified.
- B. Unsatisfactory Conditions: Report in writing to General Contractor with copy to Project Manager.
- C. Beginning of installation means acceptance of existing conditions by this Contractor.

### 3.2 PREPARATION

- A. Protection:
  - 1. Be responsible for proper repair to landscape, utilities, walls, pavements, and other site features damaged by operations under this section.
  - 2. Identify prepared sod areas requiring protection and erect barriers for proper protection and traffic control.
- B. Sodded Areas: Remove weeds, debris and rocks larger than ½". Dispose of accumulated debris at direction of Project Manager.
- C. Repair: Re-establish grade and specified conditions to damaged sod areas prior to placing sod.
- D. Adjustment: Adjust irrigation heads to proper watering height according to depth of sod material but lower than compacted blade height to enable lawn mowers to cut grass freely without damage to the sprinkler system.
- E. Fine Grading: 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. Hold surface to receive sod 1 1/2" below compacted thatch grade of adjacent undisturbed turf grass, tolerance: ± 0.04 foot.

### 3.3 SODDING

- A. Sodding:
  - 1. Soil on which sod is laid: Slightly moist.
  - 2. Lay with longest dimension parallel to contours and in continuous rows.
  - 3. Tightly butt ends and sides of sod together. Stagger and compact vertical joints between sod strips by rolling so sod will be incorporated with the ground surface, insuring tight joints between adjacent pieces. Ensure that sod is neither stretched nor overlapped.
  - 4. Exposed joints due to shrinkage will require replacement of sod in affected areas.
- B. Edges: All sod must to be cut into the existing grade around the perimeter of newly sodded areas to provide a smooth transition between compacted thatch grade of new sod and compacted thatch grade of existing turf grass to remain. No sod will be accepted with exposed edges until exposed edges are cut in as specified or dressed with topsoil feathered out over 6" prior to final acceptance.
- C. Rolling: When soil and sod are moist, roll sod lightly as soon as possible after it is laid. Roller shall weigh 100 to 160 lb per foot of roller. Delay rolling until just before the second watering.
- D. Drainage: Assure that finished areas of sod are such that positive drainage of storm and irrigation water will occur and ponding of water will be minimized.
- E. Watering: Thoroughly water sod immediately after laying to a depth sufficient that the



underside of the new sod strips and soil below the sod are thoroughly wet.

#### 3.4 FERTILIZING

- A. Fertilizer Applications: None required.

#### 3.5 REPAIR OF EXISTING LAWN AREAS DISTURBED BY RENOVATION

- A. Repair existing lawn areas disturbed by renovation work (utilities, paving, etc) as indicated, in accordance with specifications of this section.

#### 3.6 CLEANING

- A. Cleaning: Remove pallets, unused sod, and other debris from site. Clean paved and finished surfaces soiled as a result of work under this Section in accordance with directions given by Project Manager. Clean out drainage inlet structures.

#### 3.7 PROTECTION

- A. General: Provide and install barriers as required and as directed by Project Manager to protect sodded areas against damage from pedestrian and vehicular traffic until Final Acceptance.

#### 3.8 SEEDING OF TRENCHES

- A. Hand broadcast three improved varieties of bluegrass seed along all secondary pipe and stand alone wire trenches at the rate of 100 seeds per square foot and hand rake into surface of soil to provide ¼” of cover.
- B. Surface preparation and seed bed maintenance are to conform with sodding sections above.
- C. Maintenance:
  - 1. General: The maintenance period shall begin immediately after each area is seeded and continue until final acceptance of entire project or a minimum of 30 days, which ever is later. During this time, Contractor shall be responsible for watering, mowing, spraying, weeding, aerating, fertilizing, and all related work as necessary to ensure that seeded areas are in a vigorous growing condition. Furnish all supervision, labor, material and equipment to maintain turf areas.
- D. Seeding operations will be accepted once there are no bare trench sections remaining longer than one linear foot.

#### 4.1 STABILIZED CRUSHER FINE SURFACING

- A. Stabilized crusher fines to be, clean, hard, durable particles of fragments of ¼” minus select brown gray crushed granite or basalt. Fines shall be evenly mixed throughout the aggregate. When produced from gravel, fifty percent (50%) by weight, of the material retained on a number four sieve shall have one fractured face. Submit one cubic foot sample with sieve and stabilizer analysis for review and approval prior to ordering.

- B. The portion retained on the number four (4) sieve shall have a maximum percentage of wear of fifty (50) at five hundred (500) revolutions as determined by AASHTO T96-77.
- C. The portion passing a number forty (40) sieve shall have a maximum liquid limit of twenty five (25) and a maximum plasticity index of seven (7), as determined by AASHTO T89-81, respectively.
- D. The crushed aggregate screenings shall be free from clay lumps, vegetable matter, and deleterious materials.
- E. Grading requirements shall be as follows:
  - 1. Percentage of weight passing a square mesh sieve
  - 2. AASHTO T11-82 and T27-82

<u>Sieve Designation</u>	<u>Percent Passing</u>	<u>Sieve Designation</u>	<u>Percent Passing</u>
3/8"	100%	No.30	40%-50%
No.4	95%-100%	No.50	25%-35%
No.8	75%-80%	No.100	20%-25%
No.16	55%-65%	No.200	5%-15%

- F. Stabilizer – submit product information on stabilizer material including composition and incorporation rate.
- G. Geotextile – shall be Mirafi 140N or approved equal. Min overlap on joints is to be 18".
- H. Sub-grade preparation – fine grade sub-grade to .04' with a maximum variation of 1/2" over 10'. Compact sub-grade to 95% S.P.D. per ASTM D698.
- I. Placement, compaction and Finishing – place crusher fines 4" deep and finish to a uniform surface with a maximum variation of 1/2" over 10'. Insure that surface of crusher fines has a minimum cross slope of 2%. Compact crusher fines to 95% MPD per ASTM 1557.

END OF SECTION 02935

CITY AND COUNTY OF DENVER

STATE OF COLORADO



DEPARTMENT OF PUBLIC WORKS/ PARKS AND RECREATION DIVISION

## **DRAWINGS**

**Contract No. 201309801**

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**State Home-Harvard Gulch Irrigation**

**February 19, 2013**



CITY & COUNTY OF DENVER DEPARTMENT OF PARKS & RECREATION

Harvard Gulch / State Home Park Irrigation Renovation

Contract No. - CE00013

Date: September 1, 2010

APPROVALS:

*Bessley S. Sumner* 12.17.12  
 Manager of Public Works Date

*Sam D'Annunzio* 12/17/12  
 Manager of Parks and Recreation Date

*Bessley S. Sumner* 12.17.12  
 City Engineer Date

*For N. Wirth* 12/17/12  
 Director of Engineering Date

*Chris Martinez by Jocelyn Robyns* 12.17.12  
 Director of Division of Small Business Opportunity Date

GENERAL NOTES:

ALL WORK MUST CONFORM TO THE CITY AND COUNTY OF DENVER STANDARD CONSTRUCTION SPECIFICATIONS.

THE CONTRACTOR SHALL CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO 1-800-922-1987 THREE BUSINESS DAYS PRIOR TO ANY EXCAVATION. CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ANY EXISTING UTILITY (INCLUDING DEPTHS) WHICH MAY CONFLICT WITH THE PROPOSED CONSTRUCTION. ALL EXISTING UTILITIES SHALL BE PROTECTED FROM DAMAGE BY THE CONTRACTOR. DAMAGED UTILITIES SHALL BE REPAIRED BY THE CONTRACTOR AT HIS EXPENSE.

THE CONTRACTOR SHALL OBTAIN AT HIS EXPENSE ALL PERMITS WHICH ARE NECESSARY TO PERFORM THE PROPOSED WORK.

ALL LAND CORNERS, TIES, RANGE POINTS, AND BENCHMARKS OR OTHER SURVEY CONTROL POINTS WHICH MAY BE ENCOUNTERED DURING CONSTRUCTION MUST BE PRESERVED. A MONUMENT RECORD MUST BE FILED WITH THE CITY SURVEYOR'S OFFICE ON ALL LAND CORNERS, TIES, RANGE POINTS, BENCHMARKS, AND CROSSES SO THEY CAN BE REPLACED AFTER CONSTRUCTION BY THE CONTRACTOR'S SURVEYOR. A COLORADO LICENSED LAND SURVEYOR MUST REPLACE THESE MONUMENTS BEFORE THE CITY CAN ACCEPT NEW CONSTRUCTION. MONUMENT RECORDS MAY BE FAXED TO THE CITY SURVEYOR AT (720) 865-3280. PHONE (720) 865-3121.

ALL WORK IN THE RIGHT-OF-WAY WILL REQUIRE A SPECIAL PERMIT AND MUST ADHERE TO ALL CITY AND COUNTY OF DENVER STANDARDS.

COORDINATE ALL WORK WITH THE CITY AND COUNTY OF DENVER DEPARTMENT OF PARKS AND RECREATION PLANNING DESIGN AND CONSTRUCTION DIVISION PLANNER IN CHARGE KENT SONDGERATH (720) 913-0636 AND PARKS DISTRICT SUPERINTENDENT JILL COFFMAN (303) 698-4077.

STANDARD NOTES FOR WATER QUALITY/NPDES EROSION CONTROL & SEDIMENT CONTROL:

- 1) THE OWNER, SITE DEVELOPER, CONTRACTOR AND/OR THEIR AUTHORIZED AGENTS SHALL REMOVE ALL SEDIMENT, MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO OR ACCUMULATE IN, THE FLOW LINES AND PUBLIC RIGHTS OF WAYS OF THE CITY AND COUNTY OF DENVER AS A RESULT OF CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS SITE DEVELOPMENT OR CONSTRUCTION PROJECT. SAID REMOVAL SHALL BE CONDUCTED END OF DAY.
- 2) THE CONTRACTOR SHALL PREVENT SEDIMENT, DEBRIS AND ALL OTHER POLLUTANTS FROM ENTERING THE STORM SEWER SYSTEM DURING ALL DEMOLITION, EXCAVATION, TRENCHING, BORING, GRADING OR OTHER CONSTRUCTION OPERATIONS THAT ARE PART OF THIS PROJECT. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR REMEDIATION OF ANY ADVERSE IMPACTS TO ADJACENT WATERWAYS, WETLANDS, ETC., RESULTING FROM WORK DONE AS PART OF THIS PROJECT.
- 3) THE CONTRACTOR SHALL LOCATE, INSTALL AND MAINTAIN ALL EROSION CONTROL AND WATER QUALITY "BEST MANAGEMENT PRACTICES" AS INDICATED IN THE APPROVED CONSTRUCTION ACTIVITIES STORM WATER MANAGEMENT PLAN. (CHAPTER 10, CITY AND COUNTY OF DENVER, DEPARTMENT OF PUBLIC WORKS "RULES AND REGULATIONS GOVERNING SEWERAGE CHARGES AND FEES AND MANAGEMENT OF WASTEWATER")
- 4) THE DEVELOPER, GENERAL CONTRACTOR, GRADING CONTRACTOR AND/OR THEIR AUTHORIZED AGENTS SHALL INSURE THAT ALL LOADS OF CUT AND FILL MATERIALS IMPORTED TO OR EXPORTED FROM THIS SITE SHALL BE PROPERLY COVERED TO PREVENT LOSS OF THE MATERIAL DURING TRANSPORT ON PUBLIC RIGHTS OF WAYS. (SEC. 49-552; REVISED MUNICIPAL CODE)

5) THE USE OF REBAR, STEEL STAKES, OR STEEL FENCE POSTS TO STAKE DOWN STRAW HAY BALES; OR TO SUPPORT SILT FENCE USED AS AN EROSION CONTROL MEASURE; IS PROHIBITED. THE USE OF OSHA APPROVED COLORED WARNING CAPS ON REBAR OR FENCE POSTS USED WITH EROSION CONTROL MEASURES IS NOT ACCEPTABLE.

6) SOILS THAT WILL BE STOCKPILED FOR MORE THAN 30 DAYS SHALL BE PROTECTED FROM WIND AND WATER EROSION WITHIN 14 DAYS OF STOCKPILE CONSTRUCTION. STABILIZATION AND PROTECTION OF THE STOCKPILE MAY BE ACCOMPLISHED BY ANY OF THE FOLLOWING: MULCHING, TEMPORARY/PERMANENT REVEGETATION OPERATIONS, CHEMICAL SOIL STABILIZER APPLICATION (REQUIRED WMD APPROVAL), OR EROSION CONTROL MATTING/GEOTEXTILES. IF STOCKPILES ARE LOCATED WITHIN 100 FEET OF A DRAINAGE WAY, ADDITIONAL SEDIMENT CONTROLS SUCH AS TEMPORARY DIKES OR SILT FENCE SHALL BE REQUIRED.

7) APPROVED EROSION AND SEDIMENT CONTROL "BEST MANAGEMENT PRACTICES" SHALL BE MAINTAINED AND KEPT IN GOOD REPAIR FOR THE DURATION OF THIS PROJECT. AT A MINIMUM, THE CONTRACTOR OR HIS AGENTS SHALL INSPECT ALL BMPs WEEKLY AND AFTER SIGNIFICANT PRECIPITATION EVENTS. ALL NECESSARY MAINTENANCE AND REPAIR SHALL BE COMPLETED IN A TIMELY MANNER. ACCUMULATED SEDIMENT AND DEBRIS SHALL BE REMOVED FROM A BMP WHEN THE SEDIMENT LEVEL REACHES ONE HALF THE HEIGHT OF THE BMP OR, AT ANY TIME THAT SEDIMENT OR DEBRIS ADVERSELY IMPACTS THE FUNCTIONING OF THE BMP.

8) MODIFICATION OF AN ACTIVE CONSTRUCTION ACTIVITIES STORM WATER DISCHARGE PERMIT BY THE DEVELOPER, CONTRACTOR OR THEIR AUTHORIZED AGENTS SHALL REQUIRE TIMELY NOTIFICATION OF AND APPROVAL BY THE WASTEWATER MANAGEMENT DIVISION. TERMINATION OF AN ACTIVE CONSTRUCTION ACTIVITIES STORM WATER DISCHARGE PERMIT UPON COMPLETION OF THE PROJECT REQUIRES NOTIFICATION OF AND APPROVAL BY THE WASTEWATER MANAGEMENT DIVISION.

9) WATER USED IN THE CLEANING OF CEMENT TRUCK DELIVERY CHUTES SHALL BE DISCHARGED INTO A PREDEFINED, BERMED CONTAINMENT AREA ON THE JOB SITE. THE REQUIRED CONTAINMENT AREA IS TO BE BERMED SO THAT WASH WATER IS TOTALLY CONTAINED. WASH WATER DISCHARGED INTO THE CONTAINMENT AREA SHALL BE ALLOWED TO INFILTRATE OR EVAPORATE. DRIED CEMENT WASTE IS TO BE REMOVED FROM THE CONTAINMENT AREA AND PROPERLY DISPOSED OF. SHOULD A PREDEFINED BERMED CONTAINMENT AREA NOT BE AVAILABLE DUE TO THE PROJECT SIZE, OR LACK OF AN AREA WITH A SUITABLE GROUND SURFACE FOR ESTABLISHING A CONTAINMENT AREA, PROPER DISPOSAL OF READY MIX WASHOUTS AND RINSE OFF WATER AT THE JOB SITE SHALL CONFORM TO THE APPROVED TECHNIQUES AND PRACTICES IDENTIFIED IN THE COLORADO DEPARTMENT OF PUBLIC HEALTH & ENVIRONMENT'S TRAINING VIDEO ENTITLED "BUILDING FOR A CLEANER ENVIRONMENT, READY MIX WASHOUT TRAINING", AND ITS ACCOMPANYING MANUAL ENTITLED, "READY MIX WASHOUT GUIDEBOOK, VEHICLE AND EQUIPMENT WASHOUT AT CONSTRUCTION SITES". THE DIRECT OR INDIRECT DISCHARGE OF WATER CONTAINING WASTE CEMENT TO THE STORM SEWER SYSTEM IS PROHIBITED. (SEC.56-102A, C; REVISED MUNICIPAL CODE, CITY AND COUNTY OF DENVER). WATER QUALITY CONTROL DIVISION, COLORADO DEPARTMENT OF PUBLIC HEALTH & ENVIRONMENT, 4300 CHERRY CREEK DRIVE SOUTH, DENVER, COLORADO 80222-1530, 303-692-3555.

10) THE CONTRACTOR SHALL PROTECT ALL STORM SEWER FACILITIES ADJACENT TO ANY LOCATION WHERE PAVEMENT CUTTING OPERATIONS INVOLVING WHEEL CUTTING, SAW CUTTING OR ABRASIVE WATER JET CUTTING ARE TO TAKE PLACE. THE CONTRACTOR SHALL REMOVE AND PROPERLY DISPOSE OF ALL WASTE PRODUCTS GENERATED BY SAID CUTTING OPERATIONS ON A DAILY BASIS. THE DISCHARGE OF ANY WATER CONTAMINATED BY WASTE PRODUCTS FROM CUTTING OPERATIONS TO THE STORM SEWER SYSTEM IS PROHIBITED.

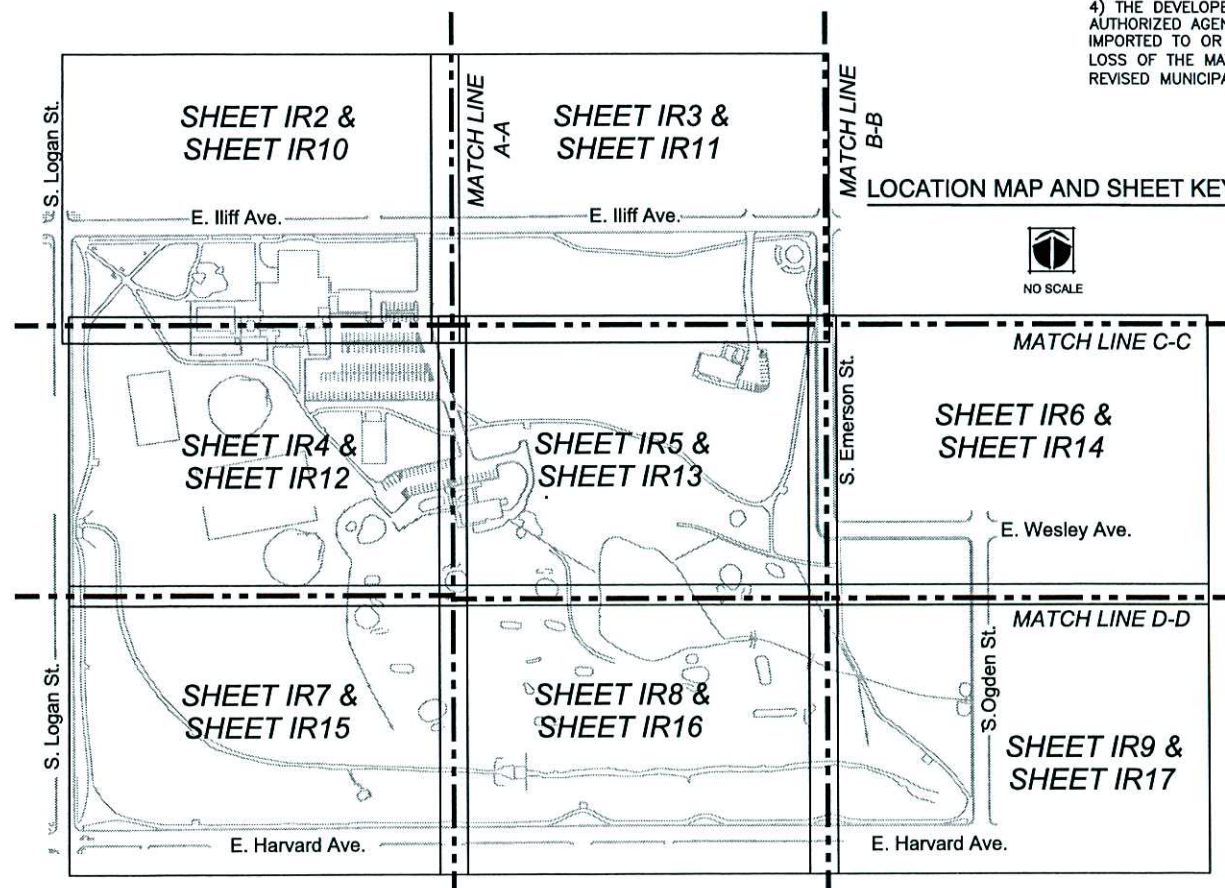
11) PAVED SURFACES WHICH ARE ADJACENT TO CONSTRUCTION SITES SHALL BE SWEEPED DAILY WHEN SEDIMENT AND OTHER MATERIALS ARE TRACKED OR DISCHARGED ON TO THEM. EITHER SWEEPING BY HAND OR USE OF STREET SWEEPERS IS ACCEPTABLE. STREET SWEEPERS USING WATER WHILE SWEEPING IS PREFERRED IN ORDER TO MINIMIZE DUST. FLUSHING OFF PAVED SURFACES WITH WATER IS PROHIBITED. (SEC.56-102A, C; REVISED MUNICIPAL CODE, CITY AND COUNTY OF DENVER).

EXISTING CONDITIONS CONFIRMATION REQUIREMENT:

- Contractor to verify:
- 1) Existing tap size to be as indicated on plan.
  - 2) Existing static water pressure to be as indicated on plan.
  - 3) Existing flow GPM availability as indicated on plan.
- Verification of the above items to be completed prior to commencing work or ordering irrigation materials. Submit findings in writing to Parks Project Manager. If Contractor fails to verify tap size, static water pressure and available flow prior to commencing work or ordering materials, Contractor shall assume full responsibility for all material costs, labor costs and design costs required to make system operational as intent of design and the costs required to replace any damaged landscape material.

CONSTRUCTION SEQUENCING AND COORDINATION REQUIREMENT:

- In order to mitigate the impacts of irrigation replacement on park resources and personnel and minimize the interruption in user access to park facilities the irrigation system is to be replaced in the following sequence:
- 1) All work specified and detail on the Point of Connection and Distribution Plan Sheets IR2 through IR9 is to be completed first including the installation of the booster pump.
  - 2) All work on the northeast irrigation sub-main service area is to be completed third. The new irrigation system served by the northeast irrigation sub-main must be fully operational including automatic operation by the two wire baseline control system before the contractor moves to the next area.
  - 3) All work on the southeast irrigation sub-main service area is to be completed fifth. The new irrigation system served by the southeast irrigation sub-main must be fully operational including automatic operation by the two wire baseline control system before the contractor moves to the next area.
  - 4) All work on the southwest irrigation sub-main service area is to be completed fourth. The new irrigation system served by the southwest irrigation sub-main must be fully operational including automatic operation by the two wire baseline control system before the contractor moves to the next area.
  - 5) All work on the northwest irrigation sub-main service area is to be completed second. The new irrigation system served by the northwest irrigation sub-main must be fully operational including automatic operation by the two wire baseline control system before the contractor moves to the next area.
  - 6) The irrigation system within the golf course is to be replaced by others concurrently with the replacement of the Harvard Gulch State Home Park irrigation system. Contractor is responsible for all required coordination with golf course irrigation contractor. Including but not limited to any perimeter cut and cap operations required to facilitate work.



DRAWING INDEX:

- Sheet No. IR1 - Irrigation Legends and Notes Plan
- Sheet No. IR2 - Point of Connection and Distribution Plan
- Sheet No. IR3 - Point of Connection and Distribution Plan
- Sheet No. IR4 - Point of Connection and Distribution Plan
- Sheet No. IR5 - Point of Connection and Distribution Plan
- Sheet No. IR6 - Point of Connection and Distribution Plan
- Sheet No. IR7 - Point of Connection and Distribution Plan
- Sheet No. IR8 - Point of Connection and Distribution Plan
- Sheet No. IR9 - Point of Connection and Distribution Plan
- Sheet No. IR10 - Irrigation Layout Plan
- Sheet No. IR11 - Irrigation Layout Plan
- Sheet No. IR12 - Irrigation Layout Plan
- Sheet No. IR13 - Irrigation Layout Plan
- Sheet No. IR14 - Irrigation Layout Plan
- Sheet No. IR15 - Irrigation Layout Plan
- Sheet No. IR16 - Irrigation Layout Plan
- Sheet No. IR17 - Irrigation Layout Plan
- Sheet No. IR18 - Irrigation Equipment Schedules Plan
- Sheet No. IR19 - Irrigation Equipment Schedules Plan
- Sheet No. IR20 - Irrigation Equipment Schedules Plan
- Sheet No. IR21 - Water Budget and Demand Plan
- Sheet No. IR22 - Irrigation Detail Plan
- Sheet No. IR23 - Irrigation Detail Plan
- Sheet No. IR23.5 - Irrigation Detail Plan
- Sheet No. IR24 - Irrigation Detail Plan
- Sheet No. IR25 - Irrigation Detail Plan
- Sheet No. IR26 - Irrigation Detail Plan
- Sheet No. IR27 - Irrigation Detail Plan
- Sheet No. WP1, WP1A, WP2 through WP5 and Flow - Water Plan Drawings
- Sheet No. E01 - Site Electrical Plan
- Sheet No. E02 - Electrical Specifications
- Sheet No. EC1 - EC6 - Storm Water Management Plan Drawings



Know what's below  
Call before you dig.

Denver Parks + Recreation

SHEET TITLE:  
Irrigation Renovation Cover Sheet

PROJECT:  
HARVARD GULCH STATE HOME PARK IRRIGATION RENOVATION

SCALE: N.A.

DESIGNED BY: MEH

DRAWN BY: MEH

CHECKED BY: KS

DATE: 09-01-10

REVISIONS:  
10-15-10  
11-12-12  
12-12-12

PREPARED BY:  
IRRIGATION DESIGN BY:  
Applied Design Services  
9721 Bayou Ridge Trail  
Parker, Colorado 80134  
(303) 841-7077  
Fax - 841-8191

SHEET NUMBER: CS





Know what's below  
Call before you dig.

Denver Parks + Recreation

SHEET TITLE:  
Irrigation Legends and  
Notes Plan

PROJECT:  
HARVARD GULCH STATE HOME  
PARK IRRIGATION RENOVATION

SCALE: N.A.

DESIGNED BY: MEH

DRAWN BY: MEH

CHECKED BY: KS

DATE: 09-01-10

REVISIONS:  
10-15-10  
11-12-12  
12-12-12

PREPARED BY:  
IRRIGATION DESIGN BY:  
Applied Design Services  
9721 Bayou Ridge Trail  
Parker, Colorado 80134  
(303) 841-7077  
Fax - 841-8191

SHEET NUMBER: IR1

IRRIGATION EQUIPMENT LEGEND:	
Symbol:	Description:
M1	EXISTING 4" IRRIGATION WATER METER TO BE ABANDONED IN CONFORMANCE WITH WATER SUPPLY POINT OF CONNECTION ABANDONMENT NOTES ON SHEET IR2. SEE WATER TAP PLAN DRAWINGS WP1 THROUGH WP8 FOR COMPLETE REQUIREMENTS.
M2	EXISTING 3" IRRIGATION AND DOMESTIC WATER METER PROTECT IN PLACE THROUGHOUT CONSTRUCTION. ABANDON IRRIGATION POINT OF CONNECTION AT THIS LOCATION PER WATER SUPPLY POINT OF CONNECTION RECONFIGURATION NOTES ON SHEET IR2. SEE WATER TAP PLAN DRAWINGS WP1 THROUGH WP8 FOR COMPLETE REQUIREMENTS.
M3	EXISTING 4" IRRIGATION WATER METER TO BE ABANDONED IN CONFORMANCE WITH WATER SUPPLY POINT OF CONNECTION ABANDONMENT NOTES ON SHEET IR3. SEE WATER TAP PLAN DRAWINGS WP1 THROUGH WP8 FOR COMPLETE REQUIREMENTS.
M4	EXISTING 6" IRRIGATION WATER METER TO BE ABANDONED COMPLETE AND IN PLACE BY DENVER WATER CONSTRUCTION CREWS. IRRIGATION CONTRACTOR TO COORDINATE SALVAGE ITEMS AS REQUIRED.
M5	NEW 8" IRRIGATION WATER METER SUPPLIED AND INSTALLED IN CONFORMANCE WITH WATER SUPPLY POINT OF CONNECTION NOTES ON SHEET IR3. SEE WATER TAP PLAN DRAWINGS WP1 THROUGH WP8 FOR COMPLETE REQUIREMENTS.
BF	NEW 8" FEBCO 880-N PATTERN IRRIGATION BACK FLOW ASSEMBLY. SUPPLIED AND INSTALLED IN CONFORMANCE WITH BACK FLOW ASSEMBLY POINT OF CONNECTION DETAIL A/IR22.
D	NEW AY McDONALD 3061 CYLINDER PATTERN DRAIN VALVE 1" INSTALLED IN CONFORMANCE WITH INSTALLATION DETAIL A/IR24.
Q	NEW BUCKNER Q44LRCAR10 WING THING QUICK COUPLER WITH MATCHING KEY AND SWIVEL. PROVIDE ONE KEY AND ONE SWIVEL FOR EACH QUICK COUPLER INSTALLED. INSTALLED IN CONFORMANCE WITH INSTALLATION DETAIL C/IR24. WITH ALL BRASS SWING JOINT.
MV	NEW 12" BERMAID MODEL 410 NORMALLY OPEN MASTER VALVE WITH DATA INDUSTRIAL FLOW SENSOR MODEL 220-B-12" INSERT AND NEW 6" BERMAID MODEL 420-55 NORMALLY OPEN P.R.V. CAPABLE MASTER VALVES WITH DATA INDUSTRIAL FLOW SENSORS MODEL 220-B-6" INSERT INSTALLED IN CONFORMANCE WITH INSTALLATION DETAIL A/IR22. ONE 12" 410 MASTER VALVE ASSEMBLY WITH FLOW SENSOR AND FIVE 6" 420-55 MASTER VALVE ASSEMBLIES WITH FLOW SENSORS REQUIRED.
	NEW CAST IRON BODIED, RESILIENT SEAT, SQUARE NUT OPERATED, LEFT HAND OPENING, R.T. BY R.T., MAIN LINE ISOLATION VALVE MATCO NORCA, 10-RT OR APPROVED EQUAL. F.I.P. DIMENSION OF VALVE TO MATCH F.I.P. DIMENSION OF MAINLINE PIPE. INSTALLED IN CONFORMANCE WITH INSTALLATION DETAIL B/IR24. SEE DRAWINGS IR2 THROUGH IR17 FOR SERVICE LINE SIZE, DISTRIBUTION LOOP SIZE AND IRRIGATION SUB-MAIN LOOP SIZING.
AR	BERMAID 02-ARC DOUBLE PURPOSE METAL BODIED VACUUM / AIR RELEASE VALVE. INSTALLED IN CONFORMANCE WITH DETAIL C/IR26.
RS	NEW HUNTER WIRELESS RAIN CLICK WITH BYPASS INSTALLED IN CONFORMANCE WITH DETAIL A/IR26. TWO REQUIRED.
	NEW PURPLE PANTONE COLOR 512 NON-POTABLE WATER SDR-21, CL-200 P.V.C. - R.T. SERVICE LINE PIPE AND DISTRIBUTION LOOP PIPE, BY P.W. PIPE OR APPROVED EQUAL. ALL SERVICE LINE PIPE AND DISTRIBUTION LOOP PIPE IS SIZED ON DRAWINGS. ALL SERVICE LINE PIPE AND DISTRIBUTION LOOP PIPE IS INSTALLED 48" DEEP. ALL SERVICE LINE PIPE FITTINGS AND DISTRIBUTION LOOP PIPE FITTINGS INCLUDING SERVICE TEES, MAINLINE TEES, 90, 45, 22.5 AND 11.25 DEGREE FITTINGS ARE TO BE HARCO DUCTILE IRON, DEEP BELL PUSH ON FITTINGS WITH HARCO FITTING TO PIPE, PIPE TO PIPE AND VALVE TO PIPE RESTRAINT. SEE TRENCHING DETAIL C/IR25, SLEEVING DETAIL D/IR25 AND HARCO JOINT RESTRAINT GUIDE DETAIL D/IR24 FOR ADDITIONAL INFORMATION.
	NEW PURPLE PANTONE COLOR 512 NON POTABLE WATER SDR-21, CL-200 P.V.C. - R.T. IRRIGATION SUB-MAIN PIPE, BY P.W. PIPE OR APPROVED EQUAL. ALL IRRIGATION SUB-MAIN PIPE IS 6". ALL IRRIGATION SUB-MAIN PIPE FITTINGS INCLUDING SERVICE TEES, MAINLINE TEES, 90, 45, 22.5 AND 11.25 DEGREE FITTINGS ARE TO BE HARCO DUCTILE IRON, DEEP BELL PUSH ON FITTINGS WITH HARCO FITTING TO PIPE, PIPE TO PIPE AND VALVE TO PIPE RESTRAINT. SEE TRENCHING DETAIL C/IR25, SLEEVING DETAIL D/IR25 AND HARCO JOINT RESTRAINT GUIDE DETAIL D/IR24 FOR ADDITIONAL INFORMATION.
	NEW TORO <u>biLine</u> BASELINE TWO-WIRE SYSTEM FOR SENTINEL, TWO WIRE PATH VALVE CONTROL WIRE CONDUCTOR CONFORMING TO ASTM 33 WITH 4/64" THICK PVC INSULATION CONFORMING TO UL STANDARD #493 UF (UNDERGROUND FEEDER) RATED AT 60 DEGREES CENTIGRADE. TWO WIRE INSULATED CONDUCTORS LAID PARALLEL AND ENCASED IN A SINGLE OUTER JACKET OF 3/64" THICK HIGH DENSITY SUNLIGHT RESISTANT POLYETHYLENE CONFORMING TO ICEA S-61-402 AND NEMA WC5 HAVING A MINIMUM WALL THICKNESS OF .045". COLOR CODED TO IDENTIFY EACH SUB MAIN LOOP (COLOR TO BE DETERMINED BY OWNER) COLEMAN CABLE #51452, 14 AWG, PAIGE #P70320D, 14/2 AND REGENCY 14/2 "MAXI CABLE" (SOFT DRAWN COPPER CONDUCTOR CONFORMING TO ASTM 33 14 AWG).
	ALL WIRE CONNECTIONS TO BE MADE UP WITH 3M DBR-6 SPLICE KITS ON BILINE SIDE AND 3M DBY SPLICE KITS ON CONTROL VALVE SIDE.
	INSTALL TWO EXTRA #14 AWG SINGLE STRAND WIRES ALONG WITH <u>biLine</u> TWO WIRE PATH CABLE COLOR CODED TO IDENTIFY EACH SUB MAIN LOOP COLOR TO BE DETERMINED BY OWNER.
	INSTALL ONE TWO STATION BICODER BL5202 FOR EACH TWO VALVE MANIFOLD AND INSTALL ONE FOUR STATION BICODER BL-5204 FOR EACH THREE VALVE MANIFOLD.
	INSTALL BASELINE BL-LA01 LIGHTNING ARRESTORS EVERY 600 LIN. FT. ALONG TWO WIRE PATH OR BETWEEN EVERY 8 CONTROL VALVES, ARRESTORS AND ALL WIRE SPLICE CONNECTIONS TO BE LOCATED IN VALVE BOX. ATTACHED GREEN ARRESTOR WIRE TO #6 BARE COPPER GROUNDING WIRE RUN AND CONNECTED TO A 5/8" BY 8' COPPER GROUND ROD PAIGE #182000 LOCATED 25' AWAY FROM ARRESTOR. GROUND ROD TO BE INSTALLED IN A CARSON IND. 910-10 10" ROUND VALVE BOX WITH BOLT DOWN TEE COVER BRANDED WS. GROUND WIRE TO BE INSTALLED 12" DEEP MINIMUM. CAD-WELD ALL GROUND ROD CONNECTIONS.
1.5" 2"	NEW 100 P.S.I., S.I.D.R.-15, HIGH DENSITY PE-3408 POLYETHYLENE SECONDARY PIPE BY P.W. PIPE OR APPROVED EQUAL. SECONDARY PIPE IS SIZED ON DRAWINGS ALL UNSIZED PIPE IS 1". ALL INSERT FITTINGS TO BE MADE UP WITH ALL STAINLESS STEEL WORM GEAR CLAMPS. DOUBLE CLAMP ALL CONNECTIONS THROUGHOUT. SEE TRENCHING DETAIL C/IR25 AND SLEEVING DETAIL D/IR25 FOR ADDITIONAL INFORMATION. INSTALL PURPLE PANTONE COLOR 512 NON-POTABLE WARNING TAPE 9" ABOVE ALL SECONDARY PIPE.

IRRIGATION EQUIPMENT LEGEND:	
Symbol:	Description:
	NEW SDR-21, CL-200 P.V.C. IRRIGATION SLEEVE INSTALLED UNDER EXISTING ASPHALT OR CONCRETE PAVEMENT OR THROUGH CRITICAL ROOT ZONE OF EXISTING TREES.
	SLEEVING FOR IRRIGATION SUB-MAIN PIPE, POLYETHYLENE LATERAL PIPE AND TWO WIRE PATH CABLE IS TO BE INSTALLED BY DIRECTIONAL BORING.
	ALL WIRE SLEEVES ARE 4", ALL POLYETHYLENE SECONDARY PIPE SLEEVES ARE 4" AND ALL IRRIGATION SUB-MAIN PIPE SLEEVES ARE TWICE (2 TIMES) THE DIAMETER OF THE PIPE BEING SLEEVED.
	ALL MAINLINE SLEEVES HAVE A SEPARATE COMPANION WIRE SLEEVE. SEE TRENCHING DETAIL C/IR25 AND SLEEVING DETAIL D/IR25 FOR ADDITIONAL INFORMATION.
	SERVICE LINE PIPE AND DISTRIBUTION LOOP PIPE IS INSTALLED BY DIRECTIONAL BORING HDPE DR-9 200 P.S.I. PIPE UNDER ASPHALT PAVEMENT WITH BUTT FUSE FLANGE ADAPTERS AND MEGA FLANGE TO PVC ADAPTERS BOTH ENDS (NO SLEEVE REQUIRED).
1-73	NORTHWEST IRRIGATION SUB-MAIN ELECTRIC CONTROL VALVES - RAIN BIRD PEB SERIES ELECTRIC CONTROL VALVE. SEE IRRIGATION EQUIPMENT SCHEDULE SHEETS IR18, IR19 AND IR20 FOR SIZE AND INSTALLATION DETAILS A&B/IR27 FOR INSTALLATION INSTRUCTIONS. INSTALL PRS ADAPTERS ON ALL POP-UP SPRAY ZONES. WITH NP FLOW CONTROL.
1-72	NORTHEAST IRRIGATION SUB-MAIN ELECTRIC CONTROL VALVES - RAIN BIRD PEB SERIES ELECTRIC CONTROL VALVE. SEE IRRIGATION EQUIPMENT SCHEDULE SHEETS IR18, IR19 AND IR20 FOR SIZE AND INSTALLATION DETAILS A&B/IR27 FOR INSTALLATION INSTRUCTIONS. INSTALL PRS ADAPTERS ON ALL POP-UP SPRAY ZONES. WITH NP FLOW CONTROL.
1-46	SOUTHWEST IRRIGATION SUB-MAIN ELECTRIC CONTROL VALVES - RAIN BIRD PEB SERIES ELECTRIC CONTROL VALVE. SEE IRRIGATION EQUIPMENT SCHEDULE SHEETS IR18, IR19 AND IR20 FOR SIZE AND INSTALLATION DETAILS A&B/IR27 FOR INSTALLATION INSTRUCTIONS. INSTALL PRS ADAPTERS ON ALL POP-UP SPRAY ZONES. WITH NP FLOW CONTROL.
1-38	SOUTHEAST IRRIGATION SUB-MAIN ELECTRIC CONTROL VALVES - RAIN BIRD PEB SERIES ELECTRIC CONTROL VALVE. SEE IRRIGATION EQUIPMENT SCHEDULE SHEETS IR18, IR19 AND IR20 FOR SIZE AND INSTALLATION DETAILS A&B/IR27 FOR INSTALLATION INSTRUCTIONS. INSTALL PRS ADAPTERS ON ALL POP-UP SPRAY ZONES. WITH NP FLOW CONTROL.
C1	ONE NEW NORTHWEST SUB-MAIN LOOP 73 STATION TORO SENTINEL SERIES (TWO WIRE PATH CONFIGURED) IRRIGATION CONTROLLER FABRICATED, SUPPLIED AND INSTALLED PER CONTROLLER CONFIGURATION AND INSTALLATION DETAIL D/IR26.
C2	ONE NEW NORTHEAST SUB-MAIN LOOP 72 STATION TORO SENTINEL SERIES (TWO WIRE PATH CONFIGURED) IRRIGATION CONTROLLER FABRICATED, SUPPLIED AND INSTALLED PER CONTROLLER CONFIGURATION AND INSTALLATION DETAIL D/IR26.
C3	ONE NEW SOUTHWEST SUB-MAIN LOOP 46 STATION TORO SENTINEL SERIES (TWO WIRE PATH CONFIGURED) IRRIGATION CONTROLLER FABRICATED, SUPPLIED AND INSTALLED PER CONTROLLER CONFIGURATION AND INSTALLATION DETAIL D/IR26.
C4	ONE NEW SOUTHEAST SUB-MAIL LOOP 38 STATION TORO SENTINEL SERIES (TWO WIRE PATH CONFIGURED) IRRIGATION CONTROLLER FABRICATED, SUPPLIED AND INSTALLED PER CONTROLLER CONFIGURATION AND INSTALLATION DETAIL D/IR26.
EC	EXISTING IRRIGATION CONTROLLER EIGHT TYPICAL. SEE POINT OF CONNECTION AND DISTRIBUTION PLANS AND IRRIGATION LAYOUT PLANS FOR DISPOSITION.
	NEW 120V 20A ELECTRICAL CONDUIT AND CONDUCTOR EXTENDED TO SERVE NEW CONTROLLERS AND TO POWER UP HOT BOX BACK FLOW ENCLOSURE PER POWER SUPPLY POINT OF CONNECTION NOTE THIS SHEET.
	NEW RAIN BIRD 5500-PC/FC-SS-SAM GEAR DRIVE ROTARY SPRINKLER HEAD WITH STAINLESS STEEL RISER. SEE IRRIGATION EQUIPMENT SCHEDULE SHEETS IR18, IR19 AND IR20 FOR NOZZLE SPECIFICATION AND POP-UP HEIGHT AND INSTALLATION DETAIL A/IR25 FOR INSTALLATION INSTRUCTIONS. WITH NP COVERS.
	NEW RAIN BIRD 5004-PL-PC AND OR FC-SAM-PRS-SS GEAR DRIVE ROTARY SPRINKLER HEAD WITH STAINLESS STEEL RISER. SEE IRRIGATION EQUIPMENT SCHEDULE SHEETS IR18, IR19 AND IR20 FOR NOZZLE SPECIFICATION AND POP-UP HEIGHT AND INSTALLATION DETAIL A/IR25 FOR INSTALLATION INSTRUCTIONS. WITH NP COVERS.
	NEW RAIN BIRD 1800 SERIES SAM PRS POP-UP SPRINKLER HEAD WITH (U) SERIES PLASTIC NOZZLES. SEE IRRIGATION EQUIPMENT SCHEDULE SHEETS IR18, IR19 AND IR20 FOR NOZZLE SPECIFICATION AND POP-UP HEIGHT AND INSTALLATION DETAIL B/IR25 FOR INSTALLATION INSTRUCTIONS. WITH NP COVERS.

RECLAIMED / NON-POTABLE RAW WATER EQUIPMENT SPECIFICATION:	
IN PREPARATION FOR THE FUTURE CONVERSION OF THE HARVARD GULCH STATE HOME PARK IRRIGATION SYSTEM TO RAW WATER, ALL IRRIGATION EQUIPMENT IS TO BE SUPPLIED AND INSTALLED IN CONFORMANCE WITH ALL STATE AND LOCAL ORDINANCES GOVERNING RECLAIMED WATER IRRIGATION SYSTEMS, INCLUDING BUT NOT LIMITED TO:	
1)	ALL P.V.C PIPE IS TO BE SUPPLIED AS PURPLE PANTONE COLOR 512 AND STAMPED WITH THE WORDS "CAUTION RECYCLED WATER DO NOT DRINK".
2)	ALL VALVE BOX LIDS ARE TO BE SUPPLIED AS PURPLE PANTONE COLOR 512.
3)	ALL ELECTRIC CONTROL VALVE FLOW CONTROLS ARE TO BE SUPPLIED AS PURPLE PANTONE COLOR 512.
4)	ALL GEAR DRIVE SPRINKLER HEAD CAPS AND POP-UP SPRAY HEAD CAPS ARE TO BE SUPPLIED AS PURPLE PANTONE COLOR 512.
5)	RECLAIMED WATER WARNING TAPE IS TO BE INSTALLED 1' ABOVE ALL PIPE.
6)	ALL NON-POTABLE PIPING SHALL HAVE 1' VERTICAL AND 10' HORIZONTAL SEPARATION FROM ALL SEWER AND POTABLE PIPING.
7)	ONLY QUICK COUPLER CONNECTIONS WILL BE ALLOWED ON NON-POTABLE SYSTEM NO HOSE BIBS.
8)	VALVES AND METERS SHALL HAVE PURPLE HOUSING OF PAINTED PURPLE AND CARRY A TAG DENOTING NON-POTABLE USE.
9)	MANHOLE COVERS WILL BE PURPLE AND CAST WITH RECYCLED WATER.
10)	VALVES WILL HAVE PENTAGONAL OPERATING NUT AND OPEN COUNTERCLOCKWISE.

EXISTING POWER SUPPLY POINT OF CONNECTION FOR NEW IRRIGATION CONTROLLERS C1/C2, C3/C4, P.O.C. ZERO STATION CONTROLLER AND HOT BOX BACK FLOW ENCLOSURE:	
THE EXISTING 120 VOLT 20 AMP ELECTRICAL SERVICE FOR EXISTING CONTROLLERS (EC) IS TO BE EXTENDED TO SERVE NEW IRRIGATION CONTROLLER LOCATIONS (C1/C2), (C3/C4), P.O.C. ZERO STATION CONTROLLER AND NEW HOT BOX BACK FLOW ENCLOSURE. SERVICE EXTENSION IS TO BE COMPLETE AND IN PLACE INCLUDING BUT NOT LIMITED TO THE FOLLOWING:	
1)	INTERCEPT EXISTING 120 VOLT ELECTRICAL SERVICE AT PERIMETER OF EXISTING CONCRETE CONTROLLER SLAB.
2)	EXTEND NEW 1.5" SCHEDULE 40 P.V.C. CONDUIT FROM TIE IN AT EXISTING CONTROLLER LOCATION TO THE NEW CONTROLLER LOCATION INCLUDING PULL BOXES AND ALL MISCELLANEOUS FITTINGS, CONNECTORS AND HARDWARE AS REQUIRED.
3)	INSTALL CONDUCTOR SIZED AS REQUIRED TO ACCOMMODATE A MAXIMUM VOLTAGE DROP OF 5% FOR LIN. FT. OF NEW CONDUCTOR FROM TIE IN AT EXISTING CONTROLLER LOCATION TO NEW CONTROLLER LOCATION.
4)	SWEEP NEW ELECTRICAL SERVICE UP AND INTO NEW CONTROLLER AND BACK FLOW ENCLOSURE AND TERMINATE AT G.F.I. RECEPTACLE PER DETAIL D/IR26 AND A/IR22.
5)	ALL WORK ON THE ELECTRICAL SERVICE IS TO BE PERFORMED BY AN ELECTRICIAN LICENSED IN THE CITY AND COUNTY OF DENVER. PULL AND PAY FOR ALL REQUIRED PERMITS AND CALL FOR AND PAY FOR ALL REQUIRED INSPECTIONS.
6)	ALL EXCAVATION, BACKFILL AND COMPACTION AS REQUIRED. IMPORT, PLACE AND COMPACT SANDY LOAM TOPSOIL IN VOIDS AND RESTORE ALL LANDSCAPING TO EXISTING CONDITIONS INCLUDING FINE GRADE TO .04' AND SOD INSTALLATION.

EXISTING IRRIGATION EQUIPMENT ABANDONMENT AND SALVAGE NOTES:	
Symbol:	Description:
	EXISTING IRRIGATION VALVE BOXES TYPICAL.
EC	EXISTING IRRIGATION CONTROLLER TO BE SALVAGED AND DELIVERED TO OWNER TOTAL EIGHT. TERMINATE THE EXISTING ELECTRICAL SERVICE PER NOTE NO.6 BELOW TYP.5 AND INTERCEPT AND EXTEND THE EXISTING ELECTRICAL SERVICE TO SERVE NEW CONTROLLER LOCATIONS (C1/C2), (C3/C4) AND NEW HOT BOX BACK FLOW ENCLOSURE PER POWER SUPPLY POINT OF CONNECTION NOTE THIS SHEET.
GENERAL SALVAGE NOTES: EXISTING IRRIGATION PIPING AND SPRINKLER HEADS WERE TURNED OFF FOR GRAPHIC CLARITY CONTRACTOR TO SALVAGE EXISTING EQUIPMENT AS FOLLOWS:	
1)	SALVAGE, CLEAN AND DELIVER ALL ELECTRIC CONTROL VALVE MANIFOLDS TO OWNER. ASSUME 40 FOR THE PURPOSE OF BIDDING.
2)	REMOVE AND DISPOSE OF ALL VALVE BOXES OFF SITE. ASSUME 60 FOR THE PURPOSE OF BIDDING. IMPORT, PLACE, AND COMPACT SOIL IN VOIDS LEFT FROM VALVE BOX OR CONCRETE PAD REMOVAL.
3)	REMOVE AND DISPOSE OF ANY EXISTING SPRINKLER HEADS DISTURBED DURING CONSTRUCTION.
4)	ABANDON ALL PIPING, WIRE AND SLEEVING IN PLACE.
5)	REMOVE MAINLINE VALVE ACCESS STACKS TO 24" BELOW GRADE AND ABANDON REMAINDER IN PLACE.
6)	SALVAGE AND DELIVER EXISTING CONTROLLERS AND ENCLOSURES TO OWNER. REMOVE AND DISPOSE OF EXISTING STAND PIPE AND CONCRETE PADS OFF SITE. REMOVE EXISTING CONDUIT AND CONDUCTOR TO 24" BELOW GRADE AND ABANDON REMAINDER IN PLACE, TYPICAL EIGHT. TERMINATE HIGH VOLTAGE POWER SUPPLY FOR EXISTING CONTROLLERS IN CONFORMANCE WITH ALL UTILITY PROVIDER STANDARDS AND SPECIFICATIONS, TYPICAL FIVE. INTERCEPT AND EXTEND EXISTING ELECTRICAL SERVICE TO SERVE NEW CONTROLLERS AND NEW HOT BOX BACK FLOW ENCLOSURE.
7)	SALVAGE EXISTING BACK FLOW ASSEMBLIES AND ENCLOSURES PER WATER SUPPLY ABANDONMENT AND RECONFIGURATION NOTES ON PLAN.

SITE SURVEY SYMBOL LEGEND:	
	WATER VALVE
	SIGN
	TELEPHONE MANHOLE
	PUBLIC SERVICE MANHOLE
	SANITARY SEWER MANHOLE
	STORM SEWER MANHOLE
	POWER POLE
	LIGHT POLE
	ELECTRIC BOX
	TRAFFIC SIGNAL
	WATER MANHOLE
	PICNIC TABLE TYP.

EXISTING LANDSCAPE LEGEND:	
	EXISTING CONIFEROUS TREE. PROTECT IN PLACE. SEE TREE PROTECTION NOTES ON SHEET IR20 FOR ADDITIONAL REQUIREMENTS.
	EXISTING DECIDUOUS TREE. PROTECT IN PLACE. SEE TREE PROTECTION NOTES ON SHEET IR20 FOR ADDITIONAL REQUIREMENTS.





Know what's below  
Call before you dig.

**EXISTING IRRIGATION WATER SUPPLY POINT OF CONNECTION ABANDONMENT NOTES (EXISTING 4" NORTHWEST SERVICE AREA TAP):**

Account No. 10600530018  
Meter No. 446198 TAP NUMBER: 285304  
Address: 420 E. Iliff Ave.

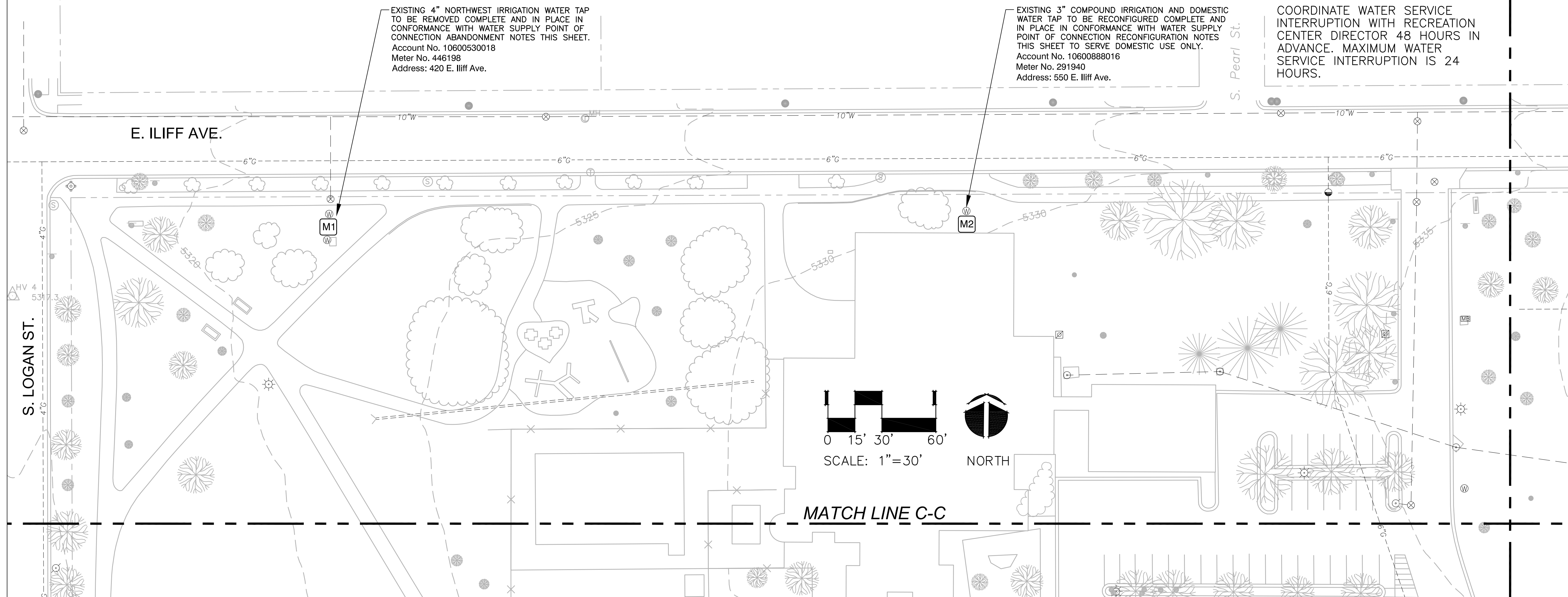
ABANDONMENT OF THE EXISTING 4" NORTHWEST IRRIGATION WATER TAP LOCATED (FROM AVAILABLE MAPPING) APPROXIMATELY 145' EAST OF THE EAST R.O.W. LINE ALONG SOUTH LOGAN ST. IS TO BE REMOVED, COMPLETE AND IN PLACE, IN CONFORMANCE WITH ALL UTILITY PROVIDER STANDARDS AND SPECIFICATIONS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

- 1) SALVAGE EXISTING BACK FLOW ASSEMBLY AND DELIVER TO OWNER. SALVAGED BACK FLOW ASSEMBLIES MAY NOT BE RELOCATED WITHOUT DENVER WATER'S APPROVAL.
- 2) SALVAGE EXISTING BACK FLOW ENCLOSURE AND DELIVER TO OWNER.
- 3) REMOVE CONCRETE SLAB AND DISPOSE OF OFF SITE.
- 4) REMOVE CHARGE AND DISCHARGE DROP LEGS TO 24" BELOW GRADE AND ABANDON REMAINDER IN PLACE.
- 5) REMOVE DRAIN VALVE BOXES AND ACCESS STACKS TO 24" BELOW GRADE AND ABANDON REMAINDER IN PLACE.
- 6) ALL REQUIRED EXCAVATION, BACKFILL, COMPACTION AND LANDSCAPE RESTORATION OF ALL DISTURBED AREAS INCLUDING IMPORTED TOPSOIL, FINE GRADE AND SOD INSTALLATION PER SPECIFICATION SECTION 02810, ITEM-3.3, PAGES 13, 14, 17 & 18 IN LANDSCAPE AREAS AND IN CONFORMANCE WITH C.C.D. TRANSPORTATION DIVISION STANDARD SPECIFICATIONS FOR ANY CUTS IN ANY STREETS.
- 7) POT HOLE UTILITIES, SAW CUT AND REMOVE EXISTING CONCRETE CURB AND GUTTER AND ASPHALT PAVEMENT AND EXCAVATE AS REQUIRED TO EXPOSE THE EXISTING CORPORATION STOP / TAPPING VALVE ON THE EXISTING 10" WATER MAIN LOCATED (FROM AVAILABLE MAPPING) APPROXIMATELY 14' SOUTH OF THE NORTH R.O.W. LINE ALONG EAST ILLIFF AVE.
- 8) CLOSE CORPORATION STOP / TAPPING VALVE AND PHYSICALLY DISCONNECT THE EXISTING SERVICE LINE (REMOVE 12" OF SERVICE LINE PIPE MIN.) IN CONFORMANCE WITH, AND UNDER THE DIRECT SUPERVISION OF, DENVER WATER METER INSPECTORS. REMOVE AND DELIVER EXISTING WATER METER TO DENVER WATER METER SHOP. ERT REMOTE READ DEVICE WILL BE REMOVED BY METER INSPECTOR. REMOVE MANHOLE RING AND COVER AND DELIVER TO OWNER. REMOVE VAULT LID AND TOP 24" OF SIDE WALLS OF VAULT AND DISPOSE OF OFF SITE. IMPORT, PLACE AND COMPACT TOPSOIL IN LOWER PORTION OF VAULT TO REMAIN. ABANDON EXISTING SERVICE LINE, FITTINGS AND CONNECTORS IN PLACE.
- 10) BACKFILL (INCLUDING FLOW FILL IF REQUIRED) COMPACT AND REPLACE ASPHALT PAVEMENT AND CONCRETE CURB AND GUTTER TO MATCH EXISTING.
- 11) ALL WORK IS TO BE PERFORMED IN CONFORMANCE WITH CITY AND COUNTY OF DENVER, TRANSPORTATION ENGINEERING DIVISION, STANDARDS AND SPECIFICATIONS INCLUDING SUBMITTAL, REVIEW AND REVISION OF AN APPROVED TRAFFIC CONTROL PLAN.
- 12) PULL AND PAY FOR ALL REQUIRED PERMITS AND CALL FOR AND PAY FOR ALL REQUIRED INSPECTIONS, INCLUDING A STREET CUT PERMIT. ALL WORK ON THE POTABLE FEED IS TO BE PERFORMED BY A PLUMBER LICENSED IN THE CITY AND COUNTY OF DENVER AND APPROVED BY DENVER WATER.
- 13) COORDINATE ALL WORK WITH DENVER WATER, METER INSPECTIONS DIVISION. CONTACT METER INSPECTIONS @ 303-628-6145. SEE WATER PLAN DRAWINGS FOR COMPLETE REQUIREMENTS.

**EXISTING 3" COMBINED DOMESTIC AND IRRIGATION WATER SUPPLY POINT OF CONNECTION RECONFIGURATION NOTES (EXISTING 3" IRRIGATION AND DOMESTIC COMBINED RECREATION CENTER TAP):**

Account No. 10600888016 TAP NUMBER: X27576  
Meter No. 291940 Address: 550 E. Iliff Ave.

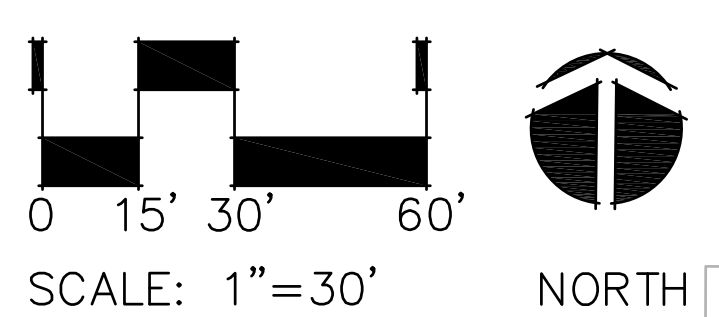
- 1) THE EXISTING 3" RECREATION CENTER WATER TAP LOCATED (FROM AVAILABLE MAPPING) 498' EAST OF THE EAST R.O.W. LINE ALONG SOUTH LOGAN ST. IS TO BE RECONFIGURED, COMPLETE AND IN PLACE, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
- 2) PROTECT THE EXISTING COMPOUND WATER METER INCLUDING DISPLACEMENT DOMESTIC WATER METER AND TURBINE IRRIGATION WATER METER IN PLACE.
- 3) REMOVAL OF THE 2" TYPE-K COPPER SERVICE LINE FEEDING THE EXISTING IRRIGATION BACK FLOW ASSEMBLY INCLUDING PHYSICALLY DISCONNECTING THE IRRIGATION SERVICE LINE FROM THE DOMESTIC SERVICE LINE AND REMOVAL OF THE TEE FITTING.
- 4) REMOVAL OF THE BACK FLOW ASSEMBLY AND ENCLOSURE AND DELIVERY TO OWNER. SALVAGED BACK FLOW ASSEMBLIES MAY NOT BE RELOCATED WITHOUT DENVER WATER'S APPROVAL. REMOVAL AND DISPOSAL OF THE CONCRETE SLAB OFF SITE. REMOVAL OF CHARGE AND DISCHARGE DROP LEGS TO 24" BELOW GRADE AND DISPOSAL OFF SITE.
- 5) REMOVAL OF ALL VALVE BOXES AND DRAIN STACKS TO 24" BELOW GRADE AND DISPOSAL OFF SITE.
- 6) ALL REQUIRED EXCAVATION, BACKFILL AND COMPACTION AND LANDSCAPE RESTORATION TO MATCH EXISTING INCLUDING FINE GRADE TO .04' AND SOD INSTALLATION OF ALL DISTURBED AREAS PER SPECIFICATION SECTION 02810, ITEM-3.3 PAGES 13, 14, 17 & 18 IN LANDSCAPE AREAS AND IN CONFORMANCE WITH C.C.D. TRANSPORTATION DIVISION STANDARD SPECIFICATIONS FOR ANY CUTS IN ANY STREETS.
- 7) ALL WORK ON THE POTABLE SERVICE IS TO BE PERFORMED BY A PLUMBER LICENSED IN THE CITY AND COUNTY OF DENVER AND APPROVED BY DENVER WATER. PULL AND PAY FOR ALL REQUIRED PERMITS AND CALL FOR AND PAY FOR ALL REQUIRED INSPECTIONS.
- 8) CONTRACTOR TO PAY ALL DENVER WATER INSPECTION FEES. CONFIRM REQUIRED FEES PRIOR TO SUBMITTING BID.
- 9) ALL EXCAVATION, BACKFILL, COMPACTION, FINE GRADE AND SURFACE RESTORATION INCLUDING SOD INSTALLATION AS REQUIRED TO EXPOSE AND PHYSICALLY DISCONNECT THE IRRIGATION SERVICE LINE FROM THE DOMESTIC SERVICE LINE.
- 10) ALL WORK IS TO BE INSPECTED BY DENVER WATER INCLUDING METERS AND VAULTS. SEE WATER PLAN DRAWINGS FOR COMPLETE REQUIREMENTS.
- 11) COORDINATE ALL WORK WITH DENVER WATER METER INSPECTIONS. CALL 303-628-6145 FOR METER INSPECTIONS.



EXISTING 4" NORTHWEST IRRIGATION WATER TAP TO BE REMOVED COMPLETE AND IN PLACE IN CONFORMANCE WITH WATER SUPPLY POINT OF CONNECTION ABANDONMENT NOTES THIS SHEET.  
Account No. 10600530018  
Meter No. 446198  
Address: 420 E. Iliff Ave.

EXISTING 3" COMPOUND IRRIGATION AND DOMESTIC WATER TAP TO BE RECONFIGURED COMPLETE AND IN PLACE IN CONFORMANCE WITH WATER SUPPLY POINT OF CONNECTION RECONFIGURATION NOTES THIS SHEET TO SERVE DOMESTIC USE ONLY.  
Account No. 10600888016  
Meter No. 291940  
Address: 550 E. Iliff Ave.

COORDINATE WATER SERVICE INTERRUPTION WITH RECREATION CENTER DIRECTOR 48 HOURS IN ADVANCE. MAXIMUM WATER SERVICE INTERRUPTION IS 24 HOURS.



MATCH LINE A-A

MATCH LINE C-C

**Denver Parks + Recreation**

SHEET TITLE:  
**Point of Connection and Distribution Plan**

PROJECT:  
**HARVARD GULCH STATE HOME PARK IRRIGATION RENOVATION**

SCALE: 1" = 30'

DESIGNED BY: MEH

DRAWN BY: MEH

CHECKED BY: KS

DATE: 09-01-10

REVISIONS:  
10-15-10  
11-12-12  
12-12-12

PREPARED BY:  
**IRRIGATION DESIGN BY:**  
*Applied Design Services*  
9721 Bayou Ridge Trail  
Parker, Colorado 80134  
(303) 841-7077  
Fax - 841-8191

SHEET NUMBER: IR2







Know what's below  
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# Denver Parks + Recreation

SHEET TITLE:  
**Point of Connection and  
Distribution Plan**

PROJECT:  
**HARVARD GULCH STATE HOME  
PARK IRRIGATION RENOVATION**

SCALE: 1" = 30'

DESIGNED BY: MEH

DRAWN BY: MEH

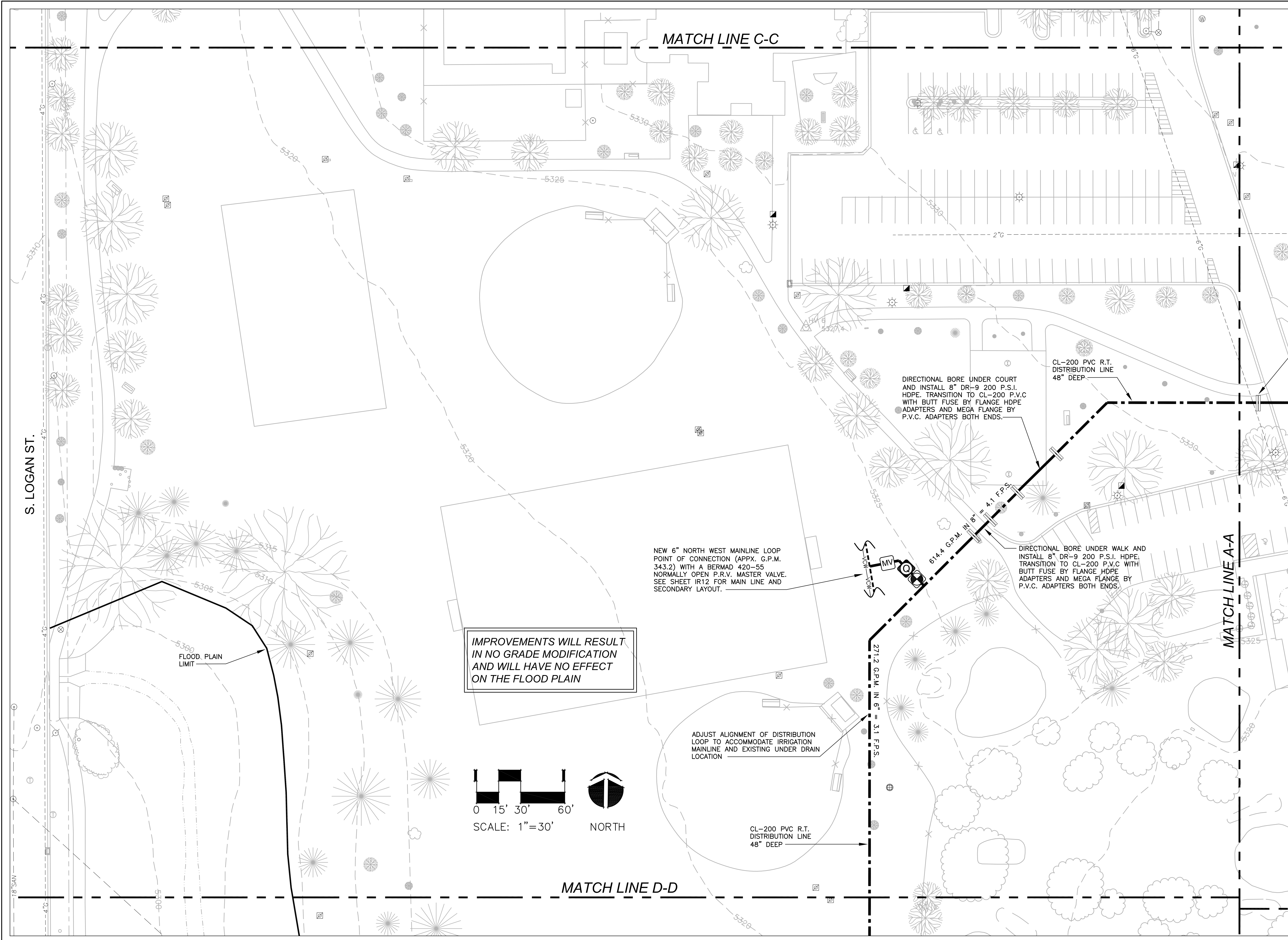
CHECKED BY: KS

DATE: 09-01-10

REVISIONS:  
10-15-10  
11-12-12  
12-12-12

PREPARED BY:  
**IRRIGATION DESIGN BY:**  
*Applied Design Services*  
9721 Bayou Ridge Trail  
Parker, Colorado 80134  
(303) 841-7077  
Fax - 841-8191

SHEET NUMBER: IR4



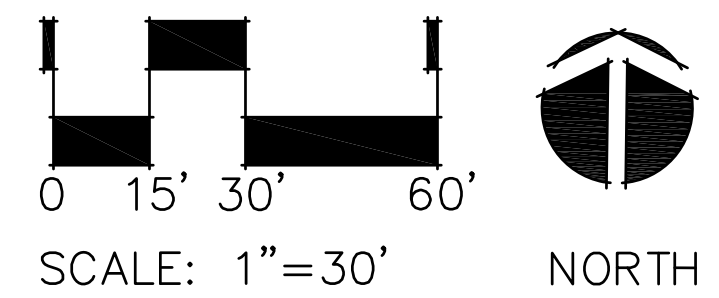
MATCH LINE C-C

S. LOGAN ST.

MATCH LINE A-A

MATCH LINE D-D

IMPROVEMENTS WILL RESULT  
IN NO GRADE MODIFICATION  
AND WILL HAVE NO EFFECT  
ON THE FLOOD PLAIN



NEW 6" NORTH WEST MAINLINE LOOP  
POINT OF CONNECTION (APPX. G.P.M.  
343.2) WITH A BERMAD 420-55  
NORMALLY OPEN P.R.V. MASTER VALVE.  
SEE SHEET IR12 FOR MAIN LINE AND  
SECONDARY LAYOUT.

ADJUST ALIGNMENT OF DISTRIBUTION  
LOOP TO ACCOMMODATE IRRIGATION  
MAINLINE AND EXISTING UNDER DRAIN  
LOCATION

DIRECTIONAL BORE UNDER COURT  
AND INSTALL 8" DR-9 200 P.S.I.  
HDPE. TRANSITION TO CL-200 P.V.C  
WITH BUTT FUSE BY FLANGE HDPE  
ADAPTERS AND MEGA FLANGE BY  
P.V.C. ADAPTERS BOTH ENDS.

DIRECTIONAL BORE UNDER WALK AND  
INSTALL 8" DR-9 200 P.S.I. HDPE.  
TRANSITION TO CL-200 P.V.C WITH  
BUTT FUSE BY FLANGE HDPE  
ADAPTERS AND MEGA FLANGE BY  
P.V.C. ADAPTERS BOTH ENDS.

CL-200 PVC R.T.  
DISTRIBUTION LINE  
48" DEEP

CL-200 PVC R.T.  
DISTRIBUTION LINE  
48" DEEP

FLOOD PLAIN  
LIMIT







Know what's below  
Call before you dig.

# Denver Parks + Recreation

SHEET TITLE:  
Point of Connection and  
Distribution Plan

PROJECT:  
HARVARD GULCH STATE HOME  
PARK IRRIGATION RENOVATION

SCALE: 1" = 30'

DESIGNED BY: MEH

DRAWN BY: MEH

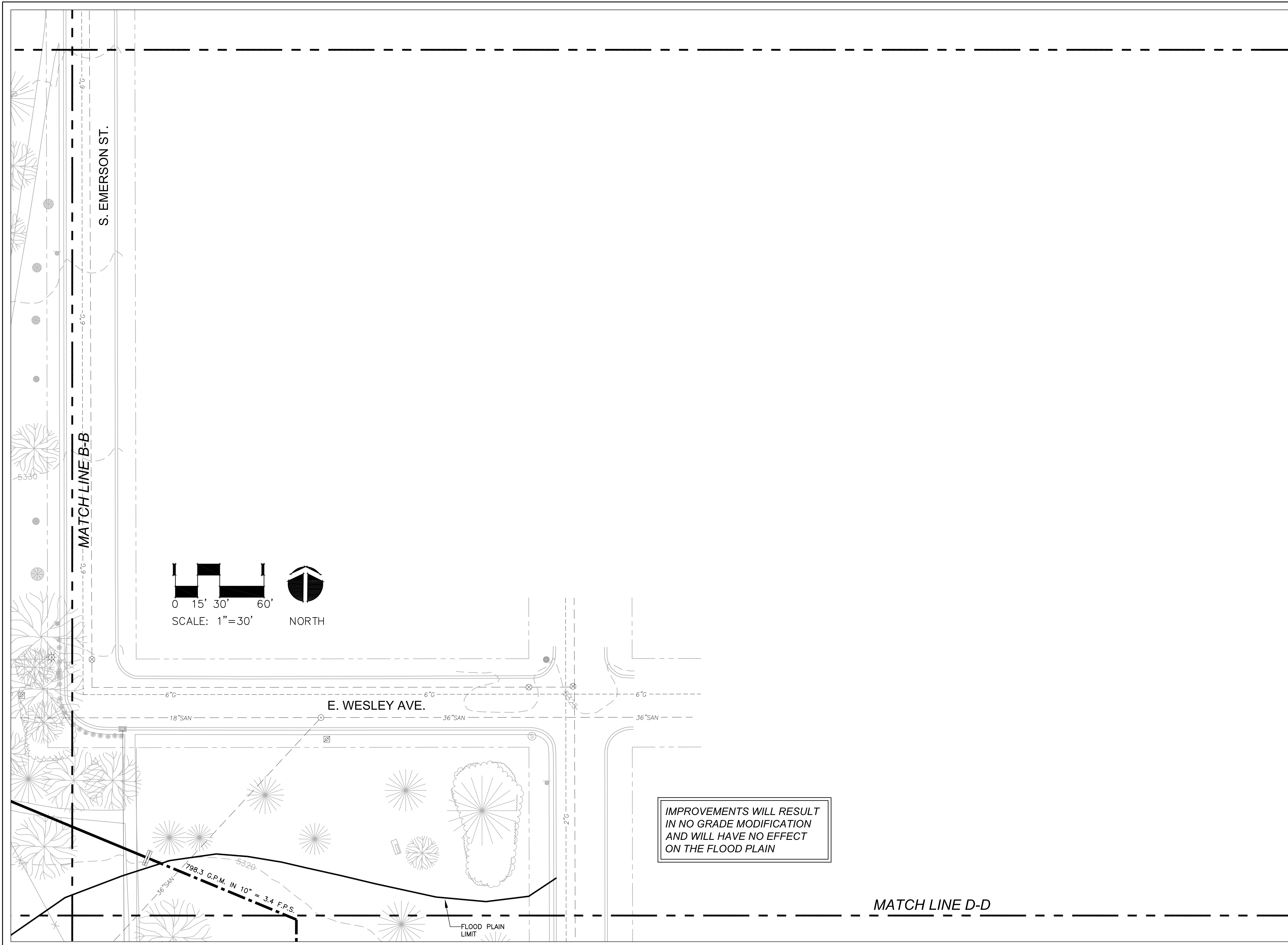
CHECKED BY: KS

DATE: 09-01-10

REVISIONS:  
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11-12-12  
12-12-12

PREPARED BY:  
IRRIGATION DESIGN BY:  
*Applied Design Services*  
9721 Bayou Ridge Trail  
Parker, Colorado 80134  
(303) 841-7077  
Fax - 841-8191

SHEET NUMBER: IR6







Know what's below  
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# Denver Parks + Recreation

SHEET TITLE:  
Point of Connection and  
Distribution Plan

PROJECT:  
HARVARD GULCH STATE HOME  
PARK IRRIGATION RENOVATION

SCALE: 1" = 30'

DESIGNED BY: MEH

DRAWN BY: MEH

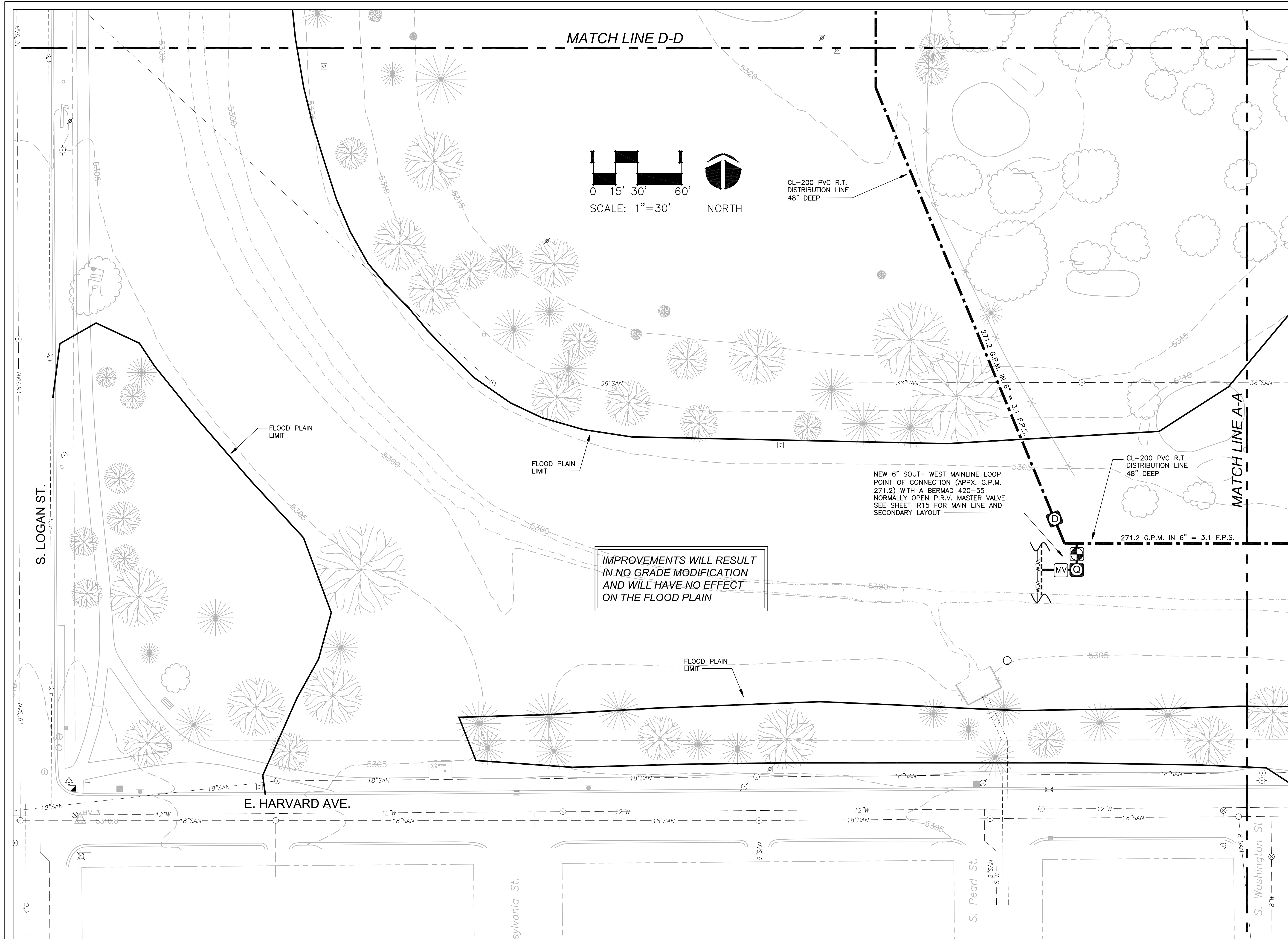
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DATE: 09-01-10

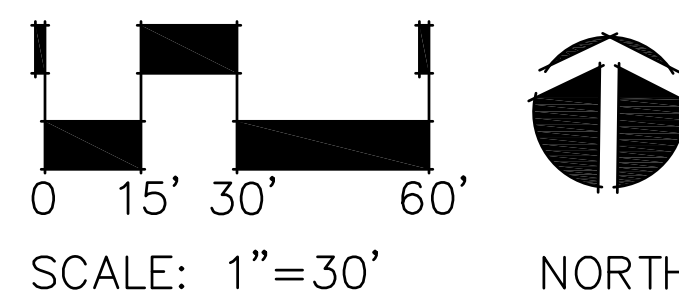
REVISIONS:  
10-15-10  
11-12-12  
12-12-12

PREPARED BY:  
IRRIGATION DESIGN BY:  
*Applied Design Services*  
9721 Bayou Ridge Trail  
Parker, Colorado 80134  
(303) 841-7077  
Fax - 841-8191

SHEET NUMBER: IR7



MATCH LINE D-D



CL-200 PVC R.T.  
DISTRIBUTION LINE  
48" DEEP

FLOOD PLAIN  
LIMIT

FLOOD PLAIN  
LIMIT

IMPROVEMENTS WILL RESULT  
IN NO GRADE MODIFICATION  
AND WILL HAVE NO EFFECT  
ON THE FLOOD PLAIN

FLOOD PLAIN  
LIMIT

NEW 6" SOUTH WEST MAINLINE LOOP  
POINT OF CONNECTION (APPX. G.P.M.  
271.2) WITH A BERMAD 420-55  
NORMALLY OPEN P.R.V. MASTER VALVE  
SEE SHEET IR15 FOR MAIN LINE AND  
SECONDARY LAYOUT

CL-200 PVC R.T.  
DISTRIBUTION LINE  
48" DEEP

271.2 G.P.M. IN 6" = 3.1 F.P.S.

MATCH LINE A-A

E. HARVARD AVE.

S. LOGAN ST.

Sylvania St.

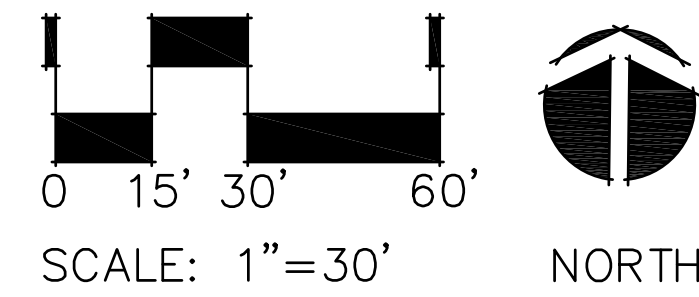
S. Pearl St.

S. Washington St.



Know what's below  
Call before you dig.

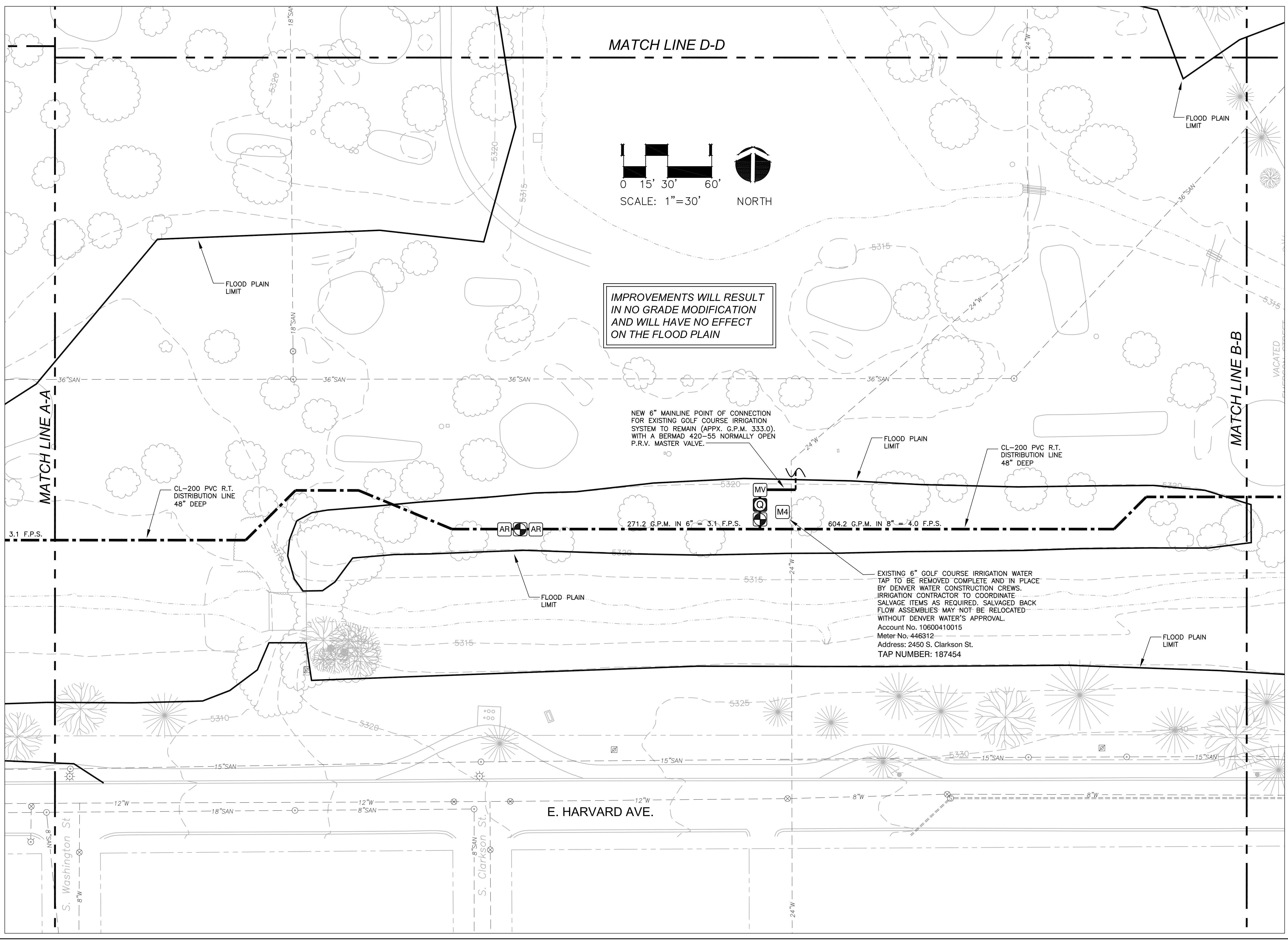
MATCH LINE D-D



IMPROVEMENTS WILL RESULT  
IN NO GRADE MODIFICATION  
AND WILL HAVE NO EFFECT  
ON THE FLOOD PLAIN

NEW 6" MAINLINE POINT OF CONNECTION  
FOR EXISTING GOLF COURSE IRRIGATION  
SYSTEM TO REMAIN (APPX. G.P.M. 333.0).  
WITH A BERMAD 420-55 NORMALLY OPEN  
P.R.V. MASTER VALVE.

EXISTING 6" GOLF COURSE IRRIGATION WATER  
TAP TO BE REMOVED COMPLETE AND IN PLACE  
BY DENVER WATER CONSTRUCTION CREWS.  
IRRIGATION CONTRACTOR TO COORDINATE  
SALVAGE ITEMS AS REQUIRED. SALVAGED BACK  
FLOW ASSEMBLIES MAY NOT BE RELOCATED  
WITHOUT DENVER WATER'S APPROVAL.  
Account No. 10600410015  
Meter No. 446312  
Address: 2450 S. Clarkson St.  
TAP NUMBER: 187454



# Denver Parks + Recreation

PROJECT: HARVARD GULCH STATE HOME  
PARK IRRIGATION RENOVATION

SHEET TITLE: Point of Connection and  
Distribution Plan

SCALE: 1" = 30'

DESIGNED BY: MEH

DRAWN BY: MEH

CHECKED BY: KS

DATE: 09-01-10

REVISIONS:  
10-15-10  
11-12-12  
12-12-12

PREPARED BY:  
IRRIGATION DESIGN BY:  
*Applied Design Services*  
9721 Bayou Ridge Trail  
Parker, Colorado 80134  
(303) 841-7077  
Fax - 841-8191

SHEET NUMBER: IR8



Know what's below  
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# Denver Parks + Recreation

SHEET TITLE:  
Point of Connection and  
Distribution Plan

PROJECT:  
HARVARD GULCH STATE HOME  
PARK IRRIGATION RENOVATION

SCALE: 1" = 30'

DESIGNED BY: MEH

DRAWN BY: MEH

CHECKED BY: KS

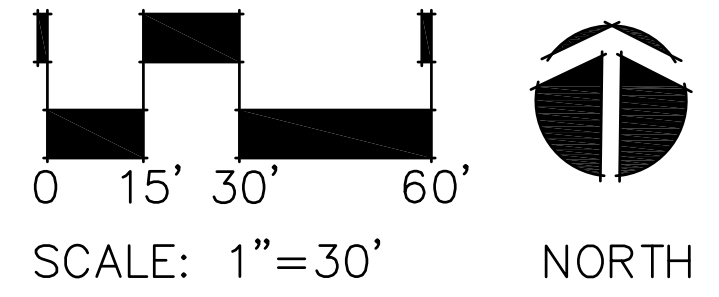
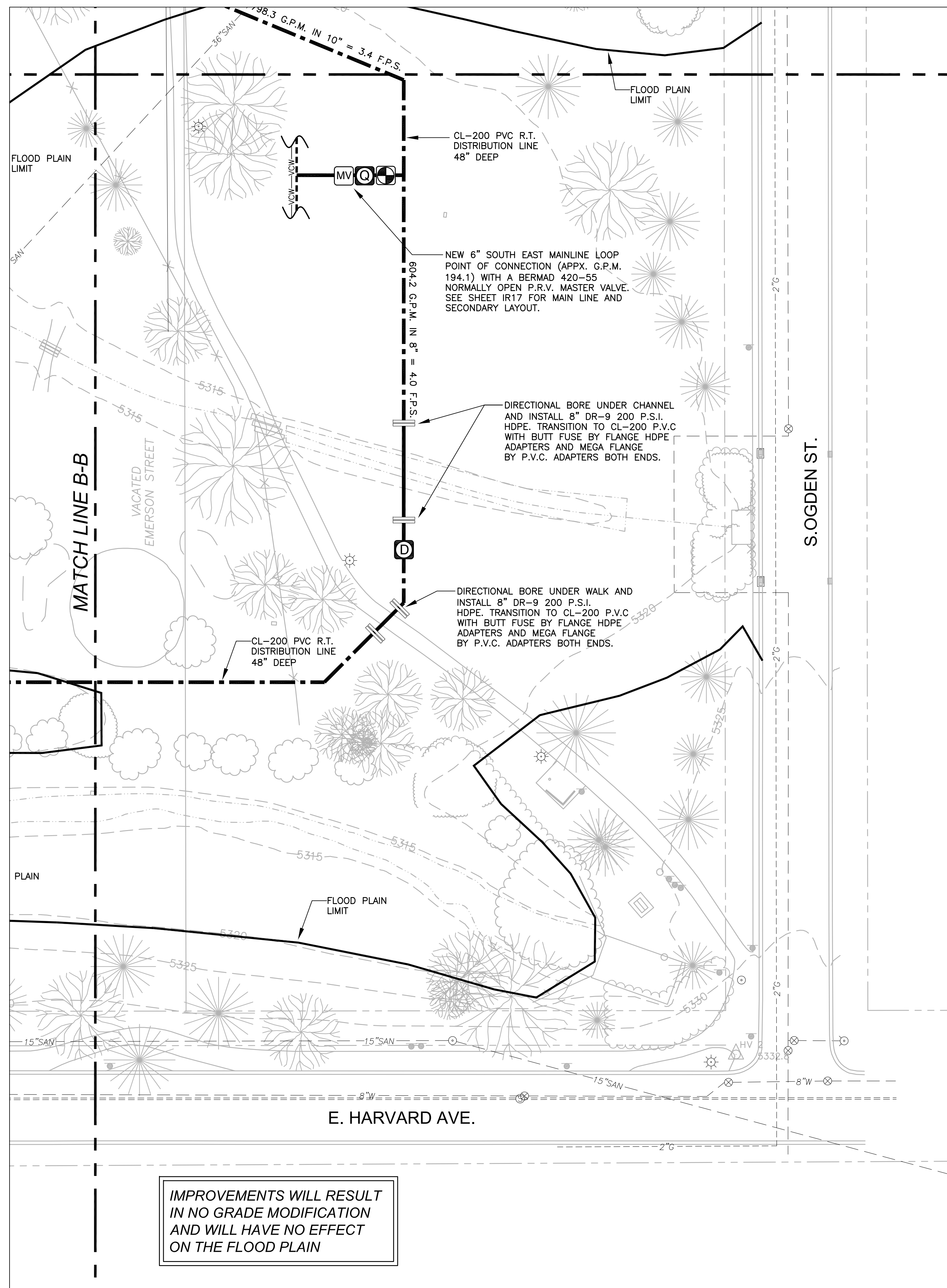
DATE: 09-01-10

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11-12-12  
12-12-12

PREPARED BY:  
IRRIGATION DESIGN BY:  
*Applied Design Services*  
9721 Bayou Ridge Trail  
Parker, Colorado 80134  
(303) 841-7077  
Fax - 841-8191

SHEET NUMBER: IR9

MATCH LINE D-D



IMPROVEMENTS WILL RESULT IN NO GRADE MODIFICATION AND WILL HAVE NO EFFECT ON THE FLOOD PLAIN

S. OGDEN ST.

E. HARVARD AVE.

MATCH LINE B-B

FLOOD PLAIN LIMIT

FLOOD PLAIN LIMIT

FLOOD PLAIN LIMIT

PLAIN

VACATED EMERSON STREET





Know what's below  
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# Denver Parks + Recreation

SHEET TITLE:  
Irrigation Layout Plan

PROJECT:  
HARVARD GULCH STATE HOME  
PARK IRRIGATION RENOVATION

SCALE: 1"=30'

DESIGNED BY: MEH

DRAWN BY: MEH

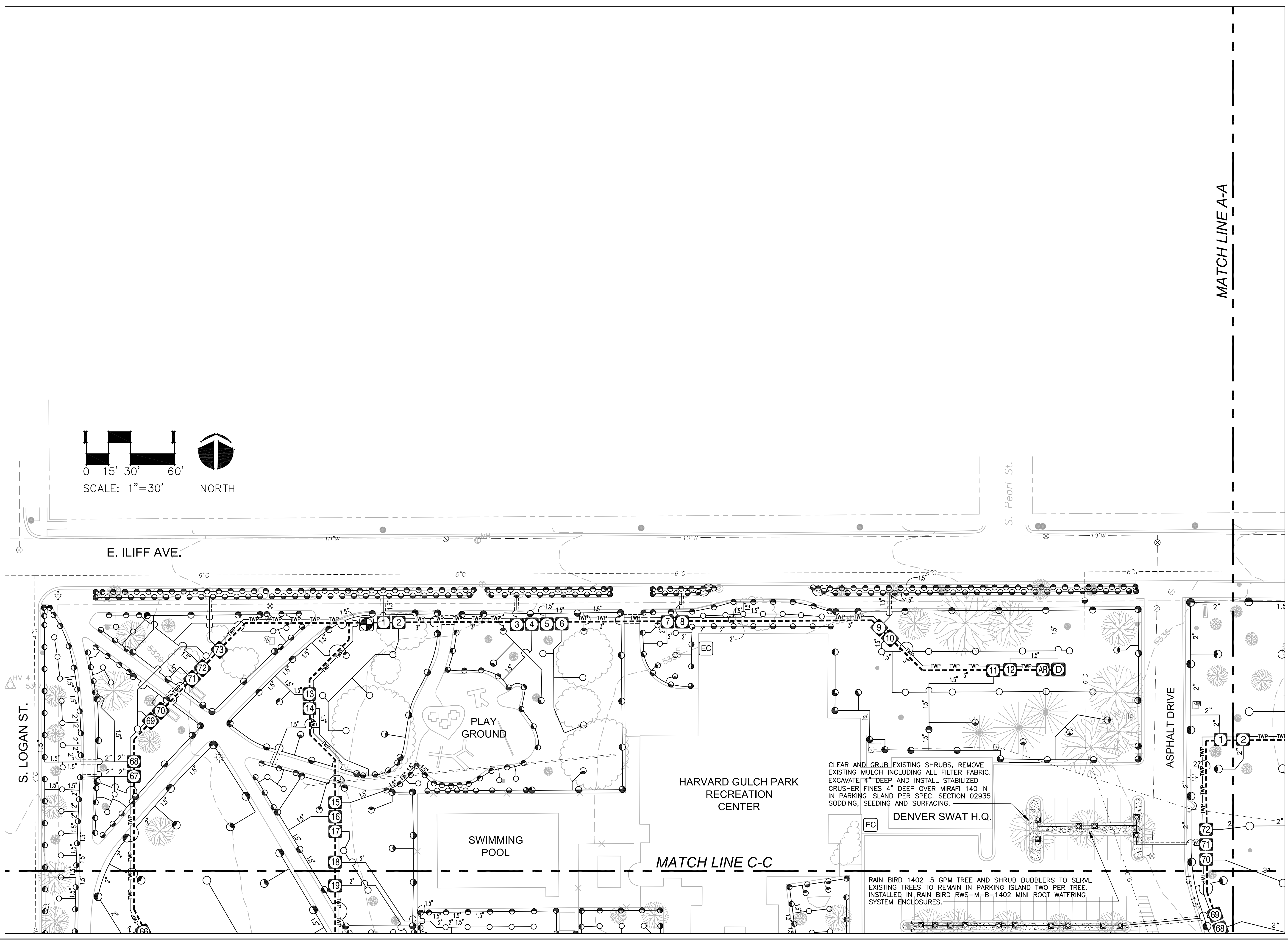
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11-12-12  
12-12-12

PREPARED BY:  
IRRIGATION DESIGN BY:  
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9721 Bayou Ridge Trail  
Parker, Colorado 80134  
(303) 841-7077  
Fax - 841-8191

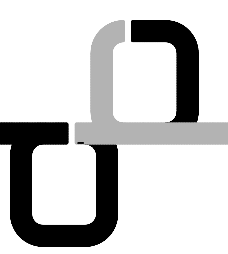
SHEET NUMBER: IR10





Know what's below  
Call before you dig.

# Denver Parks + Recreation



SHEET TITLE:  
Irrigation Layout Plan

PROJECT:  
HARVARD GULCH STATE HOME  
PARK IRRIGATION RENOVATION

SCALE: 1"=30'

DESIGNED BY: MEH

DRAWN BY: MEH

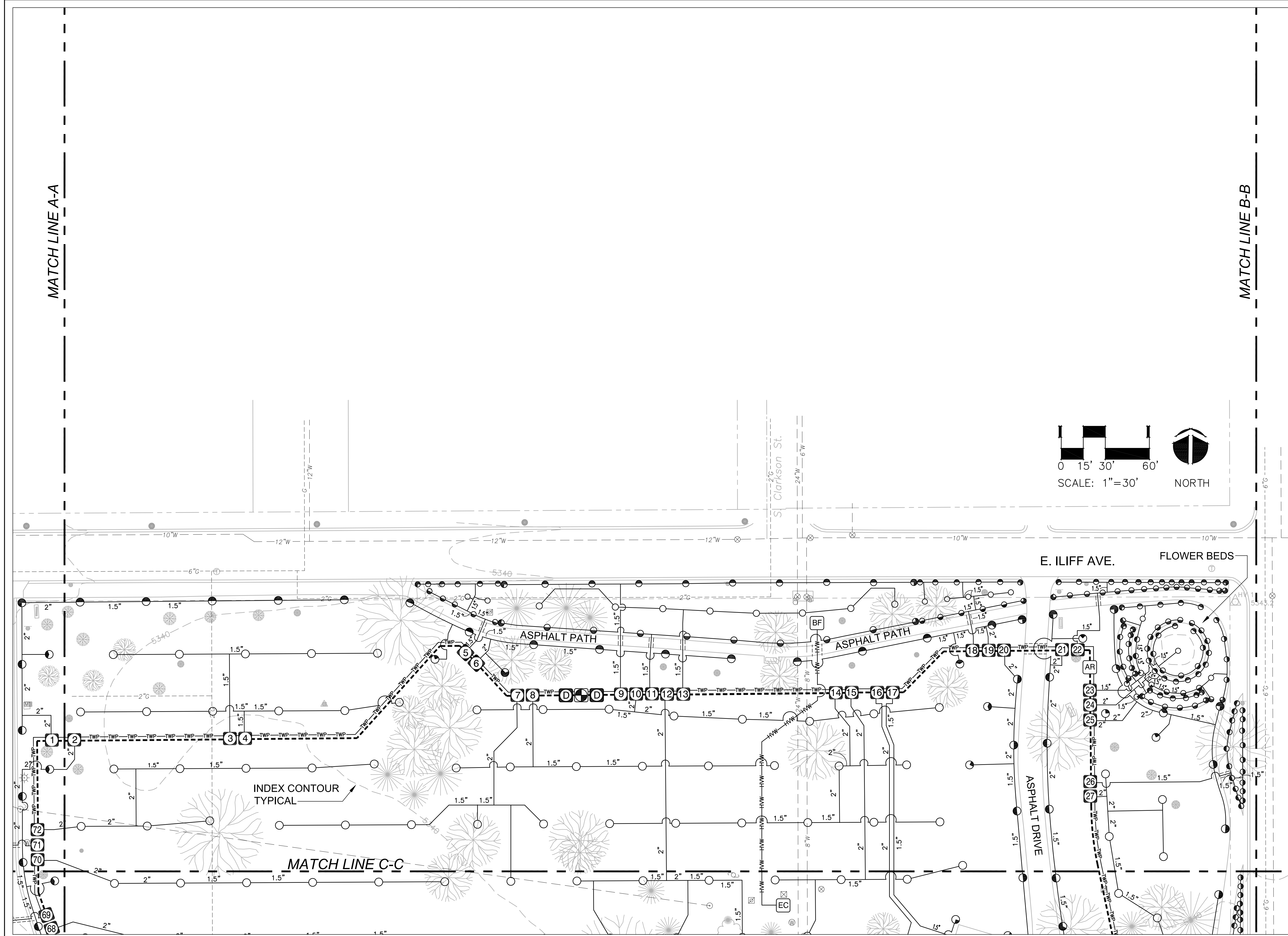
CHECKED BY: KS

DATE: 09-01-10

REVISIONS:  
10-15-10  
11-12-12  
12-12-12

PREPARED BY:  
IRRIGATION DESIGN BY:  
*Applied Design Services*  
9721 Bayou Ridge Trail  
Parker, Colorado 80134  
(303) 841-7077  
Fax - 841-8191

SHEET NUMBER: IR11







Know what's below  
Call before you dig.

# Denver Parks + Recreation

SHEET TITLE:  
Irrigation Layout Plan

PROJECT:  
HARVARD GULCH STATE HOME  
PARK IRRIGATION RENOVATION

SCALE: 1"=30'

DESIGNED BY: MEH

DRAWN BY: MEH

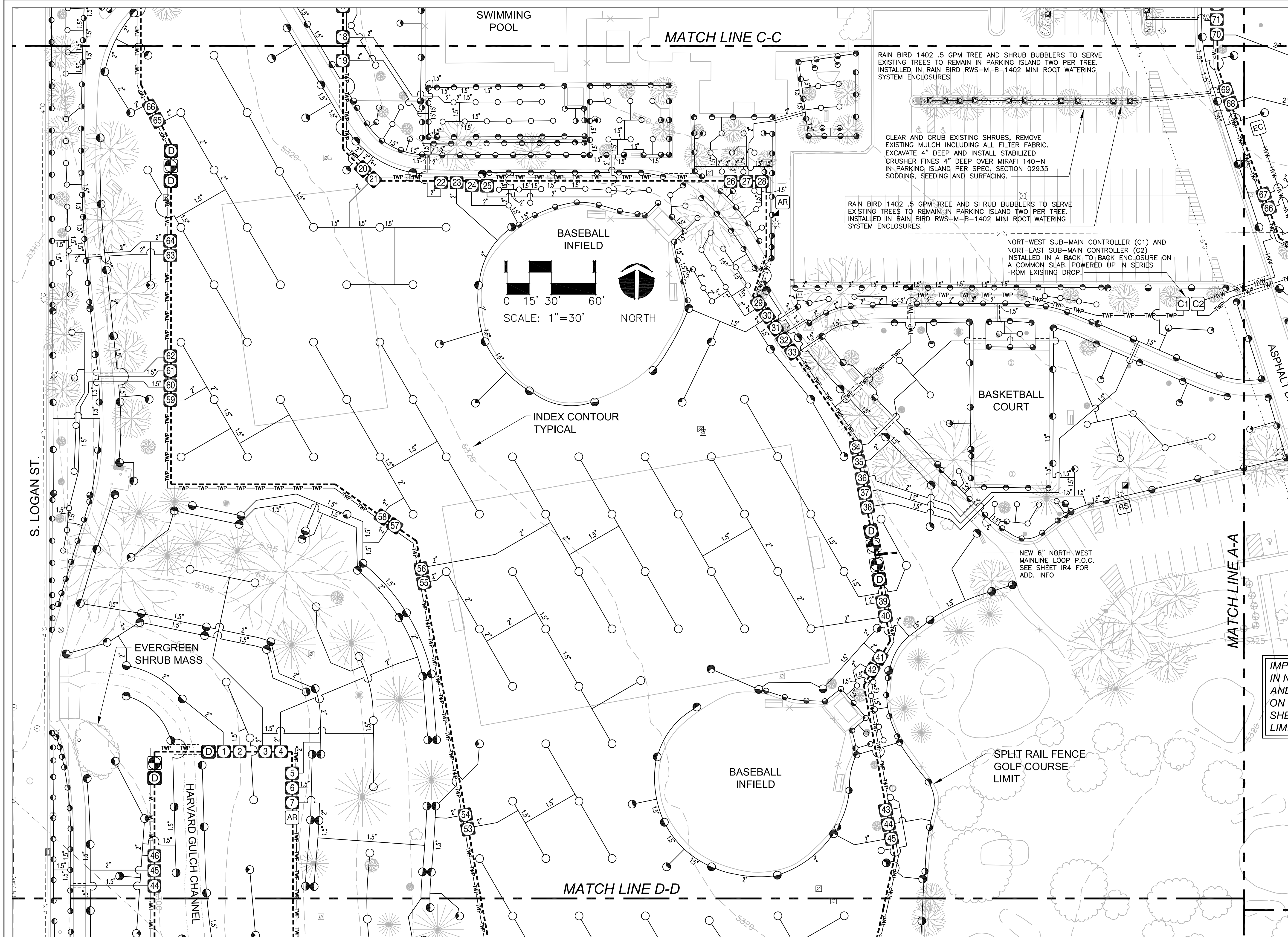
CHECKED BY: KS

DATE: 09-01-10

REVISIONS:  
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11-12-12  
12-12-12

PREPARED BY:  
IRRIGATION DESIGN BY:  
*Applied Design Services*  
9721 Bayou Ridge Trail  
Parker, Colorado 80134  
(303) 841-7077  
Fax - 841-8191

SHEET NUMBER: IR12



IMPR  
IN NO  
AND  
ON T  
SHEE  
LIMIT





Know what's below  
Call before you dig.

# Denver Parks + Recreation

SHEET TITLE:  
Irrigation Layout Plan

PROJECT:  
HARVARD GULCH STATE HOME  
PARK IRRIGATION RENOVATION

SCALE: 1"=30'

DESIGNED BY: MEH

DRAWN BY: MEH

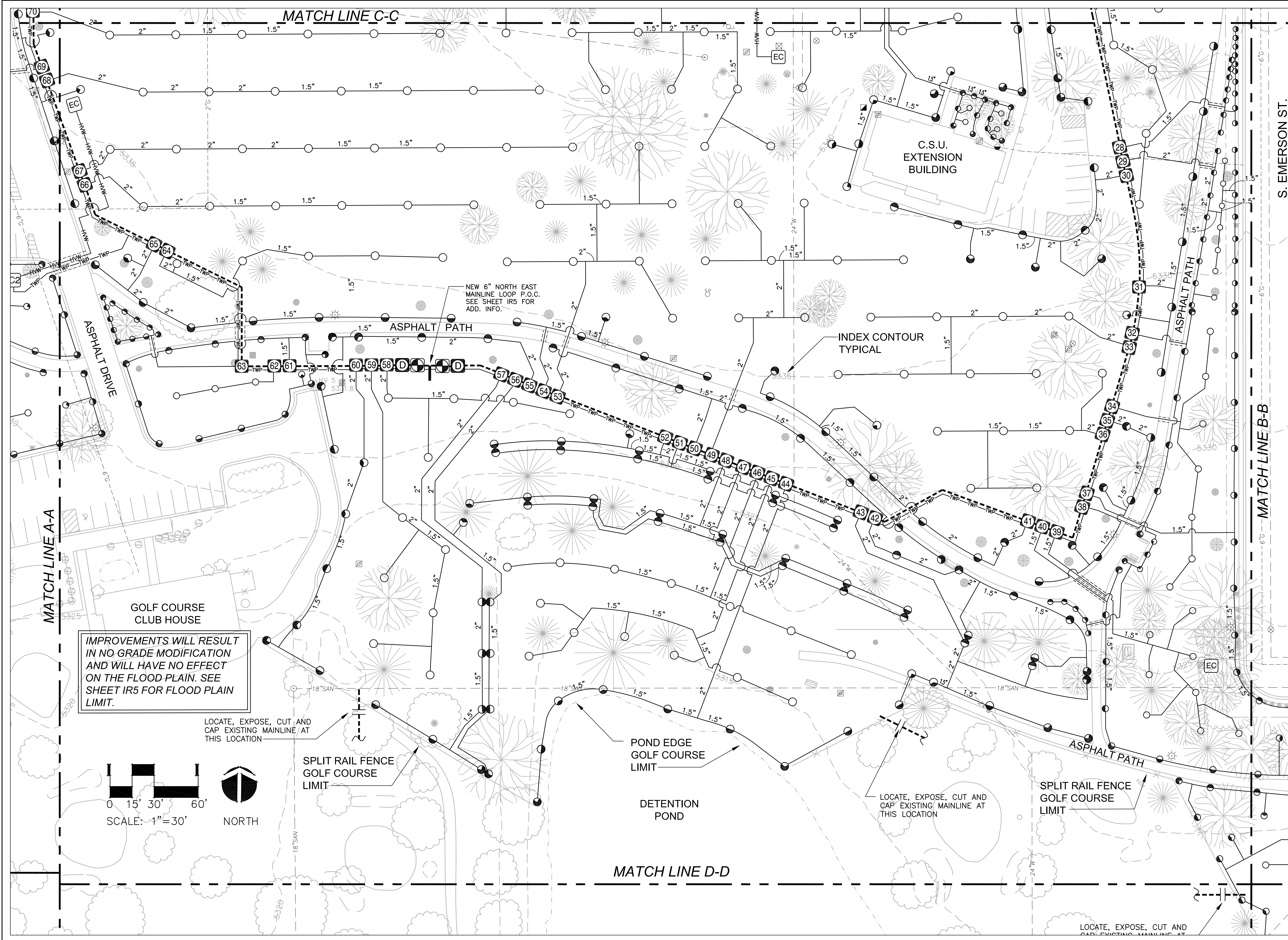
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DATE: 09-01-10

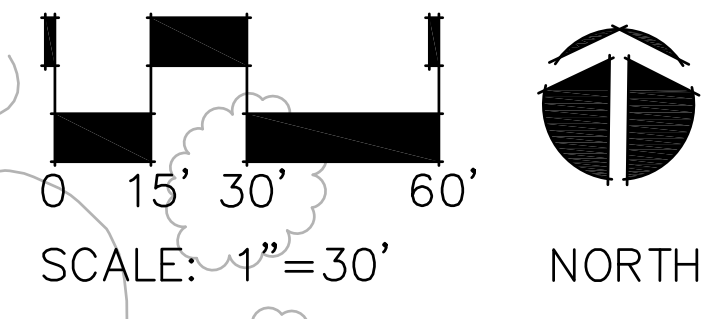
REVISIONS:  
10-15-10  
11-12-12  
12-12-12

PREPARED BY:  
IRRIGATION DESIGN BY:  
Applied Design Services  
9721 Bayou Ridge Trail  
Parker, Colorado 80134  
(303) 841-7077  
Fax - 841-8191

SHEET NUMBER: IR13



IMPROVEMENTS WILL RESULT IN NO GRADE MODIFICATION AND WILL HAVE NO EFFECT ON THE FLOOD PLAIN. SEE SHEET IR5 FOR FLOOD PLAIN LIMIT.



LOCATE, EXPOSE, CUT AND CAP EXISTING MAINLINE AT THIS LOCATION

SPLIT RAIL FENCE GOLF COURSE LIMIT

POND EDGE GOLF COURSE LIMIT

DETENTION POND

LOCATE, EXPOSE, CUT AND CAP EXISTING MAINLINE AT THIS LOCATION

SPLIT RAIL FENCE GOLF COURSE LIMIT

LOCATE, EXPOSE, CUT AND CAP EXISTING MAINLINE AT THIS LOCATION



Know what's below  
Call before you dig.

# Denver Parks + Recreation

SHEET TITLE:  
Irrigation Layout Plan

PROJECT:  
HARVARD GULCH STATE HOME  
PARK IRRIGATION RENOVATION

SCALE: 1"=30'

DESIGNED BY: MEH

DRAWN BY: MEH

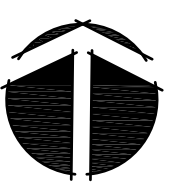
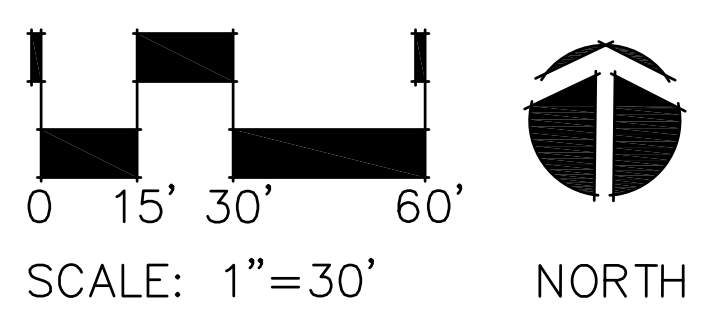
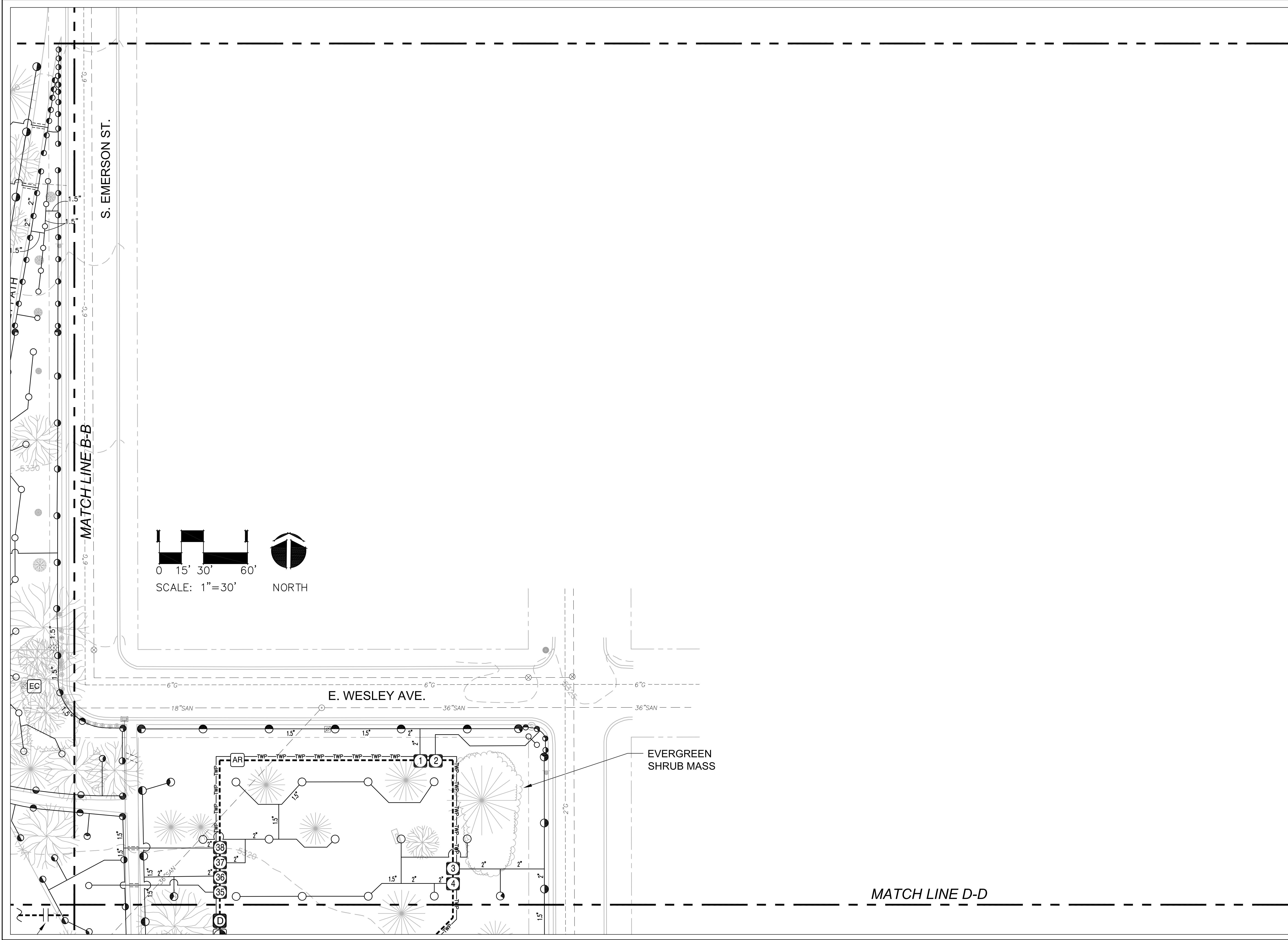
CHECKED BY: KS

DATE: 09-01-10

REVISIONS:  
10-15-10  
11-12-12  
12-12-12

PREPARED BY:  
IRRIGATION DESIGN BY:  
*Applied Design Services*  
9721 Bayou Ridge Trail  
Parker, Colorado 80134  
(303) 841-7077  
Fax - 841-8191

SHEET NUMBER: IR14



NORTH

MATCH LINE D-D

EVERGREEN SHRUB MASS

S. EMERSON ST.

MATCH LINE B-B

E. WESLEY AVE.





Know what's below  
Call before you dig.

# Denver Parks + Recreation

SHEET TITLE:  
Irrigation Layout Plan

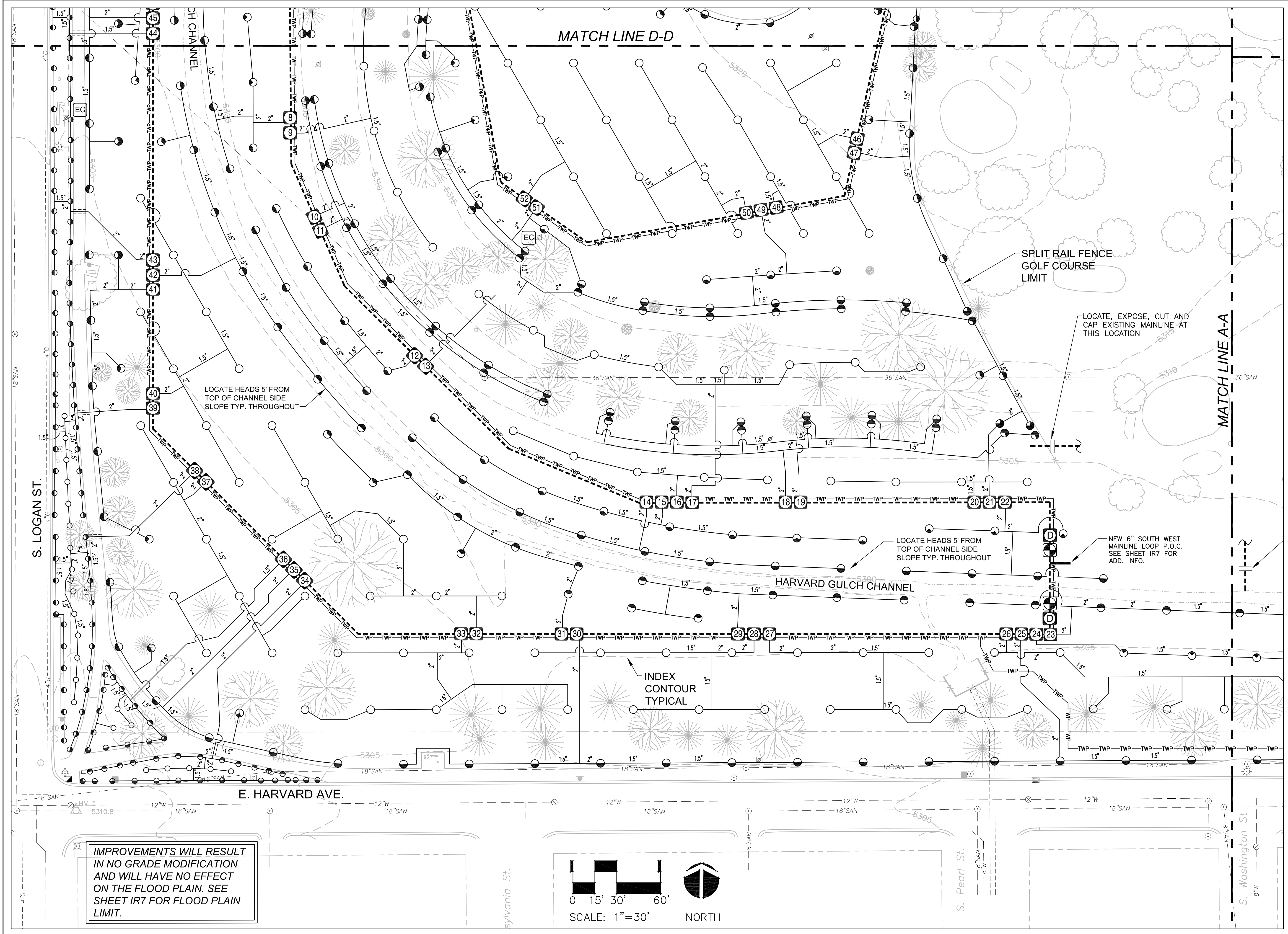
PROJECT:  
HARVARD GULCH STATE HOME  
PARK IRRIGATION RENOVATION

SCALE: 1"=30'  
DESIGNED BY: MEH  
DRAWN BY: MEH  
CHECKED BY: KS  
DATE: 09-01-10

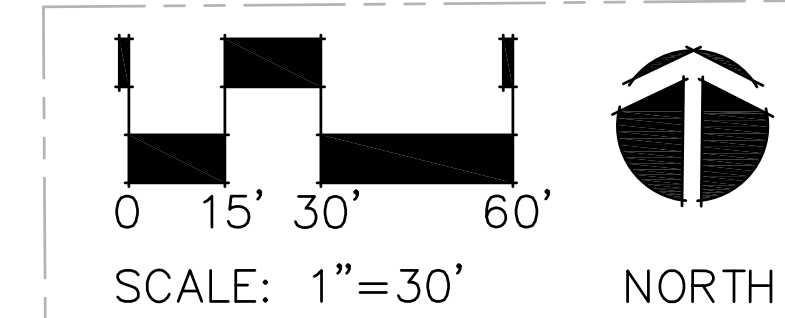
REVISIONS:  
10-15-10  
11-12-12  
12-12-12

PREPARED BY:  
IRRIGATION DESIGN BY:  
Applied Design Services  
9721 Bayou Ridge Trail  
Parker, Colorado 80134  
(303) 841-7077  
Fax - 841-8191

SHEET NUMBER: IR15



IMPROVEMENTS WILL RESULT  
IN NO GRADE MODIFICATION  
AND WILL HAVE NO EFFECT  
ON THE FLOOD PLAIN. SEE  
SHEET IR7 FOR FLOOD PLAIN  
LIMIT.





Know what's below  
Call before you dig.

# Denver Parks + Recreation

SHEET TITLE:  
Irrigation Layout Plan

PROJECT:  
HARVARD GULCH STATE HOME  
PARK IRRIGATION RENOVATION

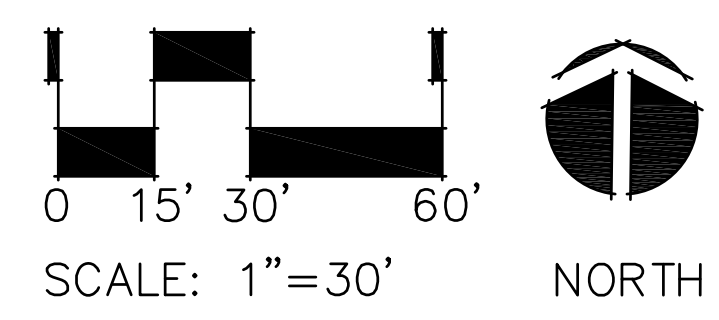
SCALE: 1"=30'  
DESIGNED BY: MEH  
DRAWN BY: MEH  
CHECKED BY: KS  
DATE: 09-01-10

REVISIONS:  
10-15-10  
11-12-12  
12-12-12

PREPARED BY:  
IRRIGATION DESIGN BY:  
*Applied Design Services*  
9721 Bayou Ridge Trail  
Parker, Colorado 80134  
(303) 841-7077  
Fax - 841-8191

SHEET NUMBER: IR16

MATCH LINE D-D



DETENTION  
POND

TREES WITHIN GOLF COURSE WERE NOT DEFINED  
INDIVIDUALLY ON SURVEY AND ARE REPRESENTED  
AS CLOUD MASS SYMBOLS

INDEX CONTOUR  
TYPICAL

NEW 6" GOLF COURSE  
MAINLINE LOOP P.O.C.  
SEE SHEET IR8 FOR  
ADD. INFO.

LOCATE, EXPOSE, CUT AND  
CAP EXISTING MAINLINE AT  
THIS LOCATION

GRADE CONTROL  
STRUCTURE

CHANNEL EDGE  
GOLF COURSE  
LIMIT

LOCATE HEADS 5' FROM  
TOP OF CHANNEL SIDE  
SLOPE TYP. THROUGHOUT

CHANNEL EDGE  
GOLF COURSE  
LIMIT

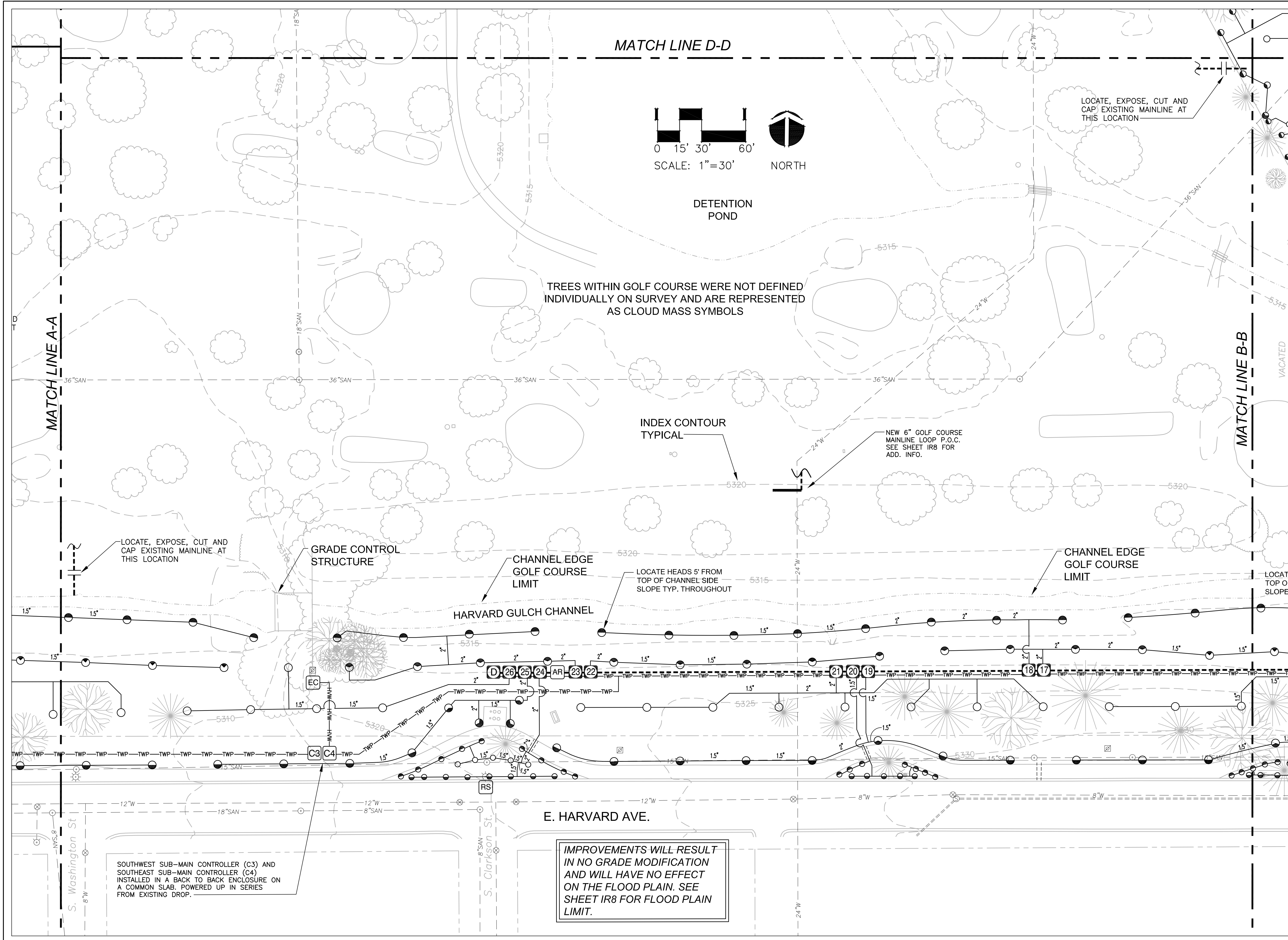
LOCATE  
TOP OF  
SLOPE

HARVARD GULCH CHANNEL

E. HARVARD AVE.

IMPROVEMENTS WILL RESULT  
IN NO GRADE MODIFICATION  
AND WILL HAVE NO EFFECT  
ON THE FLOOD PLAIN. SEE  
SHEET IR8 FOR FLOOD PLAIN  
LIMIT.

SOUTHWEST SUB-MAIN CONTROLLER (C3) AND  
SOUTHEAST SUB-MAIN CONTROLLER (C4)  
INSTALLED IN A BACK TO BACK ENCLOSURE ON  
A COMMON SLAB. POWERED UP IN SERIES  
FROM EXISTING DROP.

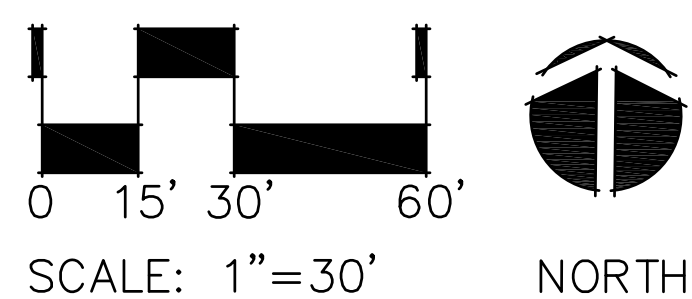






Know what's below  
Call before you dig.

MATCH LINE D-D



NEW 6" SOUTH EAST  
MAINLINE LOOP P.O.C.  
SEE SHEET IR9 FOR  
ADD. INFO.

S.OGDEN ST.

EVERGREEN  
SHRUB MASS

IMPROVEMENTS WILL RESULT  
IN NO GRADE MODIFICATION  
AND WILL HAVE NO EFFECT  
ON THE FLOOD PLAIN. SEE  
SHEET IR9 FOR FLOOD PLAIN  
LIMIT.

EVERGREEN  
SHRUB MASS

E. HARVARD AVE.

SPLIT RAIL FENCE  
GOLF COURSE  
LIMIT

LOCATE HEADS 5' FROM  
TOP OF CHANNEL SIDE  
SLOPE TYP. THROUGHOUT

DRAINAGE CHANNEL

HARVARD GULCH CHANNEL

MATCH LINE B-B

VACATED  
EMERSON STREET

# Denver Parks + Recreation

SHEET TITLE:  
Irrigation Layout Plan

PROJECT:  
HARVARD GULCH STATE HOME  
PARK IRRIGATION RENOVATION

SCALE: 1"=30'

DESIGNED BY: MEH

DRAWN BY: MEH

CHECKED BY: KS

DATE: 09-01-10

REVISIONS:  
10-15-10  
11-12-12  
12-12-12

PREPARED BY:  
IRRIGATION DESIGN BY:  
Applied Design Services  
9721 Bayou Ridge Trail  
Parker, Colorado 80134  
(303) 841-7077  
Fax - 841-8191

SHEET NUMBER: IR17



Know what's below  
Call before you dig.

# Denver Parks + Recreation

SHEET TITLE:  
Irrigation Equipment  
Schedules Plan

PROJECT:  
HARVARD GULCH STATE HOME  
PARK IRRIGATION RENOVATION

SCALE: N.A.  
DESIGNED BY: MEH  
DRAWN BY: MEH  
CHECKED BY: KS  
DATE: 09-01-10

REVISIONS:  
10-15-10  
11-12-12  
12-12-12

PREPARED BY:  
IRRIGATION DESIGN BY:  
Applied Design Services  
9721 Bayou Ridge Trail  
Parker, Colorado 80134  
(303) 841-7077  
Fax - 841-8191

SHEET NUMBER: IR18

**IRRIGATION EQUIPMENT SCHEDULE:**  
Harvard Gulch / State Home Park Irrigation Renovation  
New Northwest Irrigation Sub-Main Loop - New Controller Location (C1)

VALVE #	ZONE #	CONTROL VALVE	SPRINKLER HEADS	GPM	PSI
1	C1-1	RAIN BIRD 100-PEB PRS-D-1"	RAIN BIRD 1806 SAM PRS W/ U-8 SERIES NOZZLES	18.3	30
2	C1-2	RAIN BIRD 100-PEB 1"	RAIN BIRD 5004 PC/FC-SS-SAM WITH NO. 1.5 NOZZLES	6.8	55
3	C1-3	RAIN BIRD 100-PEB PRS-D-1"	RAIN BIRD 1806 SAM PRS W/ U-8 SERIES NOZZLES	10.8	30
4	C1-4	RAIN BIRD 100-PEB PRS-D-1"	RAIN BIRD 1806 SAM PRS W/ U-12 SERIES NOZZLES	12.6	30
5	C1-5	RAIN BIRD 100-PEB 1"	RAIN BIRD 5004 PC/FC-SS-SAM WITH NO. 1.5 NOZZLES	27.3	55
6	C1-6	RAIN BIRD 100-PEB 1"	RAIN BIRD 5004 PC/FC-SS-SAM WITH NO. 1.5 NOZZLES	5.1	55
7	C1-7	RAIN BIRD 200-PEB PRS-D-2"	RAIN BIRD 1806 SAM PRS W/ U-10&15 SERIES NOZZLES	75.7	30
8	C1-8	RAIN BIRD 100-PEB PRS-D-1"	RAIN BIRD 1806 SAM PRS W/ U-8 SERIES NOZZLES	6.1	30
9	C1-9	RAIN BIRD 100-PEB PRS-D-1"	RAIN BIRD 1806 SAM PRS W/ U-8 SERIES NOZZLES	29.0	30
10	C1-10	RAIN BIRD 100-PEB 1"	RAIN BIRD 5004 PC/FC-SS-SAM WITH NO. 1.5 NOZZLES	17.1	55
11	C1-11	RAIN BIRD 100-PEB 1"	RAIN BIRD 5004 PC/FC-SS-SAM WITH NO. 1.5 NOZZLES	27.3	55
12	C1-12	RAIN BIRD 100-PEB 1"	RAIN BIRD 5004 PC/FC-SS-SAM WITH NO. 1.5 NOZZLES	22.2	55
13	C1-13	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5004 PC/FC-SS-SAM WITH NO. 1.5 NOZZLES	30.7	55
14	C1-14	RAIN BIRD 100-PEB PRS-D-1"	RAIN BIRD 1806 SAM PRS W/ U-10&15 SERIES NOZZLES	23.8	30
15	C1-15	RAIN BIRD 100-PEB PRS-D-1"	RAIN BIRD 1806 SAM PRS W/ U-8,&10 SERIES NOZZLES	21.2	30
16	C1-16	RAIN BIRD 100-PEB 1"	RAIN BIRD 5004 PC/FC-SS-SAM WITH NO. 1.5 NOZZLES	23.9	55
17	C1-17	RAIN BIRD 100-PEB 1"	RAIN BIRD 5004 PC/FC-SS-SAM WITH NO. 1.5 NOZZLES	3.4	55
18	C1-18	RAIN BIRD 150-PEB PRS-D-1.5"	RAIN BIRD 1806 SAM PRS W/ U-15 SERIES NOZZLES	40.7	30
19	C1-19	RAIN BIRD 150-PEB PRS-D-1.5"	RAIN BIRD 1806 SAM PRS W/ U-15 SERIES NOZZLES	38.2	30
20	C1-20	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
21	C1-21	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
22	C1-22	RAIN BIRD 200-PEB PRS-D-2"	RAIN BIRD 1806 SAM PRS W/ U-12&15 SERIES NOZZLES	53.9	30
23	C1-23	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	57.4	60
24	C1-24	RAIN BIRD 200-PEB PRS-D-2"	RAIN BIRD 1806 SAM PRS W/ U-15 SERIES NOZZLES	69.7	30
25	C1-25	RAIN BIRD 200-PEB PRS-D-2"	RAIN BIRD 1806 SAM PRS W/ U-15 SERIES NOZZLES	60.4	30
26	C1-26	RAIN BIRD 200-PEB PRS-D-2"	RAIN BIRD 1806 SAM PRS W/ U-8,10,12&15 SERIES NOZZLES	58.5	30
27	C1-27	RAIN BIRD 200-PEB PRS-D-2"	RAIN BIRD 1806 SAM PRS W/ U-15 SERIES NOZZLES	50.7	30
28	C1-28	RAIN BIRD 100-PEB PRS-D-1"	RAIN BIRD 1806 SAM PRS W/ U-15 SERIES NOZZLES	21.3	30
29	C1-29	RAIN BIRD 200-PEB PRS-D-2"	RAIN BIRD 1806 SAM PRS W/ U-15 SERIES NOZZLES	72.5	30
30	C1-30	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	57.4	60
31	C1-31	RAIN BIRD 150-PEB PRS-D-1.5"	RAIN BIRD 1806 SAM PRS W/ U-8&15 SERIES NOZZLES	32.3	30
32	C1-32	RAIN BIRD 150-PEB PRS-D-1.5"	RAIN BIRD 1806 SAM PRS W/ U-8,12&15 SERIES NOZZLES	40.7	30
33	C1-33	RAIN BIRD 100-PEB 1"	RAIN BIRD 5004 PC/FC-SS-SAM WITH NO. 1.5 NOZZLES	23.9	55

**IRRIGATION EQUIPMENT SCHEDULE: cont**  
Harvard Gulch / State Home Park Irrigation Renovation  
New Northwest Irrigation Sub-Main Loop - New Controller Location (C1)

VALVE #	ZONE #	CONTROL VALVE	SPRINKLER HEADS	GPM	PSI
34	C1-34	RAIN BIRD 100-PEB 1"	RAIN BIRD 5004 PC/FC-SS-SAM WITH NO. 1.5 NOZZLES	11.9	55
35	C1-35	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	49.2	60
36	C1-36	RAIN BIRD 150-PEB PRS-D-1.5"	RAIN BIRD 1806 SAM PRS W/ U-12&15 SERIES NOZZLES	43.9	30
37	C1-37	RAIN BIRD 100-PEB 1"	RAIN BIRD 5004 PC/FC-SS-SAM WITH NO. 1.5 NOZZLES	22.2	55
38	C1-38	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5004 PC/FC-SS-SAM WITH NO. 1.5 NOZZLES	35.6	55
39	C1-39	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	49.2	60
40	C1-40	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
41	C1-41	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	73.8	60
42	C1-42	RAIN BIRD 200-PEB PRS-D-2"	RAIN BIRD 1806 SAM PRS W/ U-15 SERIES NOZZLES	53.4	30
43	C1-43	RAIN BIRD 100-PEB 1"	RAIN BIRD 5004 PC/FC-SS-SAM WITH NO. 1.5 NOZZLES	3.4	55
44	C1-44	RAIN BIRD 100-PEB 1"	RAIN BIRD 5004 PC/FC-SS-SAM WITH NO. 1.5 NOZZLES	11.9	55
45	C1-45	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
46	C1-46	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	41.0	60
47	C1-47	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
48	C1-48	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	32.8	60
49	C1-49	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
50	C1-50	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
51	C1-51	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
52	C1-52	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	41.0	60
53	C1-53	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	41.0	60
54	C1-54	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	41.0	60
55	C1-55	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
56	C1-56	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
57	C1-57	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
58	C1-58	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
59	C1-59	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	49.2	60
60	C1-60	RAIN BIRD 100-PEB PRS-D-1"	RAIN BIRD 1806 SAM PRS W/ U-8,10,12&15 SERIES NOZZLES	26.3	30
61	C1-61	RAIN BIRD 100-PEB 1"	RAIN BIRD 5004 PC/FC-SS-SAM WITH NO. 1.5 NOZZLES	17.1	55
62	C1-62	RAIN BIRD 100-PEB 1"	RAIN BIRD 5004 PC/FC-SS-SAM WITH NO. 1.5 NOZZLES	6.8	55
63	C1-63	RAIN BIRD 200-PEB PRS-D-2"	RAIN BIRD 1806 SAM PRS W/ U-15 SERIES NOZZLES	64.8	30
64	C1-64	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	73.8	60
65	C1-65	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
66	C1-66	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	73.8	60

**IRRIGATION EQUIPMENT SCHEDULE: cont**  
Harvard Gulch / State Home Park Irrigation Renovation  
New Northwest Irrigation Sub-Main Loop - New Controller Location (C1)

VALVE #	ZONE #	CONTROL VALVE	SPRINKLER HEADS	GPM	PSI
67	C1-67	RAIN BIRD 200-PEB PRS-D-2"	RAIN BIRD 1806 SAM PRS W/ U-15 SERIES NOZZLES	57.4	30
68	C1-68	RAIN BIRD 200-PEB PRS-D-2"	RAIN BIRD 1806 SAM PRS W/ U-8,10,12&15 SERIES NOZZLES	58.8	30
69	C1-69	RAIN BIRD 100-PEB 1"	RAIN BIRD 5004 PC/FC-SS-SAM WITH NO. 1.5 NOZZLES	3.4	55
70	C1-70	RAIN BIRD 100-PEB 1"	RAIN BIRD 5004 PC/FC-SS-SAM WITH NO. 1.5 NOZZLES	15.3	55
71	C1-71	RAIN BIRD 100-PEB 1"	RAIN BIRD 5004 PC/FC-SS-SAM WITH NO. 1.5 NOZZLES	17.1	55
72	C1-72	RAIN BIRD 100-PEB PRS-D-1"	RAIN BIRD 1806 SAM PRS W/ U-12 SERIES NOZZLES	26.0	30
73	C1-73	RAIN BIRD 100-PEB PRS-D-1"	RAIN BIRD 1806 SAM PRS W/ U-8 SERIES NOZZLES	15.4	30

**IRRIGATION EQUIPMENT SCHEDULE:**  
Harvard Gulch / State Home Park Irrigation Renovation  
New Northeast Irrigation Sub-Main Loop - New Controller Location (C2)

VALVE #	ZONE #	CONTROL VALVE	SPRINKLER HEADS	GPM	PSI
1	C2-1	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	73.8	60
2	C2-2	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
3	C2-3	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	41.0	60
4	C2-4	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	49.2	60
5	C2-5	RAIN BIRD 100-PEB PRS-D-1"	RAIN BIRD 1806 SAM PRS W/ U-8,10,12&15 SERIES NOZZLES	18.5	30
6	C2-6	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
7	C2-7	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	49.2	60
8	C2-8	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	49.2	60
9	C2-9	RAIN BIRD 100-PEB 1"	RAIN BIRD 5004 PC/FC-SS-SAM WITH NO. 1.5 NOZZLES	17.1	55
10	C2-10	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
11	C2-11	RAIN BIRD 100-PEB 1"	RAIN BIRD 5004 PC/FC-SS-SAM WITH NO. 1.5 NOZZLES	17.1	55
12	C2-12	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
13	C2-13	RAIN BIRD 100-PEB 1"	RAIN BIRD 5004 PC/FC-SS-SAM WITH NO. 1.5 NOZZLES	13.6	55
14	C2-14	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
15	C2-15	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	41.0	60
16	C2-16	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	57.4	60
17	C2-17	RAIN BIRD 100-PEB PRS-D-1"	RAIN BIRD 1806 SAM PRS W/ U-8,10&15 SERIES NOZZLES	20.1	30
18	C2-18	RAIN BIRD 150-PEB PRS-D-1.5"	RAIN BIRD 1806 SAM PRS W/ U-10,12&15 SERIES NOZZLES	33.6	30
19	C2-19	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	49.2	60
20	C2-20	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60





Know what's below  
Call before you dig.

**IRRIGATION EQUIPMENT SCHEDULE: cont**  
Harvard Gulch / State Home Park Irrigation Renovation  
New Northeast Irrigation Sub-Main Loop - New Controller Location (C2)

VALVE #	ZONE #	CONTROL VALVE	SPRINKLER HEADS	GPM	PSI
21	C2-21	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	73.8	60
22	C2-22	RAIN BIRD 100-PEB PRS-D-1"	RAIN BIRD 1806 SAM PRS W/ U-8,10,12&15 SERIES NOZZLES	20.7	30
23	C2-23	RAIN BIRD 150-PEB PRS-D-1.5"	RAIN BIRD 1806 SAM PRS W/ U-10&15 SERIES NOZZLES	33.3	30
24	C2-24	RAIN BIRD 200-PEB PRS-D-2"	RAIN BIRD 1806 SAM PRS W/ U-10,12&15 SERIES NOZZLES	62.8	30
25	C2-25	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
26	C2-26	RAIN BIRD 100-PEB PRS-D-1"	RAIN BIRD 1806 SAM PRS W/ U-8,10,&12 SERIES NOZZLES	12.8	30
27	C2-27	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
28	C2-28	RAIN BIRD 100-PEB PRS-D-1"	RAIN BIRD 1806 SAM PRS W/ U-8,10,12&15 SERIES NOZZLES	13.4	30
29	C2-29	RAIN BIRD 150-PEB PRS-D-1.5"	RAIN BIRD 1806 SAM PRS W/ U-8,10,12&15 SERIES NOZZLES	49.7	30
30	C2-30	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
31	C2-31	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	49.2	60
32	C2-32	RAIN BIRD 100-PEB 1"	RAIN BIRD 5004 PC/FC-SS-SAM WITH NO. 1.5 NOZZLES	10.2	55
33	C2-33	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
34	C2-34	RAIN BIRD 100-PEB 1"	RAIN BIRD 5004 PC/FC-SS-SAM WITH NO. 1.5 NOZZLES	11.9	55
35	C2-35	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	57.4	60
36	C2-36	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	49.2	60
37	C2-37	RAIN BIRD 100-PEB 1"	RAIN BIRD 5004 PC/FC-SS-SAM WITH NO. 1.5 NOZZLES	20.5	55
38	C2-38	RAIN BIRD 100-PEB PRS-D-1"	RAIN BIRD 1806 SAM PRS W/ U-10&12 SERIES NOZZLES	10.0	30
39	C2-39	RAIN BIRD 100-PEB 1"	RAIN BIRD 5004 PC/FC-SS-SAM WITH NO. 1.5 NOZZLES	13.6	55
40	C2-40	RAIN BIRD 100-PEB 1"	RAIN BIRD 5004 PC/FC-SS-SAM WITH NO. 1.5 NOZZLES	17.1	55
41	C2-41	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
42	C2-42	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	57.4	60
43	C2-43	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	73.8	60
44	C2-44	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
45	C2-45	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	57.4	60
46	C2-46	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	57.4	60
47	C2-47	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	57.4	60
48	C2-48	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
49	C2-49	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
50	C2-50	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
51	C2-51	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	49.2	60
52	C2-52	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	57.4	60
53	C2-53	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60

**IRRIGATION EQUIPMENT SCHEDULE: cont**  
Harvard Gulch / State Home Park Irrigation Renovation  
New Northeast Irrigation Sub-Main Loop - New Controller Location (C2)

VALVE #	ZONE #	CONTROL VALVE	SPRINKLER HEADS	GPM	PSI
54	C2-54	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	41.0	60
55	C2-55	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	49.2	60
56	C2-56	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	41.0	60
57	C2-57	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	49.2	60
58	C2-58	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	41.0	60
59	C2-59	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	49.2	60
60	C2-60	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	49.2	60
61	C2-61	RAIN BIRD 100-PEB 1"	RAIN BIRD 5004 PC/FC-SS-SAM WITH NO. 1.5 NOZZLES	22.2	55
62	C2-62	RAIN BIRD 100-PEB 1"	RAIN BIRD 5004 PC/FC-SS-SAM WITH NO. 1.5 NOZZLES	5.1	55
63	C2-63	RAIN BIRD 100-PEB PRS-D-1"	RAIN BIRD 1806 SAM PRS W/ U-10,12&15 SERIES NOZZLES	11.6	30
64	C2-64	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	41.0	60
65	C2-65	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
66	C2-66	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	49.2	60
67	C2-67	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
68	C2-68	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	57.4	60
69	C2-69	RAIN BIRD 100-PEB PRS-D-1"	RAIN BIRD 1402 RWS BUBLER ASSEMBLIES	5.0	30
70	C2-70	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	49.2	60
71	C2-71	RAIN BIRD 100-PEB PRS-D-1"	RAIN BIRD 1402 RWS BUBLER ASSEMBLIES	3.0	30
72	C2-72	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60

**IRRIGATION EQUIPMENT SCHEDULE:**  
Harvard Gulch / State Home Park Irrigation Renovation  
New Southwest Irrigation Sub-Main Loop - New Controller Location (C3)

VALVE #	ZONE #	CONTROL VALVE	SPRINKLER HEADS	GPM	PSI
1	C3-1	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
2	C3-2	RAIN BIRD 100-PEB 1"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	24.6	60
3	C3-3	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	49.2	60
4	C3-4	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
5	C3-5	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
6	C3-6	RAIN BIRD 100-PEB 1"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	24.6	60
7	C3-7	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	41.0	60
8	C3-8	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
9	C3-9	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	41.0	60

**IRRIGATION EQUIPMENT SCHEDULE: cont**  
Harvard Gulch / State Home Park Irrigation Renovation  
New Southwest Irrigation Sub-Main Loop - New Controller Location (C3)

VALVE #	ZONE #	CONTROL VALVE	SPRINKLER HEADS	GPM	PSI
10	C3-10	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	57.4	60
11	C3-11	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	57.4	60
12	C3-12	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
13	C3-13	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
14	C3-14	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
15	C3-15	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
16	C3-16	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	41.0	60
17	C3-17	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
18	C3-18	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
19	C3-19	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	49.2	60
20	C3-20	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	32.8	60
21	C3-21	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	49.2	60
22	C3-22	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	57.4	60
23	C3-23	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
24	C3-24	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	41.0	60
25	C3-25	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	57.4	60
26	C3-26	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	49.2	60
27	C3-27	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	57.4	60
28	C3-28	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	57.4	60
29	C3-29	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	57.4	60
30	C3-30	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
31	C3-31	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
32	C3-32	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
33	C3-33	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
34	C3-34	RAIN BIRD 150-PEB PRS-D-1.5"	RAIN BIRD 1806 SAM PRS W/ U-8,10,12&15 SERIES NOZZLES	40.9	30
35	C3-35	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
36	C3-36	RAIN BIRD 100-PEB PRS-D-1"	RAIN BIRD 1806 SAM PRS W/ U-8,10,12&15 SERIES NOZZLES	28.5	30
37	C3-37	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	57.4	60
38	C3-38	RAIN BIRD 200-PEB PRS-D-2"	RAIN BIRD 1806 SAM PRS W/ U-8,10,12&15 SERIES NOZZLES	61.0	30
39	C3-39	RAIN BIRD 200-PEB PRS-D-2"	RAIN BIRD 1806 SAM PRS W/ U-10,12&15 SERIES NOZZLES	54.7	30
40	C3-40	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
41	C3-41	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
42	C3-42	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60

**Denver Parks + Recreation**

SHEET TITLE:  
Irrigation Equipment Schedules Plan

PROJECT:  
HARVARD GULCH STATE HOME PARK IRRIGATION RENOVATION

SCALE: N.A.

DESIGNED BY: MEH

DRAWN BY: MEH

CHECKED BY: KS

DATE: 09-01-10

REVISIONS:  
10-15-10  
11-12-12  
12-12-12

PREPARED BY:  
IRRIGATION DESIGN BY:  
Applied Design Services  
9721 Bayou Ridge Trail  
Parker, Colorado 80134  
(303) 841-7077  
Fax - 841-8191

SHEET NUMBER: IR19





Know what's below  
Call before you dig.

**IRRIGATION EQUIPMENT SCHEDULE: cont**  
Harvard Gulch / State Home Park Irrigation Renovation  
New Southwest Irrigation Sub-Main Loop - New Controller Location (C3)

VALVE #	ZONE #	CONTROL VALVE	SPRINKLER HEADS	GPM	PSI
43	C3-43	RAIN BIRD 150-PEB PRS-D-1.5"	RAIN BIRD 1806 SAM PRS W/ U-15 SERIES NOZZLES	40.7	30
44	C3-44	RAIN BIRD 150-PEB PRS-D-1.5"	RAIN BIRD 1806 SAM PRS W/ U-8,10,12&15 SERIES NOZZLES	31.7	30
45	C3-45	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	49.2	60
46	C3-46	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60

**IRRIGATION EQUIPMENT SCHEDULE:**  
Harvard Gulch / State Home Park Irrigation Renovation  
New Southeast Irrigation Sub-Main Loop - New Controller Location (C4)

VALVE #	ZONE #	CONTROL VALVE	SPRINKLER HEADS	GPM	PSI
1	C4-1	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	57.4	60
2	C4-2	RAIN BIRD 100-PEB PRS-D-1"	RAIN BIRD 1806 SAM PRS W/ U-8 SERIES NOZZLES	3.8	30
3	C4-3	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	57.4	60
4	C4-4	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	49.2	60
5	C4-5	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	49.2	60
6	C4-6	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	41.0	60
7	C4-7	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	32.8	60
8	C4-8	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
9	C4-9	RAIN BIRD 150-PEB PRS-D-1.5"	RAIN BIRD 1806 SAM PRS W/ U-8,10,12&15 SERIES NOZZLES	33.6	30
10	C4-10	RAIN BIRD 150-PEB PRS-D-1.5"	RAIN BIRD 1806 SAM PRS W/ U-8,10,12&15 SERIES NOZZLES	46.5	30
11	C4-11	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5004 PC/FC-SS-SAM WITH NO. 1.5 NOZZLES	35.9	55
12	C4-12	RAIN BIRD 150-PEB PRS-D-1.5"	RAIN BIRD 1806 SAM PRS W/ U-8,10,12&15 SERIES NOZZLES	34.0	30
13	C4-13	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
14	C4-14	RAIN BIRD 100-PEB PRS-D-1"	RAIN BIRD 1806 SAM PRS W/ U-8&10 SERIES NOZZLES	9.8	30
15	C4-15	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
16	C4-16	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	57.4	60
17	C4-17	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
18	C4-18	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
19	C4-19	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
20	C4-20	RAIN BIRD 100-PEB PRS-D-1"	RAIN BIRD 1806 SAM PRS W/ U-8,10&12 SERIES NOZZLES	8.2	30
21	C4-21	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
22	C4-22	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	41.0	60
23	C4-23	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
24	C4-24	RAIN BIRD 150-PEB PRS-D-1.5"	RAIN BIRD 1806 SAM PRS W/ U-8,10,12&15 SERIES NOZZLES	39.3	30

**IRRIGATION EQUIPMENT SCHEDULE: cont**  
Harvard Gulch / State Home Park Irrigation Renovation  
New Southeast Irrigation Sub-Main Loop - New Controller Location (C4)

VALVE #	ZONE #	CONTROL VALVE	SPRINKLER HEADS	GPM	PSI
25	C4-25	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
26	C4-26	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	41.0	60
27	C4-27	RAIN BIRD 100-PEB PRS-D-1"	RAIN BIRD 1806 SAM PRS W/ U-8,10,12&15 SERIES NOZZLES	25.3	30
28	C4-28	RAIN BIRD 100-PEB 1"	RAIN BIRD 5004 PC/FC-SS-SAM WITH NO. 1.5 NOZZLES	11.9	55
29	C4-29	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	49.2	60
30	C4-30	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	32.8	60
31	C4-31	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	49.2	60
32	C4-32	RAIN BIRD 150-PEB 1.5"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	41.0	60
33	C4-33	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	65.6	60
34	C4-34	RAIN BIRD 100-PEB PRS-D-1"	RAIN BIRD 1806 SAM PRS W/ U-8,10,12&15 SERIES NOZZLES	18.5	30
35	C4-35	RAIN BIRD 100-PEB 1"	RAIN BIRD 5004 PC/FC-SS-SAM WITH NO. 1.5 NOZZLES	1.7	55
36	C4-36	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	57.4	60
37	C4-37	RAIN BIRD 200-PEB 2"	RAIN BIRD 5505 PC/FC-SS-SAM WITH NO.8 NOZZLES	57.4	60
38	C4-38	RAIN BIRD 100-PEB 1"	RAIN BIRD 5004 PC/FC-SS-SAM WITH NO. 1.5 NOZZLES	25.6	55

**RIGHT OF WAY NOTE:**  
R.O.W. PERMITS ARE REQUIRED FOR ALL WORK IN THE R.O.W. CONTACT R.O.W. INSPECTOR TOM ZIMMERMAN @ 303-446-3681 AT LEAST 48 HOURS PRIOR TO ANY R.O.W. PERMIT NEEDS. NO IRRIGATION LINE IN THE R.O.W. CAN BE LARGER THAN 3" IN DIAMETER WITHOUT ADDITIONAL PERMITTING. ALL IRRIGATION APPURTENANCES IN THE R.O.W. MUST BE BURIED AND REMAIN FLUSH WITH ADJACENT SURFACES.

**EXISTING UTILITY LEGEND:**

--- 6"W ---	EXISTING UNDER GROUND WATER LINE. PROTECT IN PLACE THROUGHOUT CONSTRUCTION.
--- 1.25"G ---	EXISTING UNDER GROUND GAS LINE. PROTECT IN PLACE THROUGHOUT CONSTRUCTION.
--- 8" SAN ---	EXISTING UNDER GROUND SANITARY SEWER LINE. PROTECT IN PLACE THROUGHOUT CONSTRUCTION.
--- 60" ---	EXISTING UNDER GROUND STORM SEWER LINE. PROTECT IN PLACE THROUGHOUT CONSTRUCTION.
	EXISTING UNDERGROUND ELECTRIC SERVICE. NOT SHOWN ON SURVEY.

THE UTILITIES SHOWN WERE PLOTTED FROM MAPS PROVIDED BY THE SERVICING ENTITY (UTILITY PROVIDER) AND VERIFIED ABOVE GROUND WHERE VISIBLE. COMMUNICATION CABLES SUCH AS TELEPHONE AND CABLE TV MAY EXIST ON OR NEAR THIS PROPERTY. MAPS WERE NOT AVAILABLE FROM THE SERVICING ENTITY FOR THESE UTILITIES.

**ASBESTOS NOTE:**  
DENVER ENVIRONMENTAL HEALTH HAS IDENTIFIED THE POTENTIAL FOR ENCOUNTERING ASBESTOS BEARING MATERIAL BURIED IN THE SOUTH HALF OF THE PARK. ANY ASBESTOS BEARING MATERIAL EXPOSED DURING IRRIGATION EXCAVATION OPERATIONS IS TO BE DISPOSED OF IN CONFORMANCE WITH C.D.P.H.E. SOLID WASTE REGULATIONS SECTION 5.5. CONTACT MR. KENT SONDEGRATH PARKS PROJECT MANAGER 720-913-0636 WHO WILL THEN COORDINATE ANY REQUIRED REMOVAL WITH MR. STEVE GONZALES, DENVER DEPARTMENT OF ENVIRONMENTAL HEALTH, 720-865-5447 WHO WILL ASSIST WITH THE ARRANGEMENTS FOR ANY REQUIRED REGULATION 8 REMOVAL. CONTRACTOR TO ASSUME THAT ANY REQUIRED ASBESTOS REMOVAL, DISPOSAL AND REQUIRED MITIGATION WILL BE PAID FOR BY THE OWNER. IRRIGATION CONTRACTOR IS TO COORDINATE AND FACILITATE WHERE POSSIBLE THE ABATEMENT CONTRACTOR'S ONSITE OPERATIONS INCLUDING COORDINATION WITH ANY ON SITE CERTIFIED ASBESTOS BUILDING INSPECTOR C.A.B.I. WHICH MAY BE REQUIRED BY THE MATERIAL ENCOUNTERED.

**IRRIGATION INSTALLATION NOTES:**

**GRADE ADJUSTMENT NOTE:**

CONTRACTOR IS RESPONSIBLE FOR IMPORTING CLEAN, FRIABLE, SANDY LOAM TOPSOIL IN CONFORMANCE WITH SPECIFICATIONS TO ADJUST BACKFILLED TRENCHES AND EXCAVATIONS TO GRADE AND TO FILL ANY VOIDS LEFT FROM EXISTING IRRIGATION EQUIPMENT REMOVAL. CONTRACTOR IS RESPONSIBLE FOR DISPOSING OF ANY EXCESS SOIL OFF SITE IN CONFORMANCE WITH ALL LOCAL CODES AND ORDINANCES.

**TREE PROTECTION NOTE:**

TREE SYMBOLS ARE REPRESENTED ON PLAN AT SCALE. LIMIT OF SYMBOL EQUALS LIMIT OF DRIP LINE. ALL AREAS WITHIN THE DRIP LINE OF EXISTING TREES TO REMAIN ARE DEFINED AS CRITICAL ROOT ZONE. ANY AND ALL CONSTRUCTION OPERATIONS (SPECIFICALLY EXCAVATION, BACKFILL AND COMPACTION) WITHIN THE DRIP LINE / CRITICAL ROOT ZONE OF ANY EXISTING TREE TO REMAIN MUST BE DONE IN CONFORMANCE WITH SPECIFICATION SECTION 02150 TREE RETENTION AND PROTECTION. PRIOR TO MOBILIZATION, CONTRACTOR TO SCHEDULE A PRE-CONSTRUCTION TREE PROTECTION INSPECTION WITH PROJECT MANAGER AND REPRESENTATIVES OF THE CITY FORESTRY DEPARTMENT. ERECT AT THE DIRECTION OF THE CITY FORESTER, MAINTAIN DAILY AND REMOVE AT PROJECT COMPLETION 48" HIGH ORANGE PLASTIC TREE PROTECTION FENCE SECURED TO 6" STEEL T-POSTS SET ON 6' CTRS. MAX. TOP OF FENCE FABRIC TO EQUAL TOP OF POST. BOTTOM OF FENCE FABRIC TO BE FLUSH WITH GROUND. SECURE FENCE FABRIC TO POSTS WITH THREE NYLON LOCK TIES PER POST.

**TREE WATERING NOTE:**

CONTRACTOR IS RESPONSIBLE FOR PROVIDING WATER TO ALL TREES IN EACH TAP SERVICE AREA THAT IS ACTIVELY UNDER CONSTRUCTION. ASSUME FOR THE PURPOSE OF BIDDING THAT THREE TRUCK WATERINGS WILL BE REQUIRED IN EACH SERVICE AREA. EACH TRUCK WATERING OPERATION IS TO APPLY 10 GALLONS OF WATER PER 1" OF TRUNK CALIPER.

**LANDSCAPE MAINTENANCE NOTE:**

CONTRACTOR IS RESPONSIBLE FOR ALL LANDSCAPE MAINTENANCE OPERATIONS IN EACH TAP SERVICE AREA ACTIVELY UNDER CONSTRUCTION. INCLUDING TRASH REMOVAL AND MOWING. ASSUME FOR THE PURPOSE OF BIDDING THAT TRASH WILL BE REMOVED ONCE PER WEEK AND EXISTING TURF GRASS WILL BE MOWED EVERY TWO WEEKS.

**LANDSCAPE RESTORATION NOTE:**

RESTORE ALL IRRIGATION PIPE AND OR WIRE TRENCHES AND ANY RELATED EXCAVATIONS IN AREAS WHERE EXISTING TURF GRASS IS TO REMAIN TO MATCH EXISTING INCLUDING BUT NOT LIMITED TO: BACKFILL, COMPACTION, ROUGH AND FINE GRADING INCLUDING REMOVAL OF ANY AND ALL EXCESS SOIL FROM SURFACE OF ADJACENT UNDISTURBED TURF GRASS AREAS TO REMAIN AND SOD AND OR SEED INSTALLATION. FINE GRADE ALL DISTURBED AREAS TO .04'. HOLD FINE GRADE 1 1/2" BELOW ELEVATION OF COMPACTED THATCH GRADE OF ADJACENT UNDISTURBED TURF GRASS IN DISTURBED AREAS TO BE SODDED AND HOLD FINE GRADE FLUSH WITH COMPACTED THATCH GRADE OF ADJACENT UNDISTURBED TURF GRASS IN DISTURBED AREAS TO BE SEEDDED. SECONDARY PIPE TRENCHES ARE TO BE SEEDDED PER SPECIFICATIONS SECTION 02935 SODDING AND SEEDING. ALL OTHER EXCAVATIONS ARE TO BE SODDED PER SPECIFICATIONS SECTION 02935 SODDING AND SEEDING.

**WATER PRESSURE CONFIRMATION NOTE:**

CONTRACTOR TO PHYSICALLY CONFIRM THE EXISTING STATIC WATER PRESSURE IN THE EXISTING WATER MAINS PRIOR TO MOBILIZATION OR IRRIGATION MATERIAL ORDERING AND NOTIFY OWNER OF SAME. SEE COVER SHEET FOR COMPLETE EXISTING CONDITIONS CONFIRMATION REQUIREMENTS.

**ASBUILT NOTE:**

EXISTING IRRIGATION SYSTEM COMPONENTS WERE DRAWN USING A COMBINATION OF EXISTING ASBUILT DRAWINGS (PROVIDED BY OWNER) AND FIELD OBSERVATION. EXISTING VALVE BOX AND CONTROLLER LOCATIONS WERE FIELD VERIFIED. EXISTING MAINLINE AND SECONDARY PIPING WAS NOT DRAFTED IN REPLACEMENT AREAS FOR GRAPHIC CLARITY.

**LIMIT OF WORK / MOBILIZATION AND ACCESS:**

THE BACK OF EXISTING CURB AND GUTTER AND IRRIGATION LIMIT LINE AROUND THE PERIMETER OF THE PARK REPRESENTS THE LIMIT OF WORK LINE TYPICAL THROUGHOUT. ALL CONSTRUCTION OPERATIONS INCLUDING MOBILIZATION AND EQUIPMENT AND MATERIAL STORAGE ARE TO TAKE PLACE WITHIN THE LIMIT OF WORK LINE AT LOCATIONS APPROVED IN ADVANCE BY THE OWNER. PARKING OF PERSONAL VEHICLES WITHIN THE LIMIT OF WORK LINE IS PROHIBITED. ALL CONSTRUCTION ACCESS IS TO TAKE PLACE AT A LOCATION REVIEWED AND APPROVED IN ADVANCE BY THE OWNER. NO CONSTRUCTION ACCESS WILL BE ALLOWED EXCEPT AT DESIGNATED LOCATIONS.

**EXISTING CONDITIONS DOCUMENTATION:**

CONTRACTOR TO PHOTOGRAPHICALLY DOCUMENT THE EXISTING CONDITION OF ALL IMPROVEMENTS WITHIN LIMIT OF WORK AND REVIEW CONDITION WITH OWNER PRIOR TO MOBILIZATION.

**GENERAL INSTALLATION NOTES:**

THE IRRIGATION CONTRACTOR SHALL BECOME THOROUGHLY FAMILIAR WITH THE SPECIFICATIONS FOR THIS AND RELATED WORK PRIOR TO CONSTRUCTION. THE IRRIGATION CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF BOTH PUBLIC AND PRIVATE UTILITIES AND ELECTRICAL WIRING PRIOR TO CONSTRUCTION. THE IRRIGATION CONTRACTOR SHALL NOT INSTALL THE SPRINKLER SYSTEM WHEN IT IS OBVIOUS IN THE FIELD THAT OBSTRUCTIONS OR GRADE DIFFERENCES EXIST THAT MAY NOT HAVE BEEN CONSIDERED IN THE ENGINEERING. OR IF DISCREPANCIES IN CONSTRUCTION DETAILS, LEGENDS, NOTES, OR SPECIFICATIONS ARE DISCOVERED. ALL SUCH OBSTRUCTIONS OR DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE PROJECT MANAGER. THE DRAWINGS ARE DIAGRAMMATIC. IN SOME CASES, IRRIGATION COMPONENTS MAY BE SHOWN OUTSIDE OF PLANTING AREAS FOR CLARITY. THE IRRIGATION CONTRACTOR SHALL AVOID ANY CONFLICTS BETWEEN IRRIGATION SYSTEM PIPE ALIGNMENT, IRRIGATION COMPONENT LOCATIONS AND PLANT MATERIALS. THE IRRIGATION CONTRACTOR SHALL ADJUST NOZZLES FOR SPRAY HEADS TO PROVIDE COMPLETE AND ADEQUATE COVERAGE WITH A MINIMUM OF OVER SPRAY FOR THE SITE CONDITIONS.

**EXISTING FACILITY COORDINATION NOTE:**

ACCESS TO THE EXISTING PLAYGROUND, BASKETBALL COURT, SANITARY FACILITIES, EXERCISE STATIONS, WALKING PATHS AND PARKING LOTS MUST NOT BE INTERRUPTED BY IRRIGATION INSTALLATION OPERATIONS. CONTRACTOR TO PROVIDE ALL PEDESTRIAN TRAFFIC CONTROL THROUGHOUT THE PARK SITE AS REQUIRED DURING IRRIGATION INSTALLATION OPERATIONS. THE EXISTING BASEBALL FIELDS WILL BE CLOSED DURING IRRIGATION INSTALLATION OPERATIONS.

Denver Parks + Recreation

SHEET TITLE:

Irrigation Equipment Schedules Plan

PROJECT:

HARVARD GULCH STATE HOME PARK IRRIGATION RENOVATION

SCALE: N.A.

DESIGNED BY: MEH

DRAWN BY: MEH

CHECKED BY: KS

DATE: 09-01-10

REVISIONS:  
10-15-10  
11-12-12  
12-12-12

PREPARED BY:  
IRRIGATION DESIGN BY:  
Applied Design Services  
9721 Bayou Ridge Trail  
Parker, Colorado 80134  
(303) 841-7077  
Fax - 841-8191

SHEET NUMBER: IR20





Know what's below  
Call before you dig.

# Denver Parks + Recreation

SHEET TITLE:  
Water Budgets and  
Demand Plan

PROJECT:  
HARVARD GULCH STATE HOME  
PARK IRRIGATION RENOVATION

SCALE: N.A.

DESIGNED BY: MEH

DRAWN BY: MEH

CHECKED BY: KS

DATE: 09-01-10

REVISIONS:  
10-15-10  
11-12-12  
12-12-12

PREPARED BY:  
IRRIGATION DESIGN BY:  
*Applied Design Services*  
9721 Bayou Ridge Trail  
Parker, Colorado 80134  
(303) 841-7077  
Fax - 841-8191

SHEET NUMBER: IR21

WATER BUDGET										
PROJECT NAME:	HARVARD GULCH PARK					SUBMITTED BY:	Applied Design	DATE:	1-Sep-2010	
DESCRIPTION	IRRIGATED	MONTH	HISTORICAL	PLANT	PLANT WATER	SYSTEM	TOTAL WATER	WEEKLY WATER	MONTHLY WATER	
	ACRES		ET	COEFFICIENT	REQUIREMENT	EFFICIENCY (%)	REQUIREMENTS (IN.)	REQUIREMENTS (IN.)	REQUIREMENTS (GAL.)	
PLANT TYPE:	44.50	APRIL	1.8	0.8	1.44	70%	2.06	0.48	2,472,316	
BLUEGRASS		MAY	5.2	0.8	4.16	70%	5.94	1.38	7,142,247	
(High Usage)		JUNE	6.6	0.8	5.28	70%	7.54	1.75	9,065,160	
		JULY	7.1	0.8	5.68	70%	8.11	1.89	9,751,914	
		AUGUST	6.2	0.8	4.96	70%	7.09	1.65	8,515,756	
		SEPTEMBER	4.5	0.8	3.60	70%	5.14	1.20	6,180,791	
		OCTOBER	1.8	0.8	1.44	70%	2.06	0.48	2,472,316	
OPERATING PERIOD-HRS./DAY	8		33.2		26.56	TOTAL	37.94	TOTAL	45,600,500	
DAYS/WEEK	3							ACRE FEET/YR.	139.94	
DAYS/MONTH	12.9							PEAK SEASON GPM	1583	
DESCRIPTION	IRRIGATED	MONTH	HISTORICAL	PLANT	PLANT WATER	SYSTEM	TOTAL WATER	WEEKLY WATER	MONTHLY WATER	
	ACRES		ET	COEFFICIENT	REQUIREMENT	EFFICIENCY (%)	REQUIREMENTS (IN.)	REQUIREMENTS (IN.)	REQUIREMENTS (GAL.)	
PLANT TYPE:	0.00	APRIL	1.8	0.8	1.44	70%	2.06	0.48	0	
FESCUE		MAY	5.2	0.8	4.16	70%	5.94	1.38	0	
		JUNE	6.6	0.8	5.28	70%	7.54	1.75	0	
		JULY	7.1	0.8	5.68	70%	8.11	1.89	0	
		AUGUST	6.2	0.8	4.96	70%	7.09	1.65	0	
		SEPTEMBER	4.5	0.8	3.60	70%	5.14	1.20	0	
		OCTOBER	1.8	0.8	1.44	70%	2.06	0.48	0	
OPERATING PERIOD-HRS./DAY	8				26.56	TOTAL	37.94	TOTAL	0	
DAYS/WEEK	3							ACRE FEET/YR.	0.00	
DAYS/MONTH	12.9							PEAK SEASON GPM	0	
DESCRIPTION	IRRIGATED	MONTH	HISTORICAL	PLANT	PLANT WATER	SYSTEM	TOTAL WATER	WEEKLY WATER	MONTHLY WATER	
	ACRES		ET	COEFFICIENT	REQUIREMENT	EFFICIENCY (%)	REQUIREMENTS (IN.)	REQUIREMENTS (IN.)	REQUIREMENTS (GAL.)	
PLANT TYPE:	0.00	APRIL	1.8	0.5	0.90	90%	1.00	0.23	0	
SHRUBS		MAY	5.2	0.5	2.60	90%	2.89	0.67	0	
(Moderate Usage)		JUNE	6.6	0.5	3.30	90%	3.67	0.85	0	
		JULY	7.1	0.5	3.55	90%	3.94	0.92	0	
		AUGUST	6.2	0.5	3.10	90%	3.44	0.80	0	
		SEPTEMBER	4.5	0.5	2.25	90%	2.50	0.58	0	
		OCTOBER	1.8	0.5	0.90	90%	1.00	0.23	0	
OPERATING PERIOD-HRS./DAY	8				16.60	TOTAL	18.44	TOTAL	0	
DAYS/WEEK	3							ACRE FEET/YR.	0.00	
DAYS/MONTH	12.9							PEAK SEASON GPM	0	
DESCRIPTION	IRRIGATED	MONTH	HISTORICAL	PLANT	PLANT WATER	SYSTEM	TOTAL WATER	WEEKLY WATER	MONTHLY WATER	
	ACRES		ET	COEFFICIENT	REQUIREMENT	EFFICIENCY (%)	REQUIREMENTS (IN.)	REQUIREMENTS (IN.)	REQUIREMENTS (GAL.)	
PLANT TYPE:	0.00	APRIL	1.8	0.3	0.54	70%	0.77	0.18	0	
NATIVE PLANT MATERIAL		MAY	5.2	0.3	1.56	70%	2.23	0.52	0	
(Low Usage)		JUNE	6.6	0.3	1.98	70%	2.83	0.66	0	
		JULY	7.1	0.3	2.13	70%	3.04	0.71	0	
		AUGUST	6.2	0.3	1.86	70%	2.66	0.62	0	
		SEPTEMBER	4.5	0.3	1.35	70%	1.93	0.45	0	
		OCTOBER	1.8	0.3	0.54	70%	0.77	0.18	0	
OPERATING PERIOD-HRS./DAY	8				9.96	TOTAL	14.23	TOTAL	0	
DAYS/WEEK	3							ACRE FEET/YR.	0.00	
DAYS/MONTH	12.9							PEAK SEASON GPM	0	
								<b>PROJECT TOTALS</b>		
								IRRIGATED ACRES	44.50	
								GALLONS/YEAR	45,600,500	
								ACRE FEET/YEAR	139.94	
								PEAK SEASON GPM	1583	
<b>DENVER WATER</b>										
REVIEWED BY:										
DATE:										
<b>NOTE:</b>										
Plant water requirements are determined utilizing 100% system efficiencies.										
Actual system efficiencies are specific to each systems design, operating pressure and will increase application rates.										
Approximate values Good/Excellent: Drip irrigation - 90% Rotor irrigation - 70% Spray head irrigation: 65% Irrigation Association Standards										
April & October ET represent 2 week watering windows.										



**PIPING SPECIFICATION:**

ALL PIPE THROUGH WATER METER VAULT UP TO THE CHARGED SIDE OF QUICK COUPLER VALVE IS TO BE CLASS 50 CEMENT LINED AND ASPHALT COATED DUCTILE IRON PIPE WITH DUCTILE IRON MJ FITTINGS AND MEGALUG 1100 SERIES FITTING TO PIPE RESTRAINT.

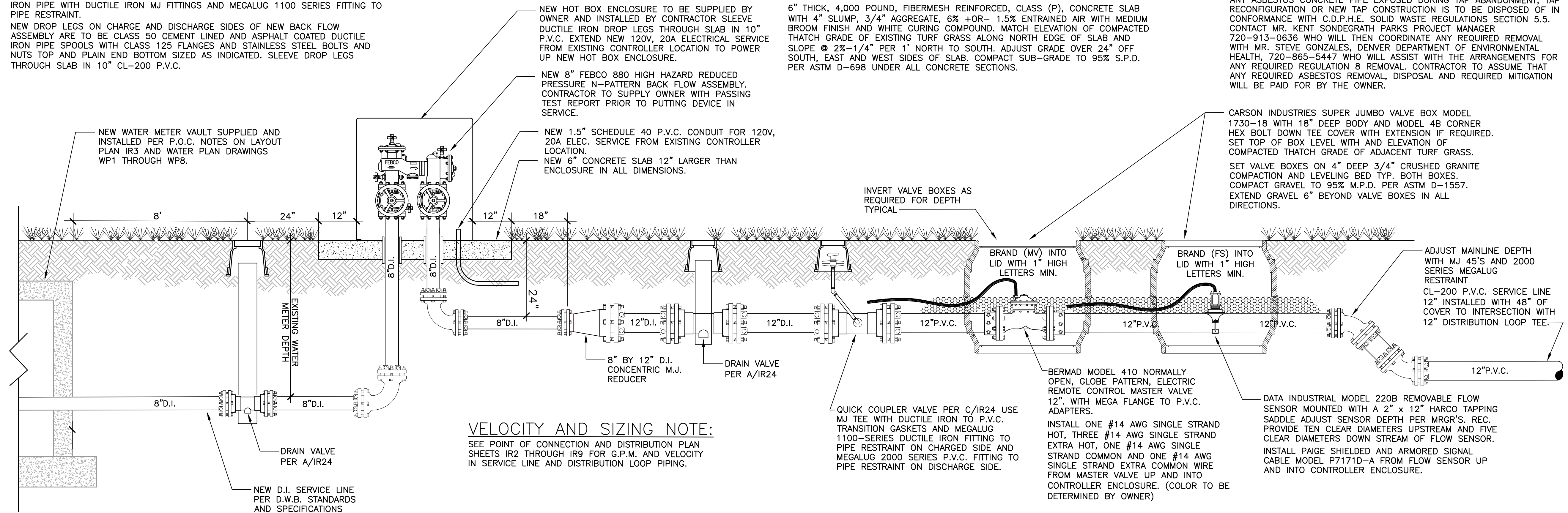
NEW DROP LEGS ON CHARGE AND DISCHARGE SIDES OF NEW BACK FLOW ASSEMBLY ARE TO BE CLASS 50 CEMENT LINED AND ASPHALT COATED DUCTILE IRON PIPE SPOOLS WITH CLASS 125 FLANGES AND STAINLESS STEEL BOLTS AND NUTS TOP AND PLAIN END BOTTOM SIZED AS INDICATED. SLEEVE DROP LEGS THROUGH SLAB IN 10" CL-200 P.V.C.

**CONCRETE SPECIFICATION:**

6" THICK, 4,000 POUND, FIBERMESH REINFORCED, CLASS (P), CONCRETE SLAB WITH 4" SLUMP, 3/4" AGGREGATE, 6% +OR- 1.5% ENTRAINED AIR WITH MEDIUM BROOM FINISH AND WHITE CURING COMPOUND. MATCH ELEVATION OF COMPACTED THATCH GRADE OF EXISTING TURF GRASS ALONG NORTH EDGE OF SLAB AND SLOPE @ 2%-1/4" PER 1' NORTH TO SOUTH. ADJUST GRADE OVER 24" OFF SOUTH, EAST AND WEST SIDES OF SLAB. COMPACT SUB-GRADE TO 95% S.P.D. PER ASTM D-698 UNDER ALL CONCRETE SECTIONS.

**ASBESTOS ABATEMENT NOTE:**

ANY ASBESTOS CONCRETE PIPE EXPOSED DURING TAP ABANDONMENT, TAP RECONFIGURATION OR NEW TAP CONSTRUCTION IS TO BE DISPOSED OF IN CONFORMANCE WITH C.D.P.H.E. SOLID WASTE REGULATIONS SECTION 5.5. CONTACT MR. KENT SONDEGRATH PARKS PROJECT MANAGER 720-913-0636 WHO WILL THEN COORDINATE ANY REQUIRED REMOVAL WITH MR. STEVE GONZALES, DENVER DEPARTMENT OF ENVIRONMENTAL HEALTH, 720-865-5447 WHO WILL ASSIST WITH THE ARRANGEMENTS FOR ANY REQUIRED REGULATION 8 REMOVAL. CONTRACTOR TO ASSUME THAT ANY REQUIRED ASBESTOS REMOVAL, DISPOSAL AND REQUIRED MITIGATION WILL BE PAID FOR BY THE OWNER.

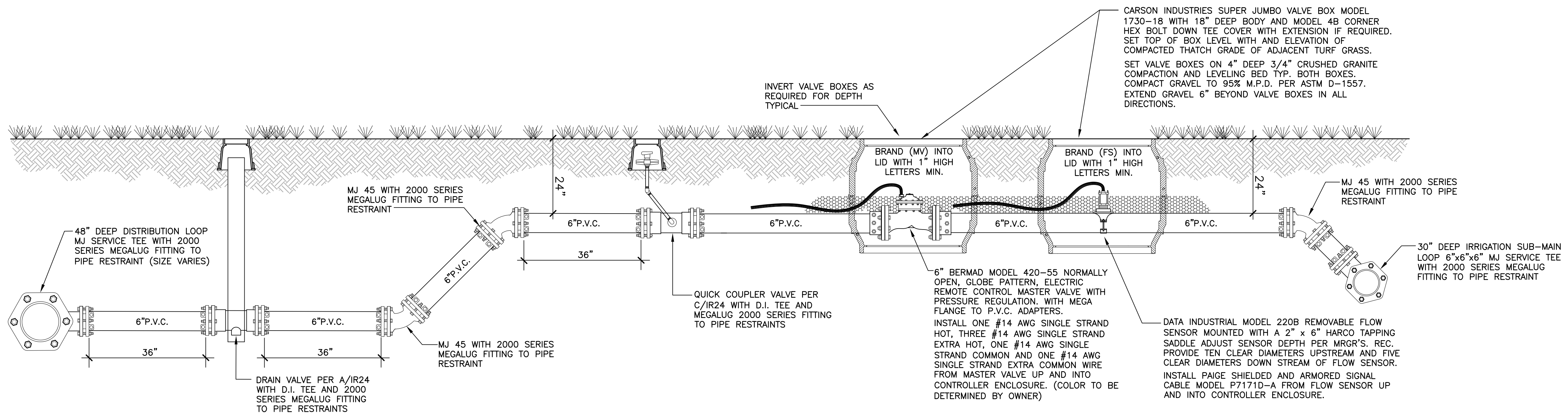


**VELOCITY AND SIZING NOTE:**

SEE POINT OF CONNECTION AND DISTRIBUTION PLAN SHEETS IR2 THROUGH IR9 FOR G.P.M. AND VELOCITY IN SERVICE LINE AND DISTRIBUTION LOOP PIPING.

**A TAP BACK FLOW AND MASTER VALVE ASSEMBLY SECTION (LOOKING SOUTH)**

IR22 NO SCALE



**B IRRIGATION SUB-MAIN POINT OF CONNECTION TO DISTRIBUTION LOOP (TYP. 5)**

IR22 NO SCALE



**Denver Parks + Recreation**  
 SHEET TITLE: Irrigation Detail Plan  
 PROJECT: HARVARD GULCH STATE HOME PARK IRRIGATION RENOVATION

SCALE:	N.A.
DESIGNED BY:	MEH
DRAWN BY:	MEH
CHECKED BY:	KS
DATE:	09-01-10
REVISIONS:	10-15-10 11-12-12 12-12-12
PREPARED BY:	IRRIGATION DESIGN BY: Applied Design Services 9721 Bayou Ridge Trail Parker, Colorado 80134 (303) 841-7077 Fax - 841-8191
SHEET NUMBER:	IR22





Know what's below  
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Denver Parks + Recreation

PROJECT: HARVARD GULCH STATE HOME PARK IRRIGATION RENOVATION

SHEET TITLE: Irrigation Detail Plan

SCALE: See Details

DESIGNED BY: MEH

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IRRIGATION DESIGN BY:  
Applied Design Services  
9721 Bayou Ridge Trail  
Parker, Colorado 80134  
(303) 841-7077  
Fax - 841-8191

SHEET NUMBER: IR23

**RAIN BIRD VARIABLE FREQUENCY PACKAGED BOOSTER PUMP STATION SPECIFICATION (OR APPROVED EQUAL):**

Available from Rain Bird Corporation  
6901 East Point Road,  
Tucson, Arizona 85706  
1-520-806-5620

**BASIC INFORMATION:**

Quote Number: CVC081210701A  
Date: August 12, 2010  
Job Name: Harvard Gulch State Home Park Irrigation Renovation  
Job City: Denver  
Job State: Colorado  
Sales Region: RM  
Rain Bird Sales Rep: Mark Austin (720) 810-7066

**PUMP STATION DETAILS:**

Maximum Design Flow Rate: 1,600 G.P.M.  
Rated Discharge Pressure: 110 P.S.I.  
Pump Station Model No.: VC33018460  
Exhaust Fan Requirement: 1,920 CFM  
Total Number of Pumps: 5  
Intake Pressure: Ambient  
Required Boost Pressure: 150 Feet  
Intake Diameter: 30"

Voltage: 480 V  
Phase: 3 P  
Hertz: 60 HZ  
Estimated Full Load Amps: 178 AMPS  
Apparent Power: 148 KVA  
Main Disconnect Size: 200 AMPS

Enclosure Heater size to be 5KW.

Custom fabricated powder coated steel suction and discharge zee pipes sized to provide 48" of cover at buried connection: 12" FE x 12" FE

Full flow bypass manifold with isolation valves.  
Pressure transducer on inlet pipe.

Two year warranty and preventative maintenance plan (including 3 site visits at 6 mo. intervals).

**PUMP AND MOTOR DETAILS:**

Quantity: 3, Size: 500 GPM 150 TDH, Type: Horizontal end suction main pumps: Close coupled ASTM A48 Class 30 cast iron discharge heads with back pullout design, external hydraulic balancing line, tangential ANSI flange connection, SAE 660 bronze impellers and shaft sleeves, and John Crane type 1/2 mechanical seals.

Quantity: 3, Size 30 HP, Type: Horizontal solid shaft main motors: 2-pole/3600 RPM, ODP (Open Drip Proof) or TEFC (Totally Enclosed Fan Cooled) motor enclosure, Design B, Code G, Class F insulation, Standard efficiency rated, 1.15 SF (1.0 SF on VFD) Manufactured by Baldor

Quantity: 1, Size: 175 GPM 150 TDH, Type: Horizontal end suction main pump: Close coupled, ASTM A48 Class 30 cast iron discharge heads with back pullout design, external hydraulic balancing line, tangential ANSI flange connection, SAE 660 bronze impeller and shaft sleeve, and John Crane type 1/2 mechanical seal.

Quantity: 1, Size 15 HP, Type: Horizontal solid shaft main motor, 2-Pole/3600 RPM, ODP (Open Drip Proof) or TEFC (Totally Enclosed Fan Cooled) motor enclosure, Design B, Code G, Class F insulation, Standard efficiency rated, 1.15 SF (1.0 SF on VFD) Manufactured by Baldor.

Quantity: 1, Size 30 GPM 150 TDG, Type: Vertical multistage pressure maintenance pump built with epoxy coated ductile iron pump head, and inline epoxy coated ductile iron base. The chamber stack is to be built with stainless steel impellers, stainless steel shafting, stainless steel chambers, stainless steel outer sleeves, and a mechanical cartridge type seal.

Quantity: 1, Size: 3 HP, Type: Vertical solid shaft high thrust C-Face main motor with high thrust bearings: 2-Pole/3000 RPM, Totally Enclosed Fan Cooled (TEFC) motor enclosure, Design B, Code G, Class F insulation, Standard efficiency rated, 1.15 SF (1.0 SF on VFD), Manufactured by Baldor.

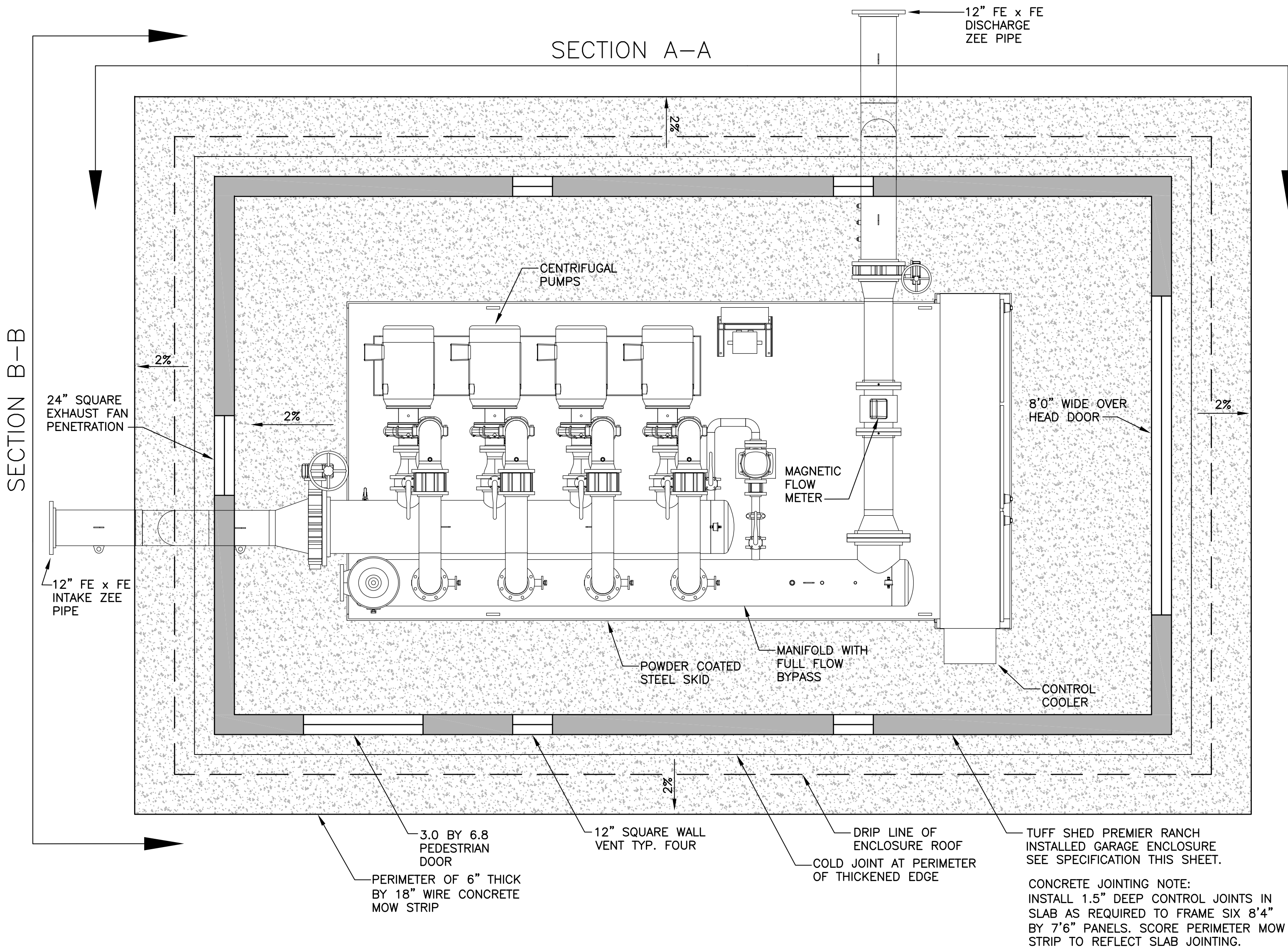
Main motors will be VFD started only.  
Main motors will alternate on start up to equalize motor run time.  
Intermediate pump will be VFD started only.  
Pressure maintenance pump will be DOL started only.

Powder coated steel skid.

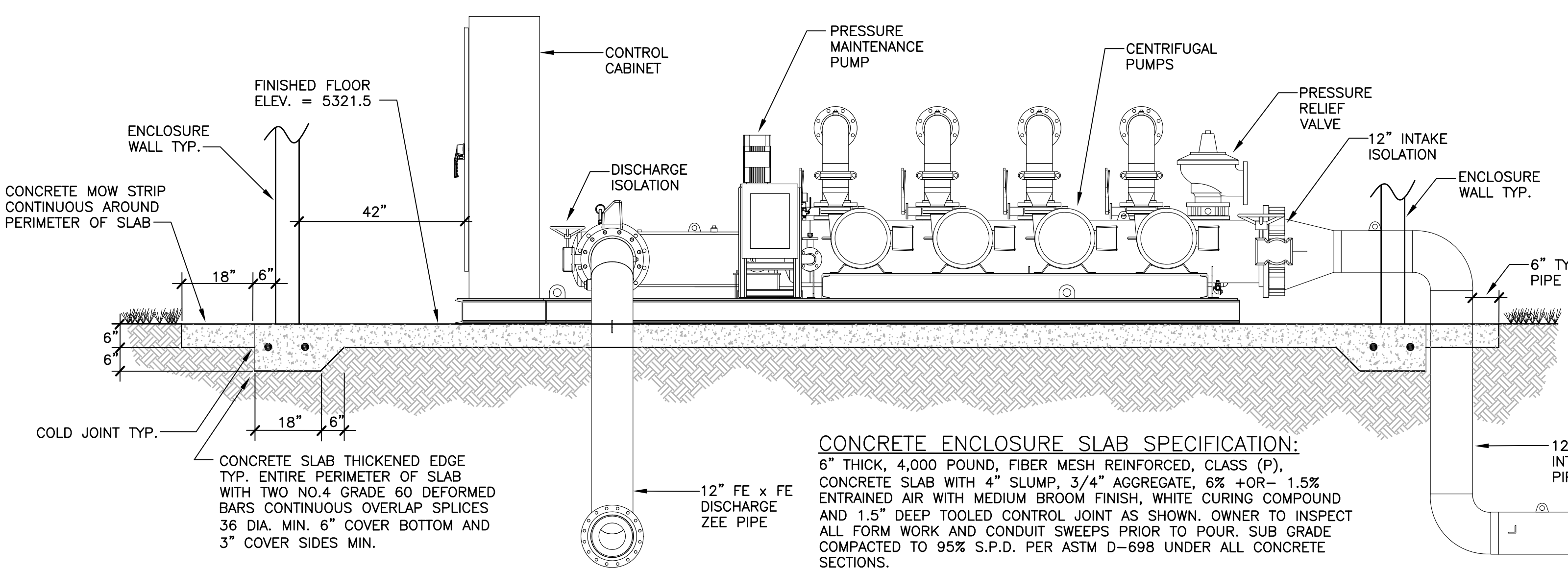
**PUMP ENCLOSURE SPECIFICATION:**

SUPPLY AND INSTALL ONE 14' BY 24' TUFF SHED PREMIER RANCH INSTALLED GARAGE ENCLOSURE FOR THE NEW BOOSTER PUMP COMPLETE AND IN PLACE, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

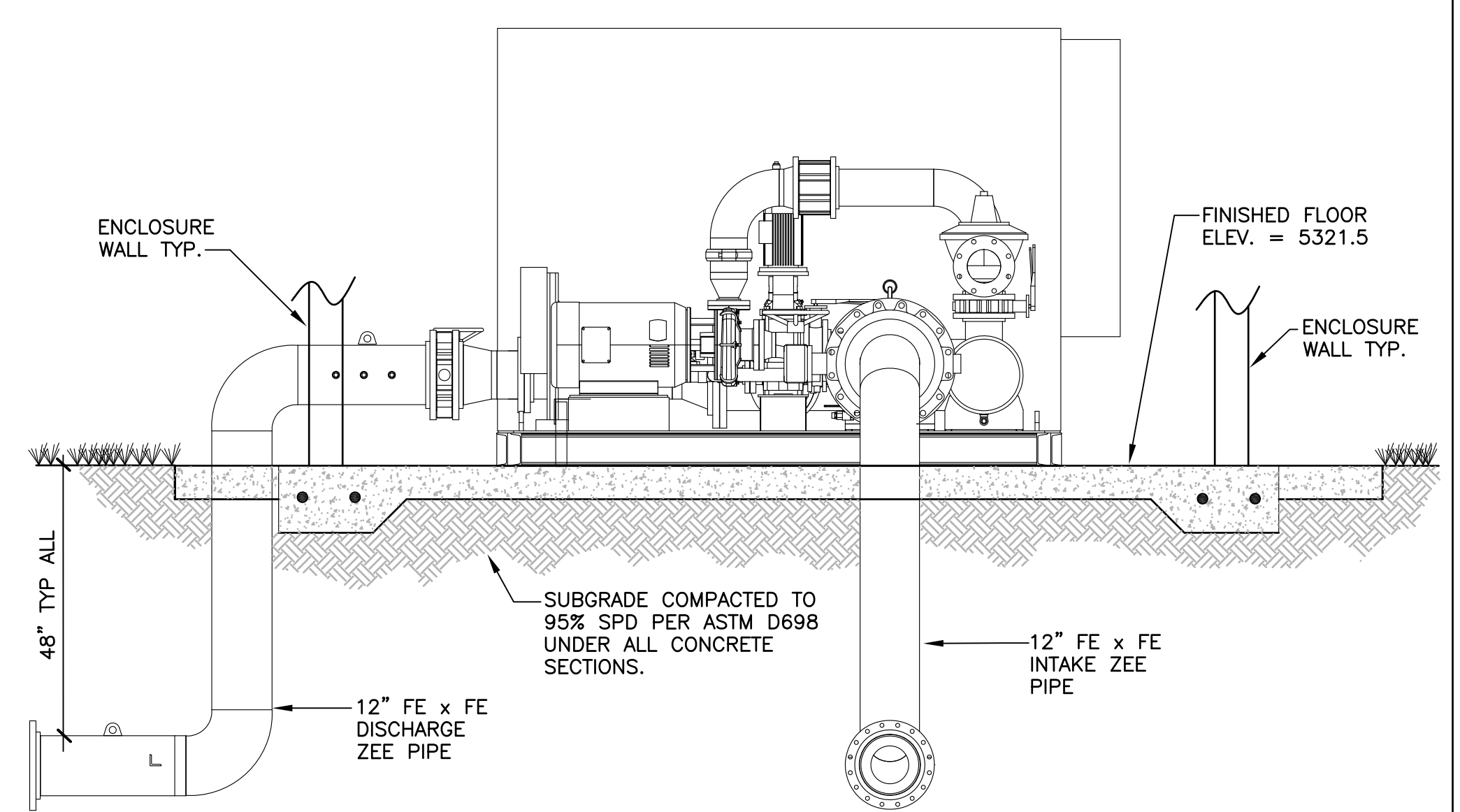
- 1) ROOF COLOR TO BE (AUTUMN BROWN), SIDING AND TRIM COLOR TO BE (COUNCIL BLUFFS). PROVIDE ENCLOSURE WITH FOUR 12" SQUARE WALL VENTS, ONE 24" SQUARE OPENING FOR THE EXHAUST FAN, ONE 3'0" BY 6'8" EXTERIOR DOOR WITH ADD ON SLIDE BOLT PAD LOCK HARDWARE AND ONE 8'0" OVERHEAD DOOR.
- 2) MANUFACTURER SHALL SUPPLY ALL REQUIRED ENGINEERING DRAWINGS AND CALCULATIONS AND IS RESPONSIBLE FOR ALL PERMITTING REQUIRED BY THE DENVER BUILDING DEPARTMENT. INCLUDING PULLING AND PAYING FOR ALL REQUIRED PERMITS AND CALLING FOR AND PAYING FOR ALL REQUIRED INSPECTIONS.
- 3) ENCLOSURE LOCATION AND FINISHED FLOOR ELEVATION WILL BE STAKED IN THE FIELD BY THE OWNER.
- 4) CONTACT TUFF SHED 201 RIO GRANDE BLVD., DENVER, CO. 80223 (303) 573-8833 FOR PRICING.
- 5) ADDITIONALLY SUPPLY AND INSTALL ONE GREENHECK S1-16-436-B4 EXHAUST FAN INCLUDING ALL SUPPORT FRAMING, WALL PENETRATION BLOCK OUT AND EXTERIOR TRIM WORK REQUIRED TO WEATHER PROOF AND SECURE THE PENETRATION.
- 6) INTAKE AND DISCHARGE ZEE PIPE PENETRATION ARE TO BE COMPLETE AND IN PLACE FRAMED UP AND TRIMMED OUT AS REQUIRED TO WEATHER PROOF AND SECURE THE PENETRATIONS.
- 7) ALL ELECTRICAL WORK AS DETAILED ON ELECTRICAL SITE PLAN SHEET EO-1



**A BOOSTER PUMP AND ENCLOSURE PLAN VIEW**  
IR23 SCALE: 1/2" = 1'



**B BOOSTER PUMP AND ENCLOSURE SECTION A-A**  
IR23 SCALE: 1/2" = 1'



**C BOOSTER PUMP AND ENCLOSURE SECTION B-B**  
IR23 SCALE: 1/2" = 1'

**CONCRETE ENCLOSURE SLAB SPECIFICATION:**  
6" THICK, 4,000 POUND, FIBER MESH REINFORCED, CLASS (P), CONCRETE SLAB WITH 4" SLUMP, 3/4" AGGREGATE, 6% +OR- 1.5% ENTRAINED AIR WITH MEDIUM BROOM FINISH, WHITE CURING COMPOUND AND 1.5" DEEP TOOLED CONTROL JOINT AS SHOWN. OWNER TO INSPECT ALL FORM WORK AND CONDUIT SWEEPS PRIOR TO POUR. SUB GRADE COMPACTED TO 95% S.P.D. PER ASTM D-698 UNDER ALL CONCRETE SECTIONS.



Know what's below  
Call before you dig.

# Denver Parks + Recreation

SHEET TITLE:  
Irrigation Detail Plan

PROJECT:  
HARVARD GULCH STATE HOME  
PARK IRRIGATION RENOVATION

SCALE: See Details

DESIGNED BY: MEH

DRAWN BY: MEH

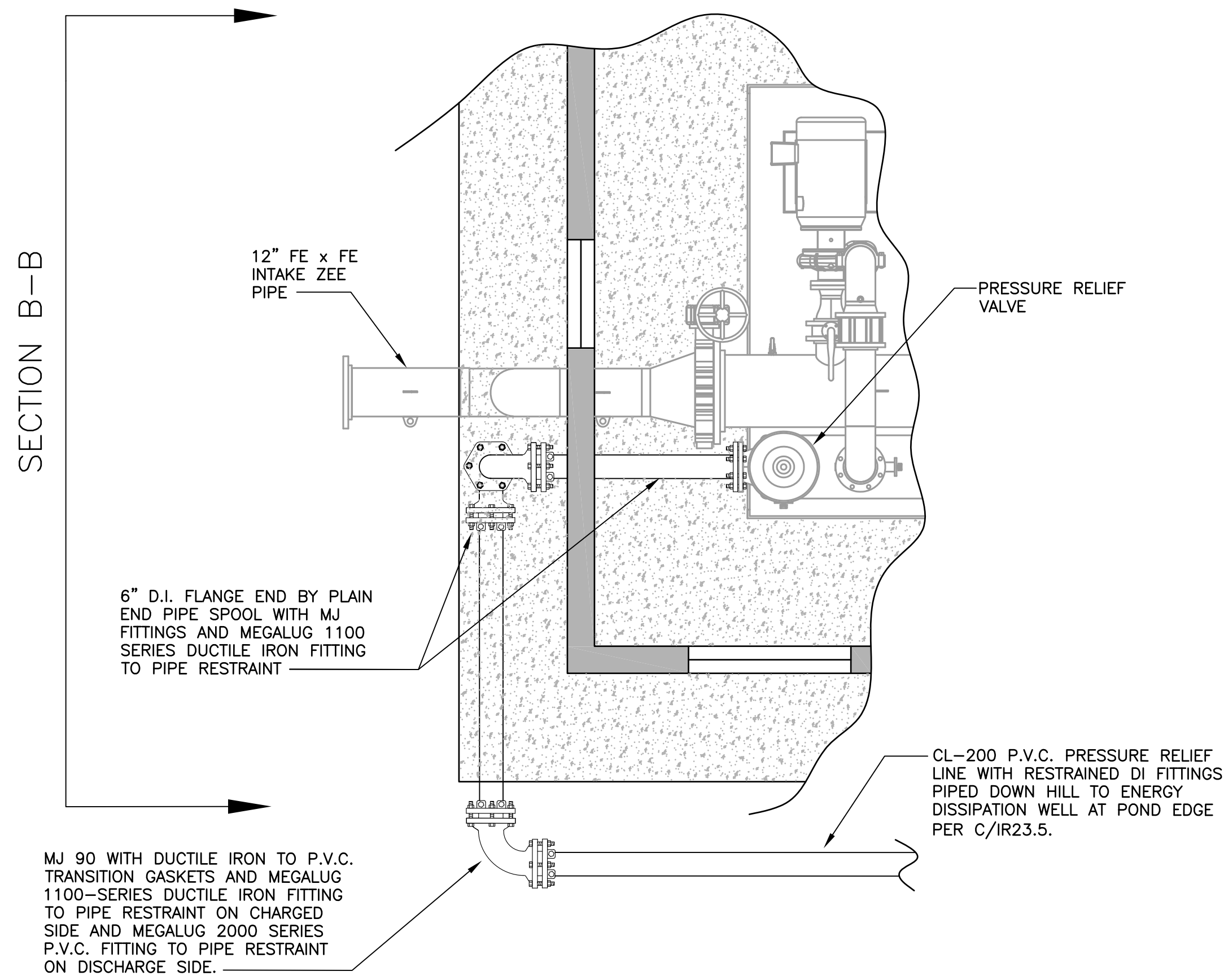
CHECKED BY: KS

DATE: 09-01-10

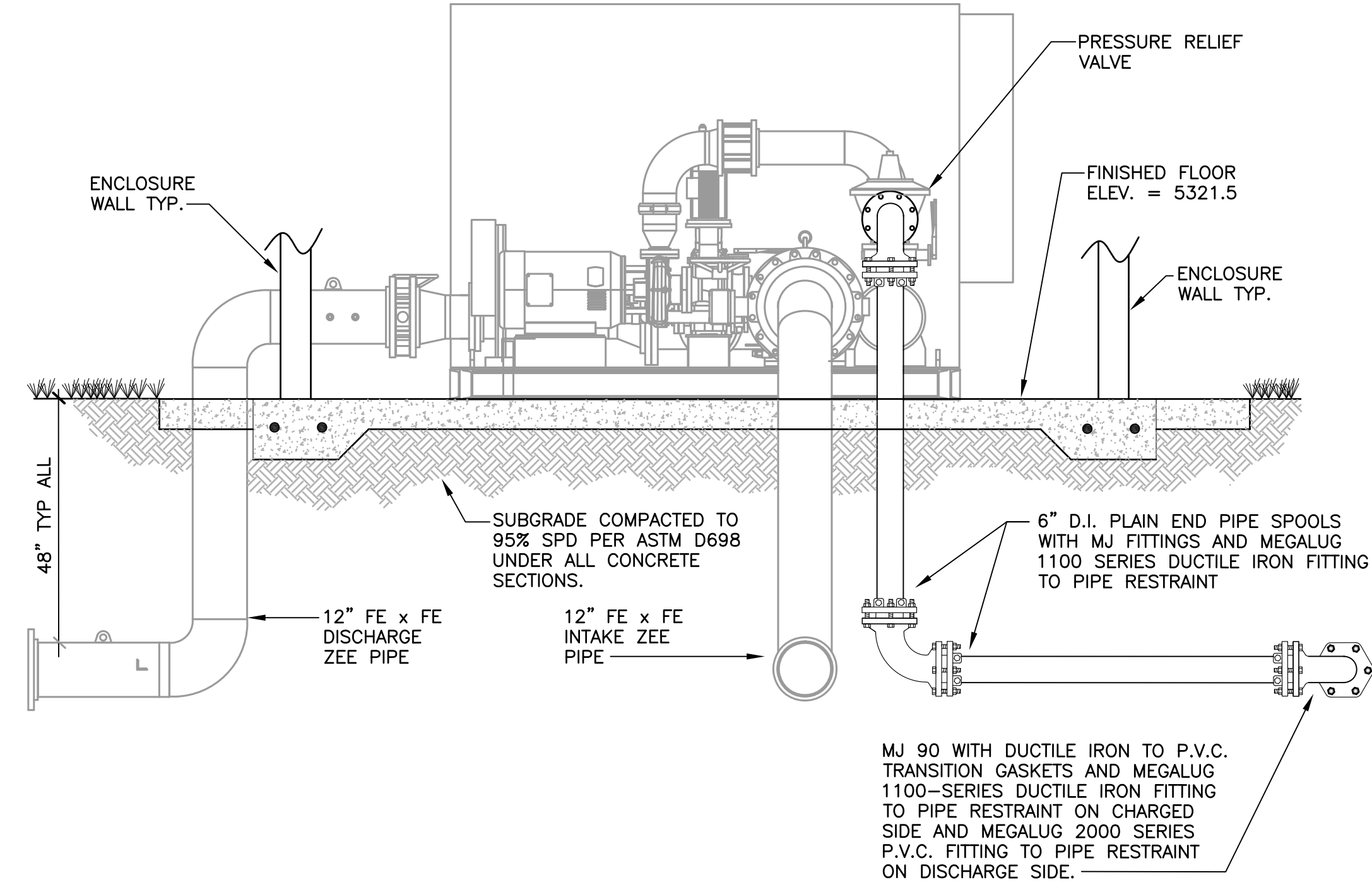
REVISIONS:  
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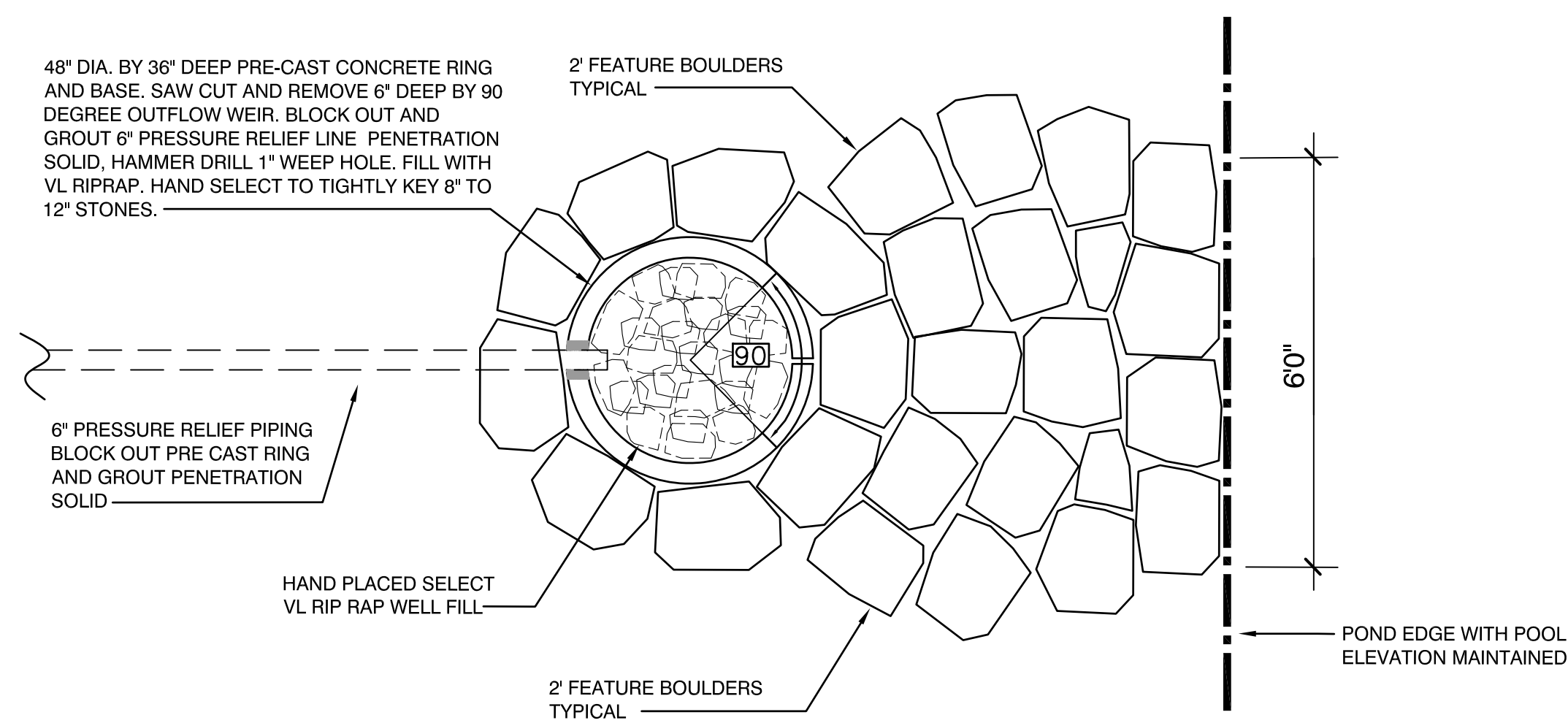
SHEET  
NUMBER: IR23.5



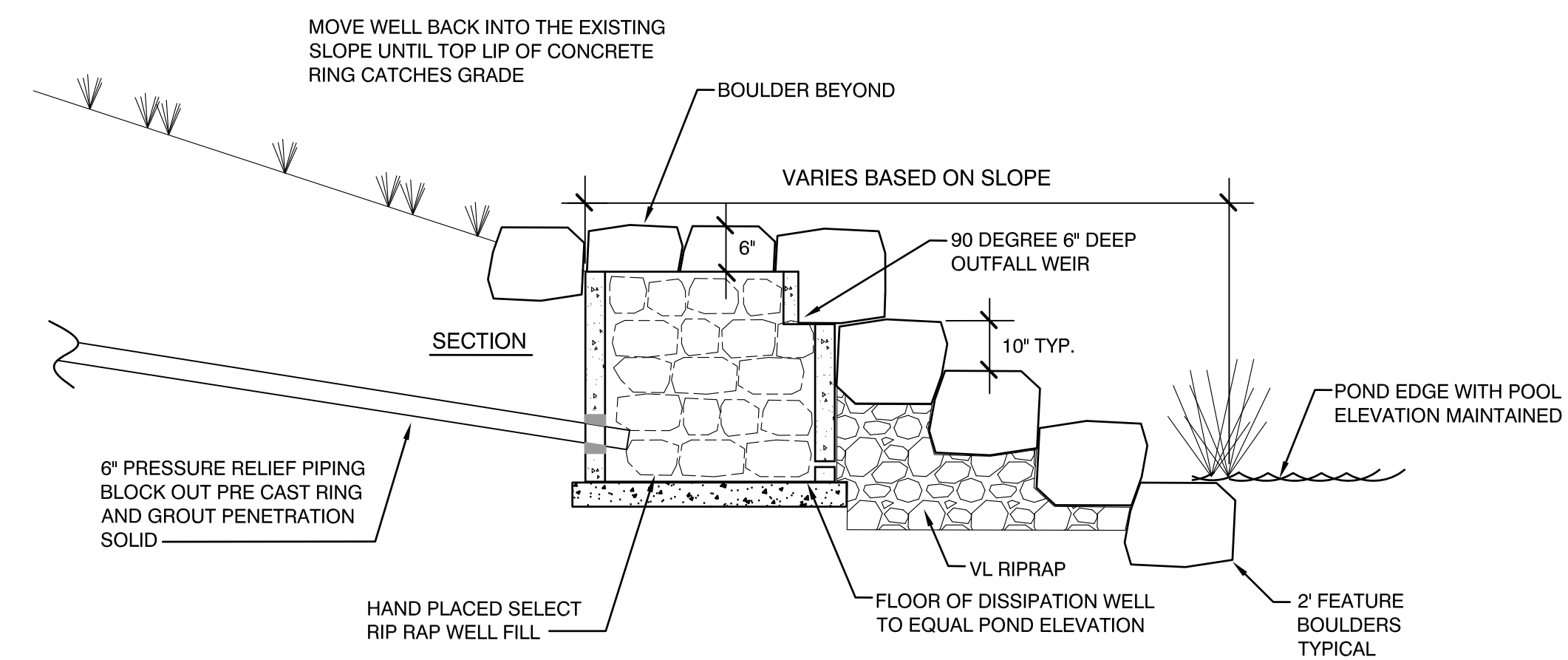
**A** PRESSURE RELIEF PIPING PLAN VIEW  
IR23.5 SCALE: 1/2" = 1'



**B** PRESSURE RELIEF PIPING SECTION B-B  
IR23.5 SCALE: 1/2" = 1'



DISSIPATION WELL AND RUN DOWN PLAN



DISSIPATION WELL AND RUN DOWN SECTION

**C** ENERGY DISSIPATION WELL AND RUN DOWN  
IR23.5 NO SCALE





Know what's below  
Call before you dig.

**Denver Parks + Recreation**

SHEET TITLE:  
Irrigation Detail Plan

PROJECT:  
HARVARD GULCH STATE HOME  
PARK IRRIGATION RENOVATION

SCALE: N.A.

DESIGNED BY: MEH

DRAWN BY: MEH

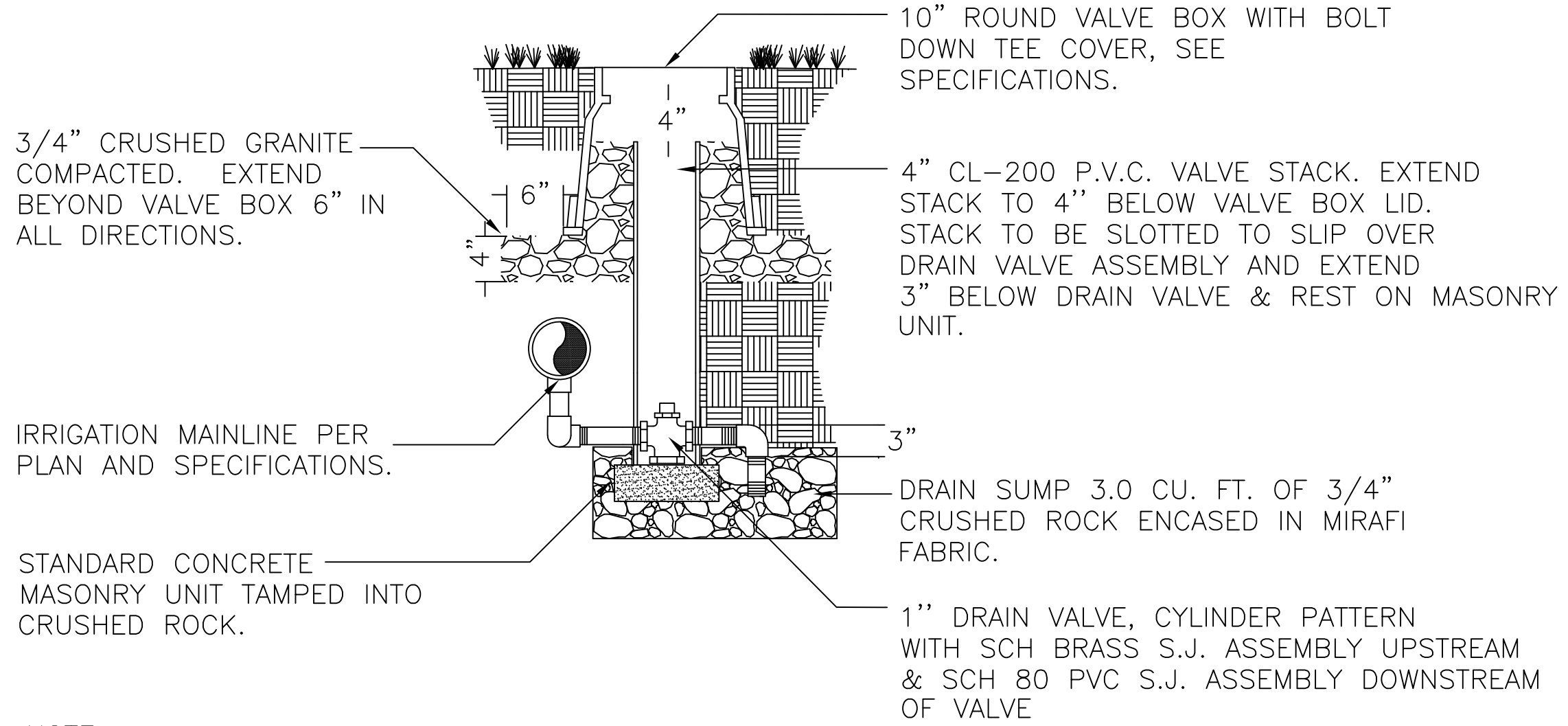
CHECKED BY: KS

DATE: 09-01-10

REVISIONS:  
10-15-10  
11-12-12  
12-12-12

PREPARED BY:  
IRRIGATION DESIGN BY:  
Applied Design Services  
9721 Bayou Ridge Trail  
Parker, Colorado 80134  
(303) 841-7077  
Fax - 841-8191

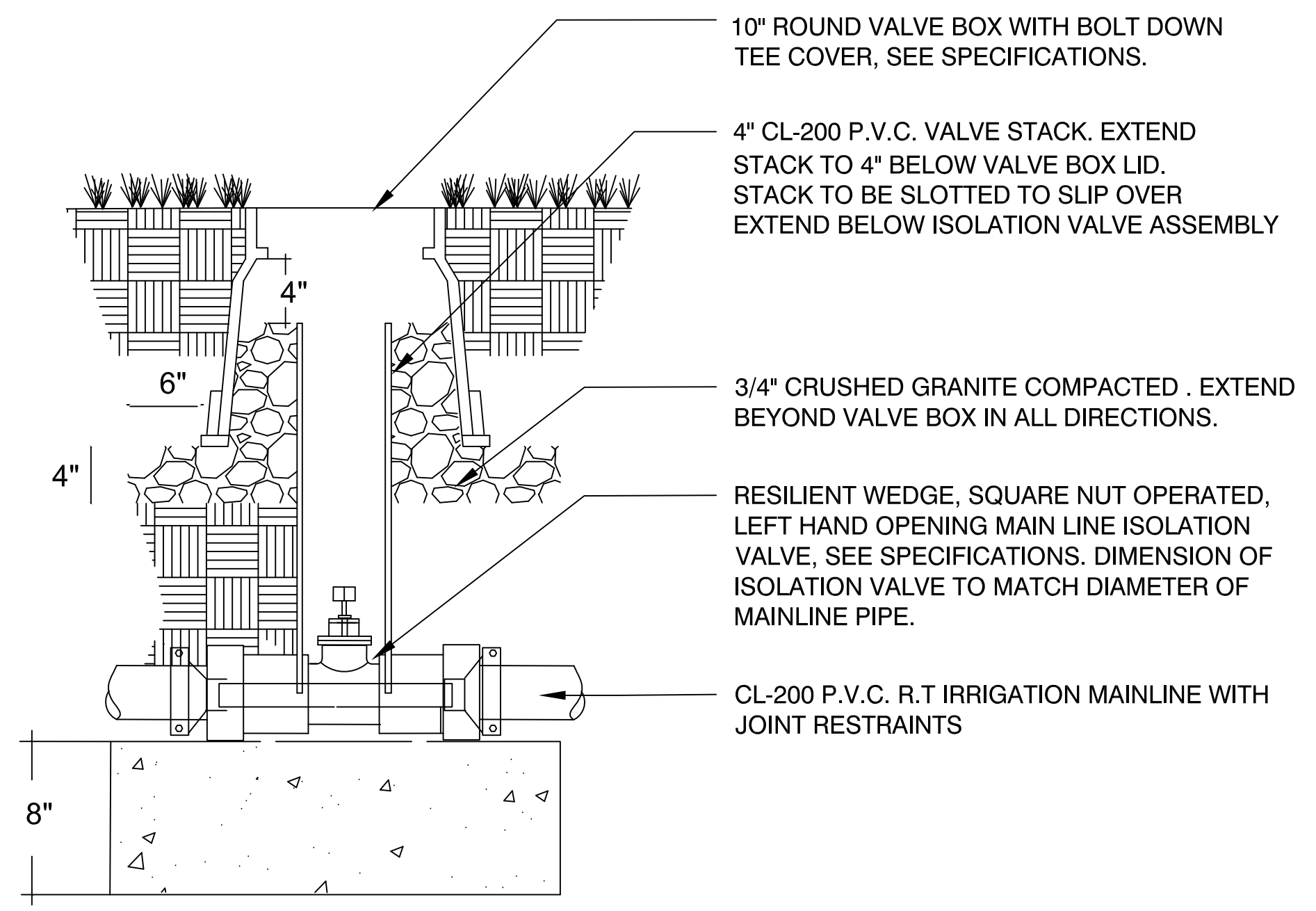
SHEET NUMBER: IR24



NOTE:  
1. BRAND (DV) INTO VALVE BOX LID WITH 1" HIGH LETTERS MIN.  
2. EXTEND VERTICAL DISCHARGE NIPPLE INTO DRAIN SUMP A MINIMUM OF 3".  
3. SET TOP OF VALVE BOX LID LEVEL WITH FINISHED GRADE OF ADJACENT TURFGRASS AREAS.

**A MANUAL DRAIN VALVE**

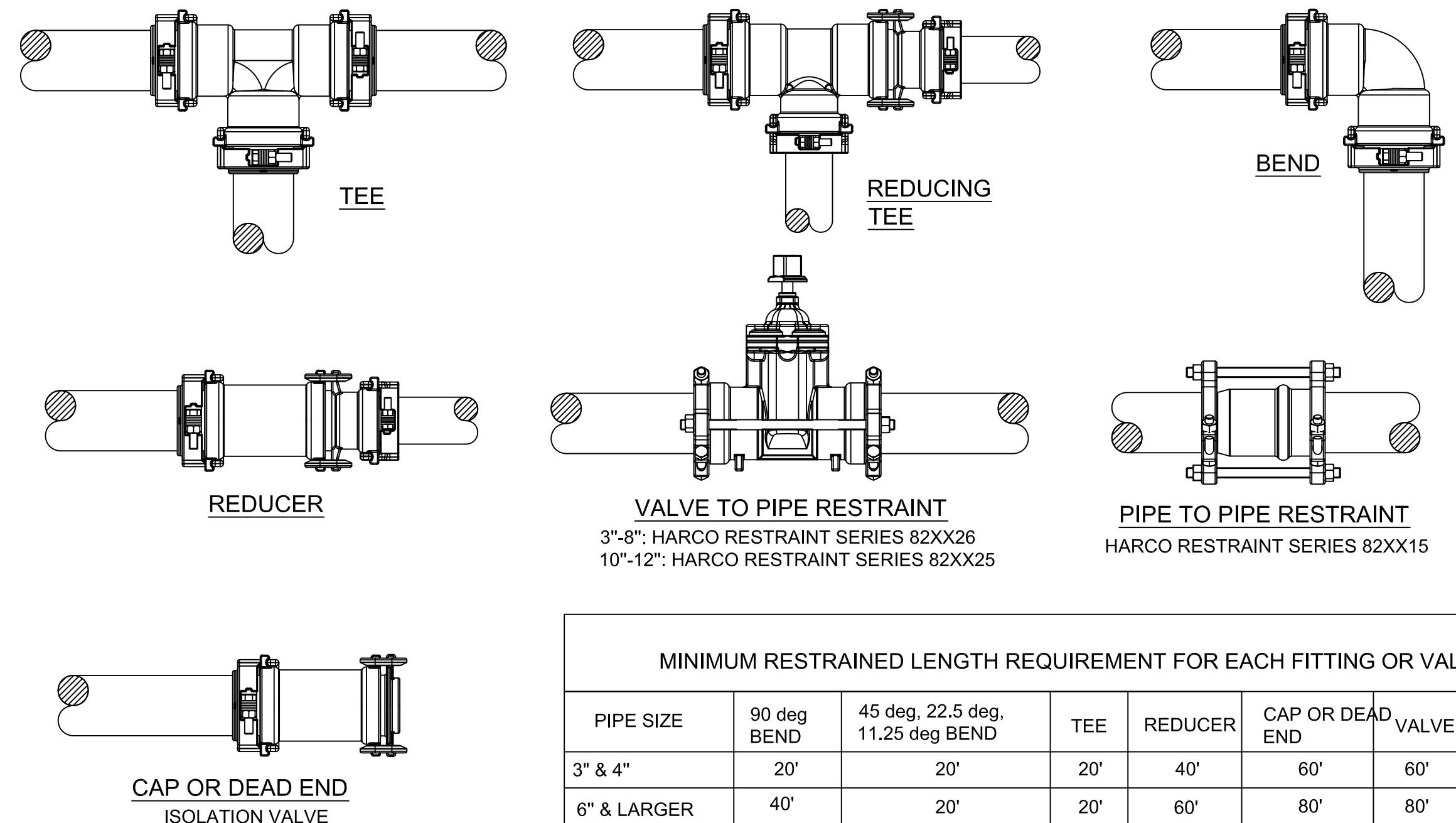
IR24 NO SCALE



NOTE:  
1. BRAND (GV) INTO VALVE BOX LID WITH 1" HIGH LETTERS MIN.  
2. SET TOP OF VALVE BOX LID LEVEL WITH FINISHED GRADE OF ADJACENT TURF GRASS AREAS.  
3. PROVIDE 4" CLEAR BETWEEN TOP OF STACK AND UNDERSIDE OF VALVE BOX LID.

**B MAINLINE ISOLATION VALVE ASSEMBLY**

IR24 NO SCALE

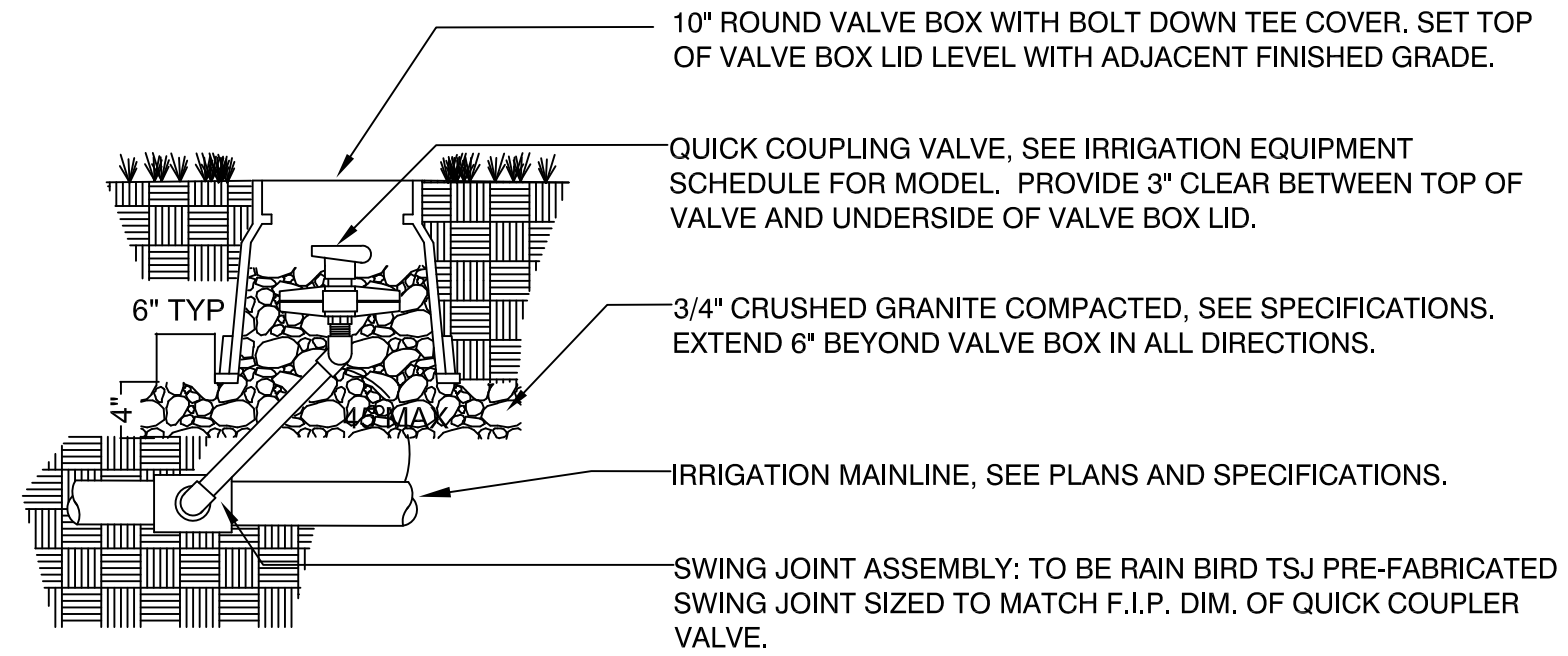


MINIMUM RESTRAINED LENGTH REQUIREMENT FOR EACH FITTING OR VALVE BELL							
PIPE SIZE	90 deg BEND	45 deg, 22.5 deg, 11.25 deg BEND	TEE	REDUCER	CAP OR DEAD END	VALVE	COUPLING/SERVICE TEE (SEE NOTE 3)
3" & 4"	20'	20'	20'	40'	60'	60'	NONE
6" & LARGER	40'	20'	20'	60'	80'	80'	NONE

NOTES:  
1. THE RESTRAINT SCHEMES HERE ARE FOR SYSTEM PRESSURES UP TO 125 PSI. FOR HIGHER PRESSURES, CALL THE HARCO FACTORY.  
2. EACH FITTING AND VALVE BELL MUST BE RESTRAINED TO THE LENGTH OF PIPE NOTED IN THE TABLE USING FITTING TO PIPE RESTRAINT, VALVE TO PIPE RESTRAINT, AND PIPE TO PIPE RESTRAINT AS REQUIRED.  
3. PIPE JOINTS WITHIN THE RESTRAINED LENGTH REQUIREMENT MUST BE RESTRAINED WITH PIPE TO PIPE RESTRAINTS.  
4. SERVICE TEES AND COUPLINGS WITHIN THE RESTRAINED LENGTH REQUIREMENT MUST BE RESTRAINED TO PIPE RESTRAINTS.  
5. FITTING BELLS 4" AND BELOW: HARCO RESTRAINTS SERIES 60-100-XX OR 82XX10.

**D HARCO D.I. FITTING TO PIPE, PIPE TO PIPE AND VALVE TO PIPE JOINT RESTRAINT**

IR24 NO SCALE



NOTE:  
1. INSURE THAT HANDLE ON QUICK COUPLER KEY WILL CLEAR VALVE BOX IN ALL DIRECTIONS.  
2. BRAND (QC) INTO VALVE BOX LID WITH 1" HIGH LETTERS MIN.  
3. NIPPLE ANGLE TO BE 10 DEGREES MIN. AND 45 DEGREES MAX. INSTALL SWING JOINT SUCH THAT DOWNWARD PRESSURE ON VALVE WILL TIGHTEN FITTING INTO MAINLINE TEE.  
4. FOR QUICK COUPLERS LOCATED WITHIN 100 FEET OF BACKFLOW PREVENTION DEVICES AND INTENDED FOR WINTERIZATION USE, ALL FITTINGS AND NIPPLES OF THE SWING JOINT ASSEMBLY MUST BE CONSTRUCTED ENTIRELY OF BRASS.

**C QUICK COUPLER VALVE ASSEMBLY**

IR24 NO SCALE



Know what's below  
Call before you dig.

# Denver Parks + Recreation

SHEET TITLE:  
Irrigation Detail Plan

PROJECT:  
HARVARD GULCH STATE HOME  
PARK IRRIGATION RENOVATION

SCALE: N.A.

DESIGNED BY: MEH

DRAWN BY: MEH

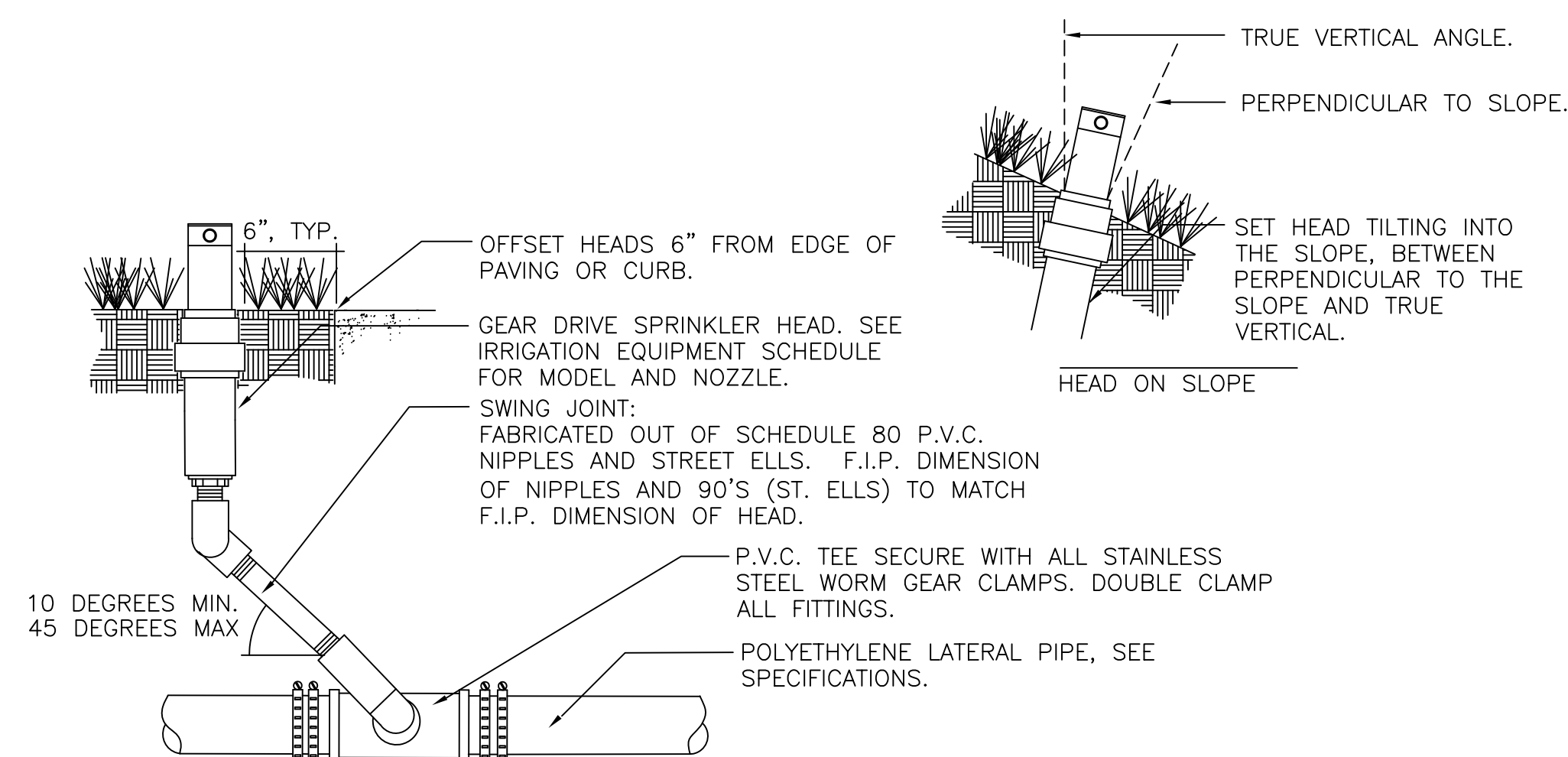
CHECKED BY: KS

DATE: 09-01-10

REVISIONS:  
10-15-10  
11-12-12  
12-12-12

PREPARED BY:  
IRRIGATION DESIGN BY:  
Applied Design Services  
9721 Bayou Ridge Trail  
Parker, Colorado 80134  
(303) 841-7077  
Fax - 841-8191

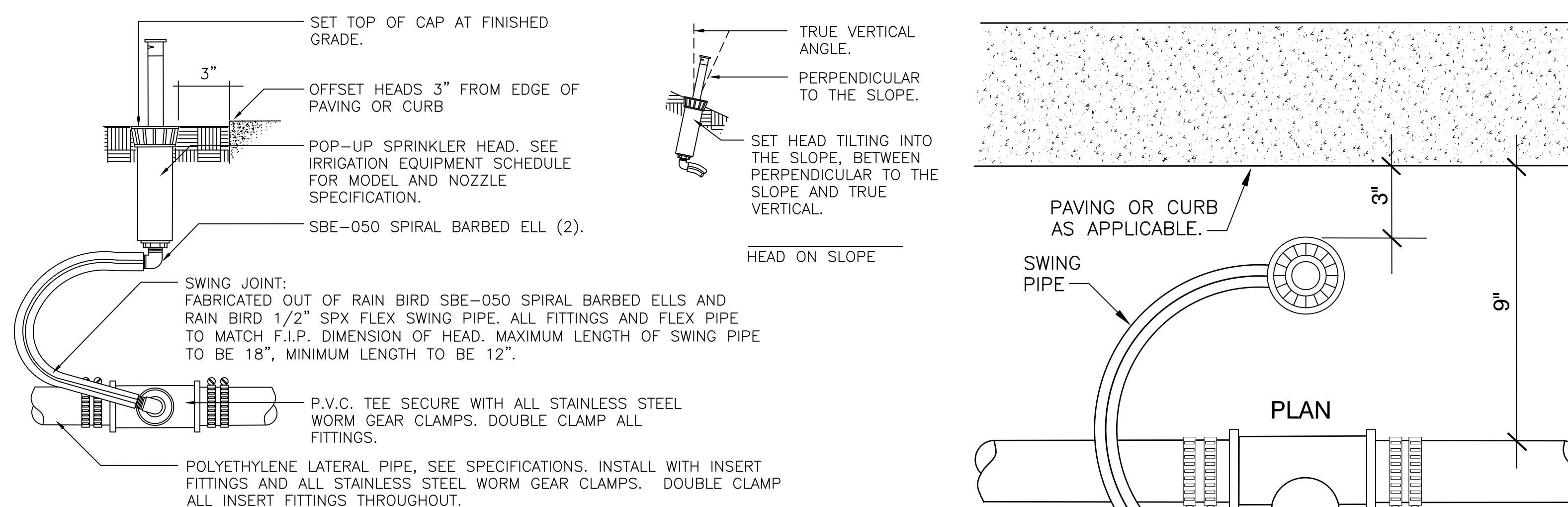
SHEET NUMBER: IR25



- NOTE:
1. PLUMB HEAD PERPENDICULAR TO FINISHED GRADE OR AS SPECIFIED FOR HEADS ON A SLOPE.
  2. SET CAP OF HEAD LEVEL WITH FINISHED GRADE TURFGRASS AREAS. SET TOP OF HEAD 1/2" ABOVE FINISHED GRADE IN SEEDED AREAS.

## A GEAR DRIVE SPRINKLER HEAD

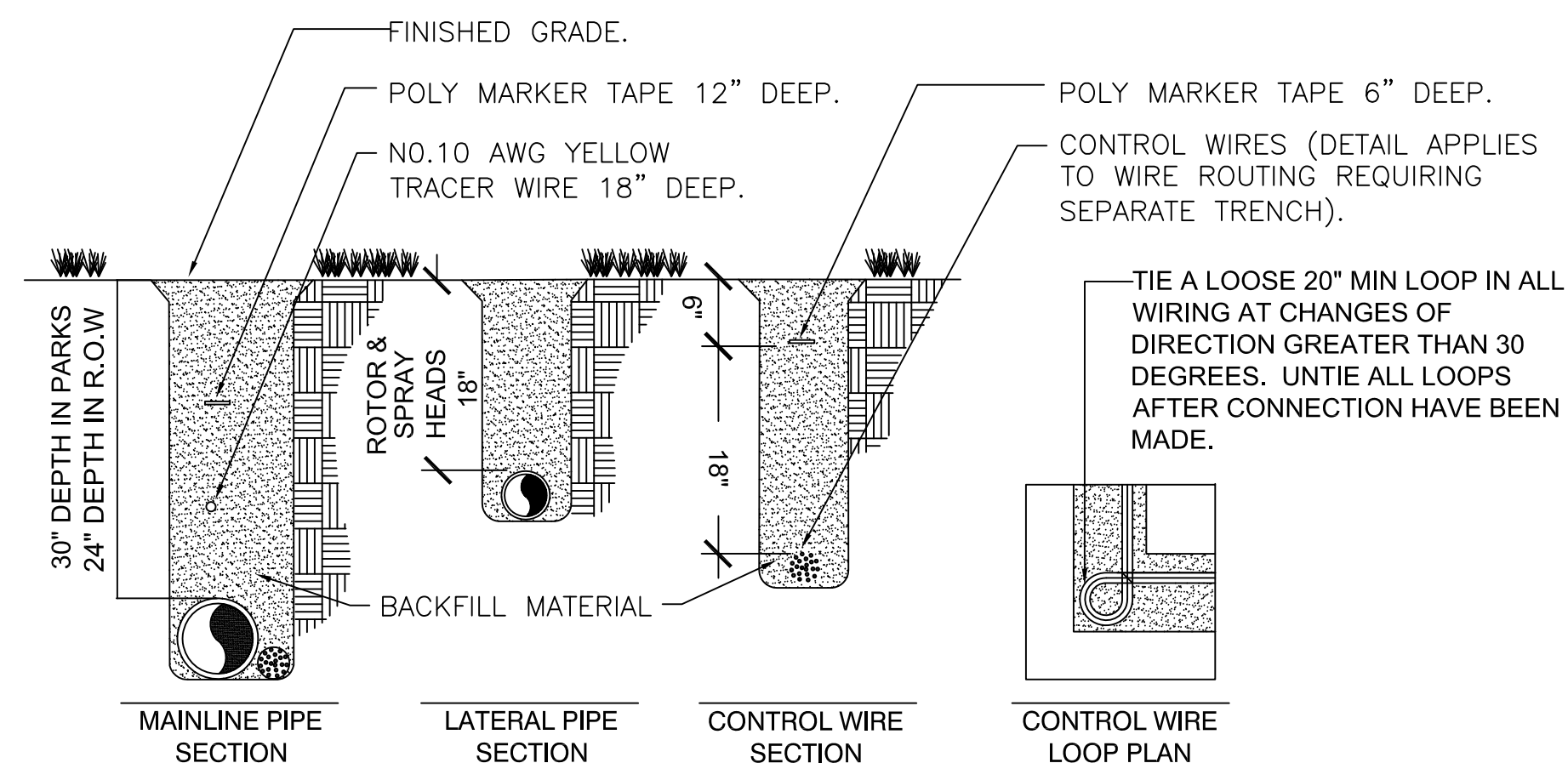
IR25 NO SCALE



- NOTE:
1. PLUMB HEAD PERPENDICULAR TO FINISHED GRADE OR AS SPECIFIED FOR HEADS ON A SLOPE.
  2. SET TOP OF HEAD LEVEL WITH FINISHED GRADE IN TURF GRASS AREAS. SET TOP OF HEAD 1/2" ABOVE FINISHED GRADE IN SEEDED AREAS.
  3. LATERAL PIPE TO BE PLACED 9" MIN FROM EDGE OF CURB/WALKS AND 36" MIN FROM THE CENTERLINE OF SWALES.

## B POP-UP SPRINKLER HEAD

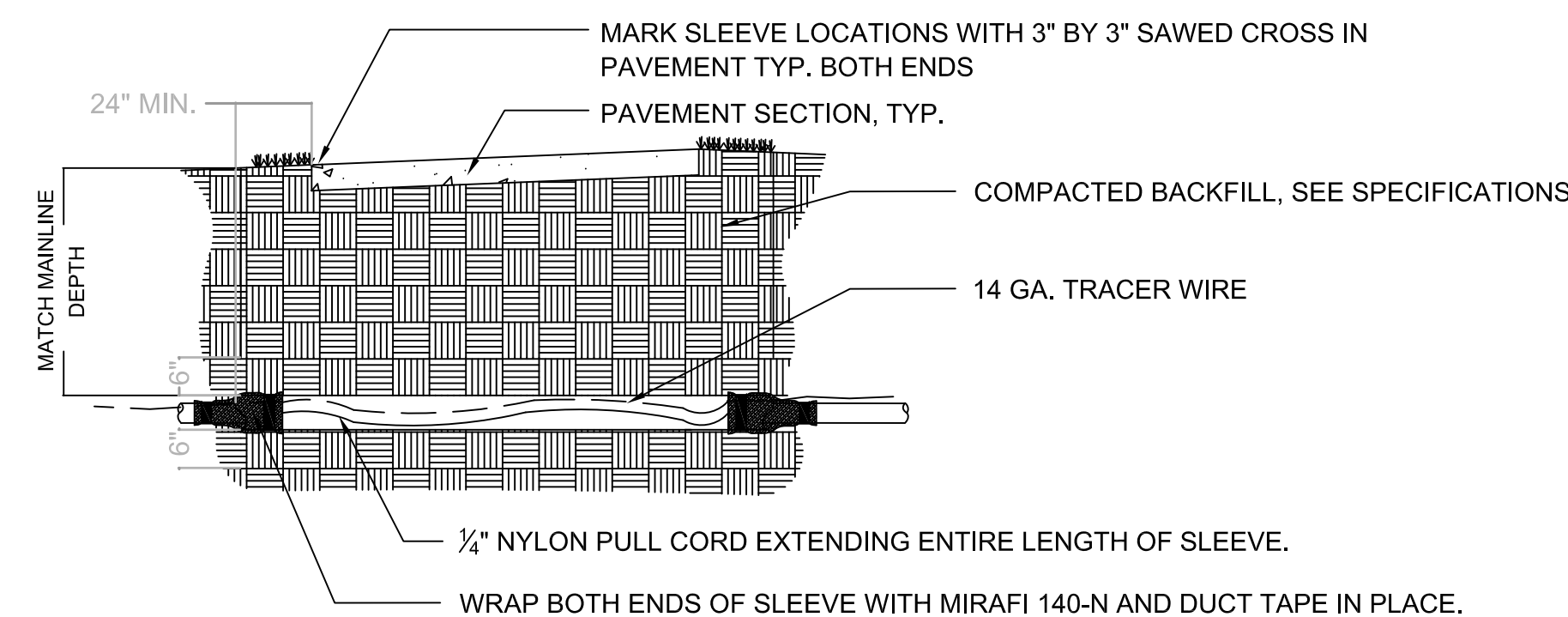
IR25 NO SCALE



- NOTE:
1. TRENCH DEPTHS ARE SHOWN AS MINIMUMS, MAXIMUM DEPTH VARIATION ALLOWABLE IS 2". SEE SPECIFICATIONS FOR MINIMUM TRENCH WIDTHS.
  2. MULTIPLE IRRIGATION PIPES SHALL NOT BE INSTALLED IN THE SAME TRENCH.
  3. IRRIGATION WIRE SHALL BE PLACED BESIDE IRRIGATION PIPE, NEVER STACKED.
  4. BUNDLE AND TAPE ALL WIRES AT 10'-0" MINIMUM SECTIONS.
  5. BACKFILL MATERIAL SHALL BE FREE OF RUBBISH, FROZEN MATERIALS AND STONES LARGER THAN 1". SEE SPECIFICATIONS FOR TYPICAL BACKFILL MATERIAL, PROCEDURES AND REGULATIONS.

## C TRENCHING

IR25 NO SCALE



- NOTES:
1. SLEEVING SHALL BE CL-200 P.V.C. UNLESS OTHERWISE NOTED ON PLAN.
  2. ALL MAINLINE AND LATERAL SLEEVES SHALL BE A MINIMUM OF 2 PIPE SIZES LARGER THAN THE PIPE BEING SLEEVED.
  3. DENVER WATER REQUIRES TRACER WIRE IN ALL SLEEVES THAT CROSS STREETS. IF SLEEVE IS FOR MAINLINE AND A TRACER WIRE IS ALREADY INCLUDED, NO ADDITIONAL TRACER WIRE IS NEEDED.
  4. SLEEVES SHALL BE INSTALLED AT SAME DEPTH AS MAINLINE OR LATERALS.
  5. SLEEVES TO BE INSTALLED 24" DEPTH MINIMUM UNDER ROADWAYS AND 30" DEPTH MINIMUM UNDER TREE CRITICAL ROOT ZONES.

## D SLEEVING

IR25 NO SCALE



Know what's below  
Call before you dig.

# Denver Parks + Recreation

SHEET TITLE:  
Irrigation Detail Plan

PROJECT:  
HARVARD GULCH STATE HOME  
PARK IRRIGATION RENOVATION

SCALE: N.A.

DESIGNED BY: MEH

DRAWN BY: MEH

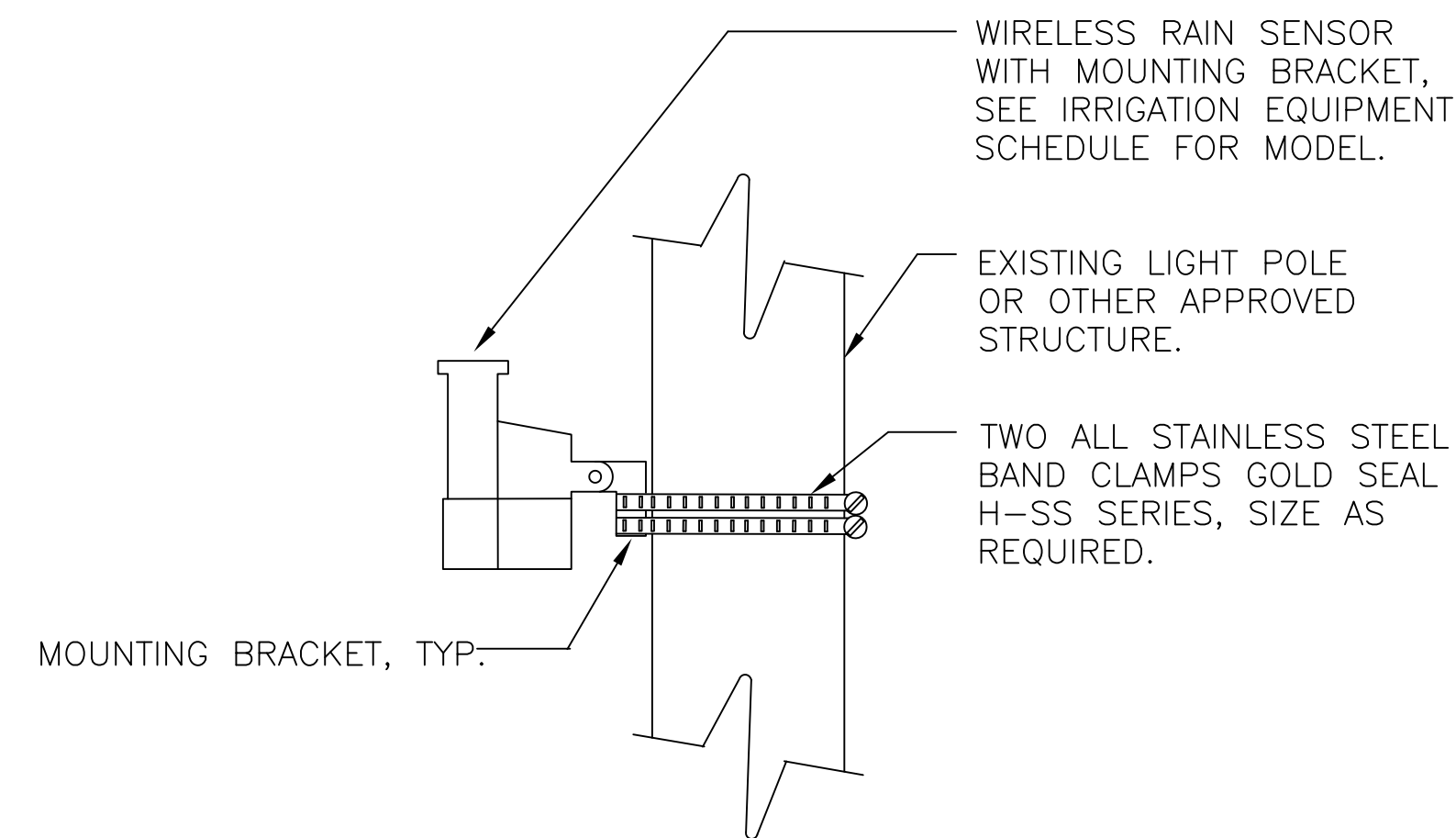
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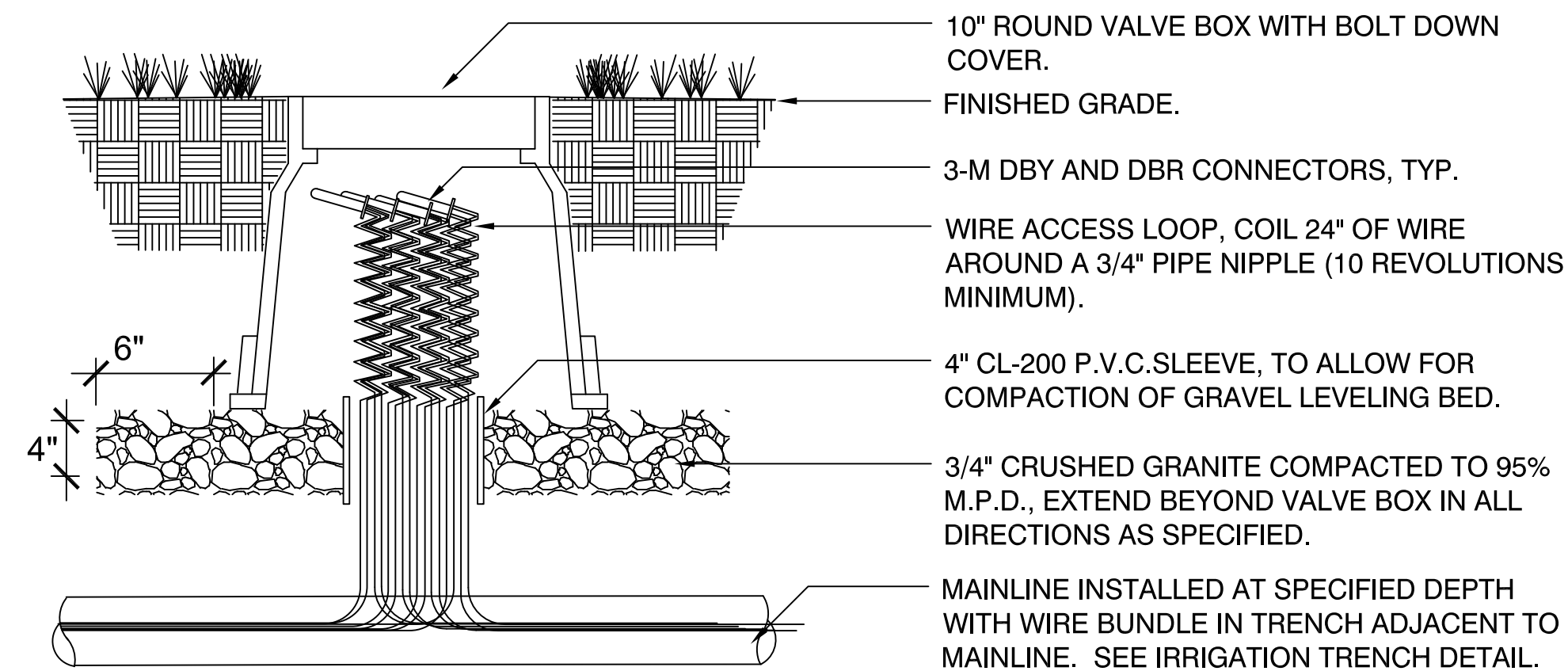
SHEET NUMBER: IR26



**NOTE:**

1. MOUNT TO POLE OR LIGHT POLE WITHIN 200 FEET OF CONTROLLER.
2. INSTALL A MINIMUM OF 15' ABOVE GRADE.
3. ENSURE SENSOR IS NOT SHIELDED BY TREE CANOPIES OR STRUCTURES AND NOT AFFECTED BY IRRIGATION OVERSPRAY.

**A** RAIN SENSOR MOUNTING DETAIL  
IR26 NO SCALE



**NOTE:**

1. SET TOP OF BOX LEVEL WITH 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) WIRES.

**B** WIRE SPLICE ACCESS LOOP  
IR26 NO SCALE

### Controller Specification Summary:

NORTHWEST SUB-MAIN LOOP CONTROLLER (C1): ONE TORO SENTINEL SERIES (73) STATION CONTROLLER MODEL NO. ESB204-TW-U2/BL-18SS/PD-VRA-FK-GFI.  
 NORTHEAST SUB-MAIN LOOP CONTROLLER (C2): ONE TORO SENTINEL SERIES (72) STATION CONTROLLER MODEL NO. ESB204-TW-U2/BL-18SS/PD-VRA-FK-GFI.  
 SOUTHWEST SUB-MAIN LOOP CONTROLLER (C3): ONE TORO SENTINEL SERIES (46) STATION CONTROLLER MODEL NO. ESB204-TW-U2/BL-18SS/PD-VRA-FK-GFI.  
 SOUTHEAST SUB-MAIN LOOP CONTROLLER (C4): ONE TORO SENTINEL SERIES (38) STATION CONTROLLER MODEL NO. ESB204-TW-U2/BL-18SSD/PD-VRA-FK-GFI.

Controllers to be configured for biLine two wire path baseline control system. Controllers (C1) and (C2) are to be installed in a common double door enclosure with a common mow strip / pad. Controllers (C3) and (C4) are to be installed in a common double door enclosure with a common mow strip / pad.

CONTRACTOR TO INCLUDE IN THEIR BID A COST FOR THE MANUFACTURER'S ON SITE CONTROLLER OPTIMIZATION REPRESENTATIVE TO SET UP AND PROGRAM CONTROLLERS AFTER INSTALLATION. CONTACT MR. BRANDON GULLEY @ (303) 961-6959 TO CONFIRM COSTS AND SCOPE OF SERVICES.

ADDITIONALLY SUPPLY ONE HAND HELD TRANSCEIVER MODEL SHHR FOR EACH TORO SENTINEL CONTROLLER INSTALLED TWO (2) REQUIRED.

SLEEVE #6 AWG SOLID BARE COPPER GROUNDING WIRE IN 1" SCH-40 P.V.C. CONDUIT TO 12" BEYOND SLAB. INSTALL GROUNDING RODS AND OR PLATES AS DIRECTED BY CONTROLLER MANUFACTURER'S ON SITE OPTIMIZATION REPRESENTATIVE. RODS TO BE INSTALLED IN CARSON IND. 910-10 ROUND VALVE BOXES BRANDED (GR). WIRE CONNECTIONS TO BE CAD WELDED.

USING A MEGGER OHM METER CONTRACTOR IS TO VERIFY THE CONTROLLER GROUNDING IS WITHIN MANUFACTURER'S GUIDELINE OF 10 OHMS OR LESS.

SUPPLY CONTROLLER WITH WIRELESS CARD AND SUPPLY ENCLOSURE WITH VENTILATION LOUVERS AND EXHAUST FAN.

CONTROLLER ENCLOSURE STRONG BOX STAINLESS STEEL ENCLOSURE WITH DARK GREEN POWDER COATED FINISH COLOR 6005 (TIGER DRYLACK POWDER COATINGS CHART). SECURE TO SLAB PER MFR'S REC.

DUPLEX REC. WITH G.F.I. BREAKER

6" THICK, 4,000 POUND, FIBER MESH REINFORCED, CLASS (P), CONCRETE SLAB WITH 4" SLUMP, 3/4" AGGREGATE, 6% +OR- 1.5% ENTRAINED AIR WITH MEDIUM BROOM FINISH AND WHITE CURING COMPOUND. OWNER TO INSPECT ALL FORM WORK AND CONDUIT SWEEPS PRIOR TO POUR. SUB GRADE COMPACTED TO 95% S.P.D. PER ASTM D-698 UNDER ALL CONCRETE SECTIONS.

SLOPE SLAB AWAY FROM ENCLOSURE @ 2% 1/4" PER 1' EDGE OF SLAB TO BE 1" ABOVE ADJACENT FINISHED GRADE. SLAB TO BE 12" LARGER THAN ENCLOSURE IN ALL DIMENSIONS

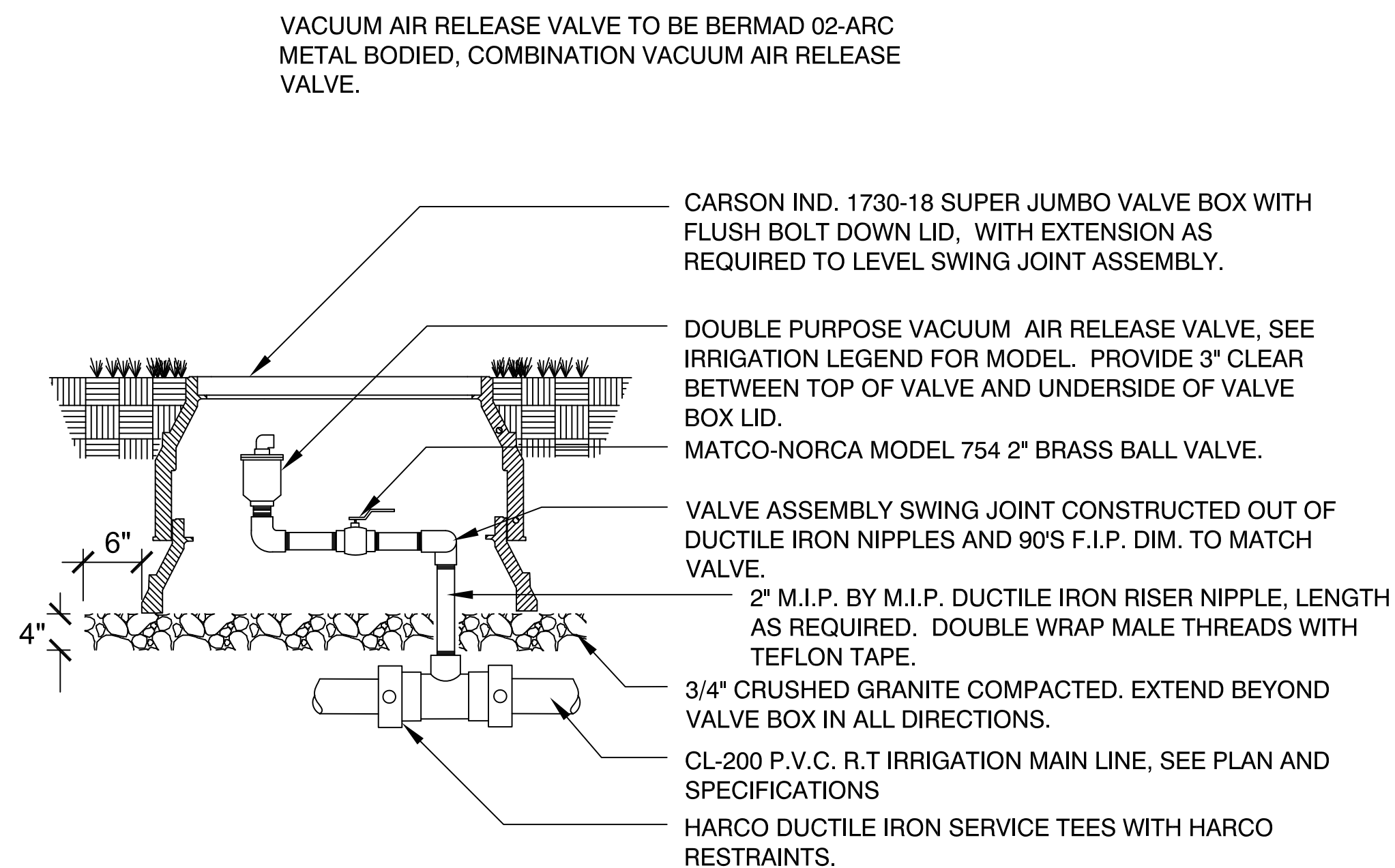
DUPLICATE CONDUIT COUNT AND CONFIGURATION FOR BOTH SIDES OF DOUBLE DOOR ENCLOSURE.

LOW VOLTAGE MASTER VALVE WIRES AND FLOW SENSOR CABLE SLEEVED IN 1.5" SCH-40 P.V.C. CONDUIT TO 12" BEYOND SLAB

NEW HIGH VOLTAGE POWER SUPPLY INSTALLED TO NEW CONTROLLER LOCATION SLEEVED IN 1" SCH-40 P.V.C. CONDUIT THROUGHOUT

LOW VOLTAGE VALVE CONTROL WIRE SLEEVED IN 4" SCH-40 P.V.C. CONDUIT TO 12" BEYOND SLAB ONE PER CONTROLLER.

SPARE LOW VOLTAGE VALVE CONTROL WIRE 4" SCH-40 P.V.C. CONDUIT CAPPED 12" BEYOND SLAB.



**NOTE:**

1. PROVIDE 3" CLEAR BETWEEN TOP OF VALVE AND UNDERSIDE OF VALVE BOX LID.
2. SET TOP OF VALVE BOX LID LEVEL WITH FINISHED GRADE OF ADJACENT UNDISTURBED TURF GRASS AREAS.
3. DRILL 20-1/2" DIA. HOLES IN LID. DRILL HOLES IN A SQUARE PATTERN. HOLES SHALL NOT COMPROMISE REINFORCING MEMBERS IN LID.

**C** AIR RELIEF VALVE  
IR26 NO SCALE

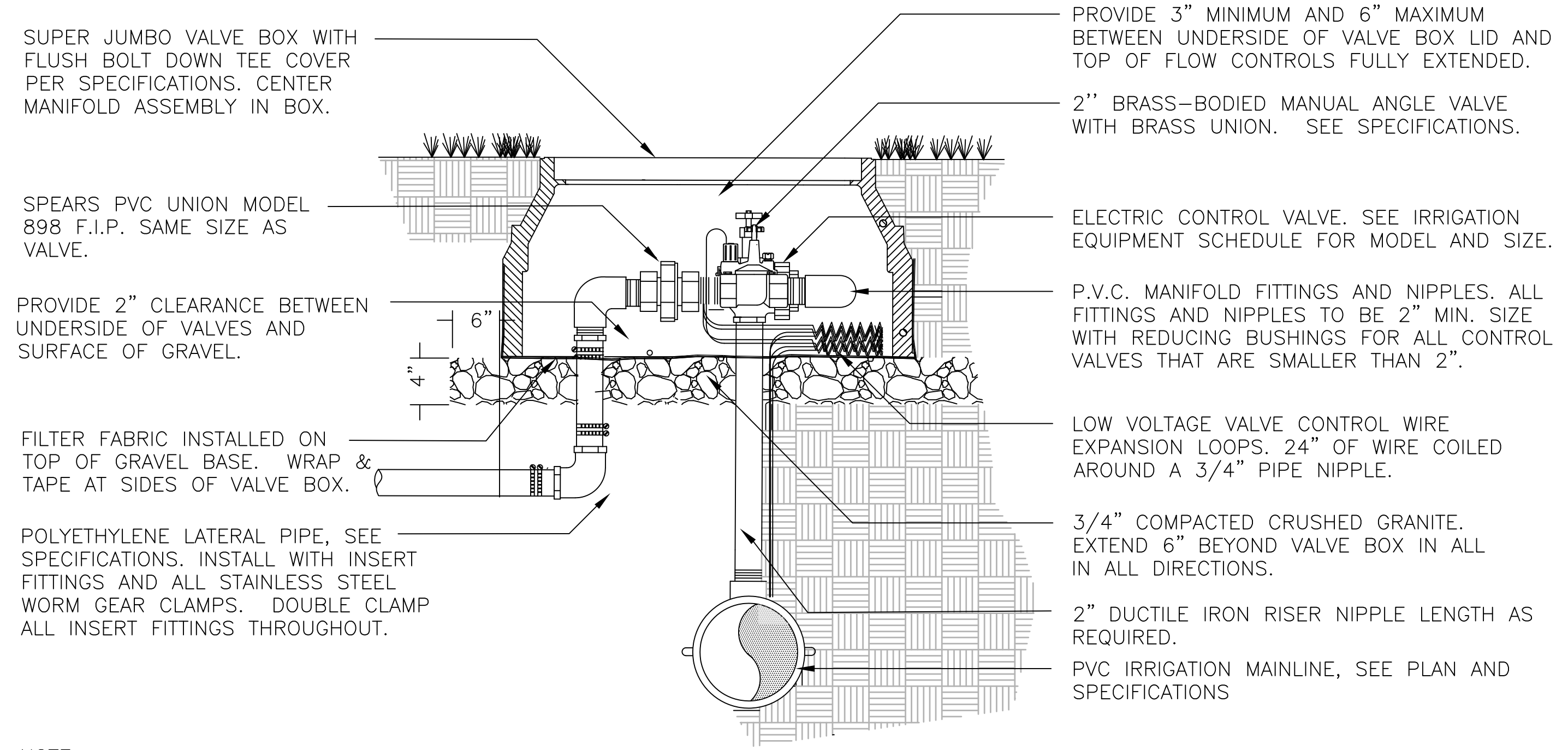
Rev. 04-07-09

**D** CONTROLLER ENCLOSURE ELEVATION  
IR26 NO SCALE





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SUPER JUMBO VALVE BOX WITH FLUSH BOLT DOWN TEE COVER PER SPECIFICATIONS. CENTER MANIFOLD ASSEMBLY IN BOX.

SPEARS PVC UNION MODEL 898 F.I.P. SAME SIZE AS VALVE.

PROVIDE 2" CLEARANCE BETWEEN UNDERSIDE OF VALVES AND SURFACE OF GRAVEL.

FILTER FABRIC INSTALLED ON TOP OF GRAVEL BASE. WRAP & TAPE AT SIDES OF VALVE BOX.

POLYETHYLENE LATERAL PIPE, SEE SPECIFICATIONS. INSTALL WITH INSERT FITTINGS AND ALL STAINLESS STEEL WORM GEAR CLAMPS. DOUBLE CLAMP ALL INSERT FITTINGS THROUGHOUT.

PROVIDE 3" MINIMUM AND 6" MAXIMUM BETWEEN UNDERSIDE OF VALVE BOX LID AND TOP OF FLOW CONTROLS FULLY EXTENDED.

2" BRASS-BODIED MANUAL ANGLE VALVE WITH BRASS UNION. SEE SPECIFICATIONS.

ELECTRIC CONTROL VALVE. SEE IRRIGATION EQUIPMENT SCHEDULE FOR MODEL AND SIZE.

P.V.C. MANIFOLD FITTINGS AND NIPPLES. ALL FITTINGS AND NIPPLES TO BE 2" MIN. SIZE WITH REDUCING BUSHINGS FOR ALL CONTROL VALVES THAT ARE SMALLER THAN 2".

LOW VOLTAGE VALVE CONTROL WIRE EXPANSION LOOPS. 24" OF WIRE COILED AROUND A 3/4" PIPE NIPPLE.

3/4" COMPACTED CRUSHED GRANITE. EXTEND 6" BEYOND VALVE BOX IN ALL DIRECTIONS.

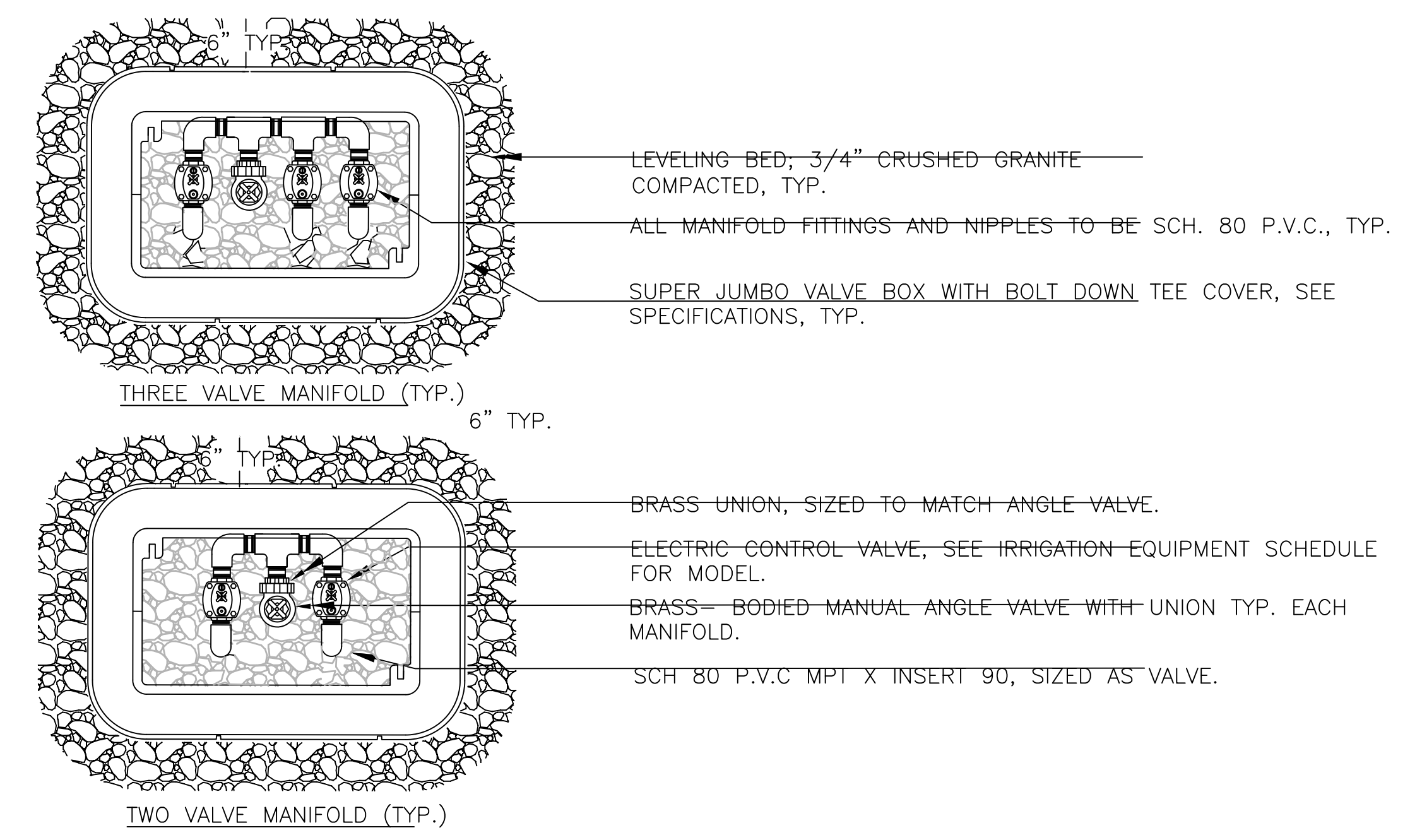
2" DUCTILE IRON RISER NIPPLE LENGTH AS REQUIRED.

PVC IRRIGATION MAINLINE, SEE PLAN AND SPECIFICATIONS

NOTE:

1. SET TOP OF VALVE BOX LID LEVEL WITH ADJACENT FINISHED GRADE.
2. BRAND (STATION NO.) INTO VALVE BOX LID WITH 1" HIGH LETTERS MIN. AND LOCK TIE PLASTIC VALVE NO. TAGS TO FLOW CONTROL STEM ON EACH CONTROL VALVE.

**A** ELECTRIC CONTROL VALVE MANIFOLD SECTION  
IR27 NO SCALE



LEVELING BED, 3/4" CRUSHED GRANITE COMPACTED, TYP.

ALL MANIFOLD FITTINGS AND NIPPLES TO BE SCH. 80 P.V.C., TYP.

SUPER JUMBO VALVE BOX WITH BOLT DOWN TEE COVER, SEE SPECIFICATIONS, TYP.

BRASS UNION, SIZED TO MATCH ANGLE VALVE.

ELECTRIC CONTROL VALVE, SEE IRRIGATION EQUIPMENT SCHEDULE FOR MODEL.

BRASS-BODIED MANUAL ANGLE VALVE WITH UNION TYP. EACH MANIFOLD.

SCH 80 P.V.C MPT X INSERT 90, SIZED AS VALVE.

NOTE:

1. CENTER MANIFOLD ASSEMBLY IN BOX. ENSURE THAT LATERAL PIPE HAS 6" OF COVER MINIMUM WHERE IT PASSES UNDER VALVE BOX FRAME.
2. DO NOT MODIFY OR CUT SIDE WALLS OF VALVE BOX.
3. ASSEMBLE VALVE MANIFOLD ASSEMBLY FOR REVIEW AND APPROVAL PRIOR TO FABRICATION AND INSTALLATION.
4. LOCATE VALVE BOXES AND MAINLINE A MINIMUM DISTANCE OF 24" FROM CURBS AND WALKS AND A MINIMUM OF 36" FROM CENTER LINE OF DRAINAGE SWALES.

**B** ELECTRIC CONTROL VALVE MANIFOLD OPTIONS PLAN VIEW  
IR27 NO SCALE

Denver Parks + Recreation

SHEET TITLE: Irrigation Detail Plan  
PROJECT: HARVARD GULCH STATE HOME PARK IRRIGATION RENOVATION

SCALE:	N.A.
DESIGNED BY:	MEH
DRAWN BY:	MEH
CHECKED BY:	KS
DATE:	09-01-10
REVISIONS:	10-15-10 11-12-12 12-12-12
PREPARED BY:	IRRIGATION DESIGN BY: Applied Design Services 9721 Bayou Ridge Trail Parker, Colorado 80134 (303) 841-7077 Fax - 841-8191

SHEET NUMBER: IR27



# CITY & COUNTY OF DENVER DEPARTMENT OF PARKS & RECREATION

## Harvard Gulch State Home Park - Irrigation Renovation - Irrigation Water Tap Plan

### APPROVALS:

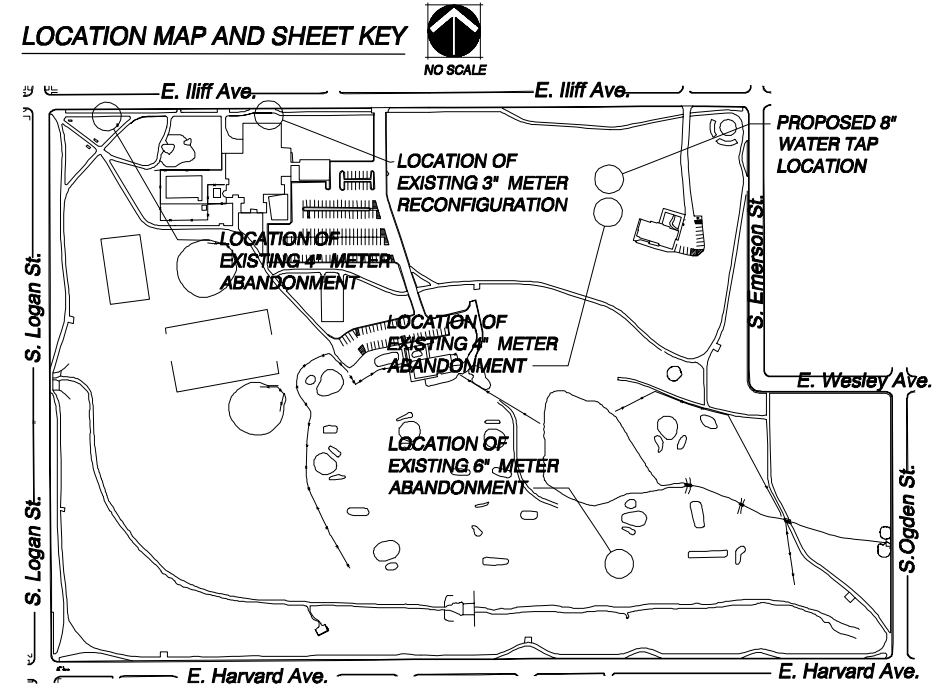
Denver Water Department	Date
-------------------------	------

### DRAWING INDEX:

#### WATER TAP PACKAGE:

- Sheet No. WP-1 - Cover Sheet
- Sheet No. WP-1A- Denver Water Notes
- Sheet No. WP-2 - Overall Water Plan
- Sheet No. WP-3 - Water Plan - Northwest Area
- Sheet No. WP-4 - Water Plan - Northeast Area
- Sheet No. WP-5 - Water Plan - Southeast Area

### LOCATION MAP AND SHEET KEY



### GENERAL NOTES:

- ALL WORK MUST CONFORM TO THE CITY AND COUNTY OF DENVER STANDARD CONSTRUCTION SPECIFICATIONS.
- THE CONTRACTOR SHALL CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO @ 1-800-922-1987 FORTY EIGHT (48) HOURS PRIOR TO ANY EXCAVATION. CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ANY EXISTING UTILITY (INCLUDING DEPTHS) WHICH MAY CONFLICT WITH THE PROPOSED CONSTRUCTION. ALL EXISTING UTILITIES SHALL BE PROTECTED FROM DAMAGE BY THE CONTRACTOR. DAMAGED UTILITIES SHALL BE REPAIRED BY THE CONTRACTOR AT HIS EXPENSE.
- THE CONTRACTOR SHALL OBTAIN AT HIS EXPENSE ALL PERMITS WHICH ARE NECESSARY TO PERFORM THE PROPOSED WORK.
- ALL LAND CORNERS, TIES, RANGE POINTS, AND BENCHMARKS OR OTHER SURVEY CONTROL POINTS WHICH MAY BE ENCOUNTERED DURING CONSTRUCTION MUST BE PRESERVED. A MONUMENT RECORD MUST BE FILED WITH THE CITY SURVEYOR'S OFFICE ON ALL LAND CORNERS, TIES, RANGE POINTS, BENCHMARKS, AND CROSSES SO THEY CAN BE REPLACED AFTER CONSTRUCTION BY THE CONTRACTOR'S SURVEYOR. A COLORADO LICENSED LAND SURVEYOR MUST REPLACE THESE MONUMENTS BEFORE THE CITY CAN ACCEPT NEW CONSTRUCTION. MONUMENT RECORDS MAY BE FAXED TO THE CITY SURVEYOR AT (720) 865-3280. PHONE (720) 865-3121.
- ALL WORK IN THE RIGHT-OF-WAY WILL REQUIRE A SPECIAL PERMIT AND MUST ADHERE TO ALL CITY AND COUNTY OF DENVER STANDARDS.
- COORDINATE ALL WORK WITH THE CITY AND COUNTY OF DENVER DEPARTMENT OF PARKS AND RECREATION PLANNING DESIGN AND CONSTRUCTION DIVISION PLANNER IN CHARGE BRITTA HERWIG @ (720) 913-0614 AND PARKS DISTRICT SUPERINTENDENT JUAN MARSH @ (303) 331-4113.

To be completed by Denver Water	
Denver Water's review of these plans relates only to Denver Water requirements, and does not include a full analysis of soil conditions, support of base materials, or any other matters. Any modification of these plans must be resubmitted to Denver Water for review prior to construction. The Professional Engineer, Contractor, and Owner's liability and responsibility for this proposed water distribution system shall be solely responsible for the adequacy of the design, installation, and materials utilized in this water distribution system for any specific site location.	
Date	LD No.
Contract No.	Equip No.
<input type="checkbox"/> Approve for Construction Approval Valid for 1 year	
Signed Administrator	

WATER PLAN BY:  
**ICON**  
 ENGINEERING, INC.  
 8100 South Platte Street, Suite 300, Englewood, CO 80152  
 Phone: (303) 225-0802 / Fax: (303) 225-1019  
 WWW.ICONENGIN.COM

CALL UTILITY NOTIFICATION CENTER OF COLORADO  
 1-800-922-1987  
 CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES

**Denver Parks + Recreation**  
 SHEET TITLE:  
**Water Tap Cover Sheet**  
 PROJECT:  
**Harvard Gulch State Home Park Irrigation Renovation**

SCALE:	N.A.
DESIGNED BY:	KDB
DRAWN BY:	KDB
CHECKED BY:	KDB
DATE:	11-09-12
REVISIONS:	
IRRIGATION DESIGN BY:	Applied Design Services 9721 Bayou Ridge Trail Parker, Colorado 80134 (303) 841-7077 Fax - 841-8191
SHEET NUMBER:	WP-1

# DENVER WATER NOTES:

## GENERAL CONSTRUCTION AND WATER NOTES:

### MAIN EXTENSION NOTES:

- ALL MATERIALS AND WORKMANSHIP SHALL BE IN CONFORMANCE WITH DENVER WATER'S ENGINEERING STANDARDS, MATERIALS SPECIFICATIONS, AND DRAWINGS. ALL MAIN INSTALLATION/SYSTEM MODIFICATIONS WILL BE APPROVED AND INSPECTED BY DENVER WATER.
- CONTRACTORS SHALL MAINTAIN A COPY OF THE CURRENT ENGINEERING STANDARDS ON-SITE AT ALL TIMES DURING CONSTRUCTION. SEE THE CHART BELOW FOR A QUICK REFERENCE TO THE FREQUENTLY USED MATERIAL SPECIFICATIONS.

### MATERIAL SPECIFICATION QUICK REFERENCES:

MATERIAL SPECIFICATION	DESCRIPTION
MS 01	DI PIPE
MS 02	PVC PIPE
MS 03	FITTINGS
MS 4, MS 5	VALVES
MS 8	TAPPING VALVES
MS 9	TAPPING SLEEVES
MS 12	VALVE BOXES/RECYCLED WATER SYSTEM VALVE BOXES SHALL BE FITTED WITH TRIANGULAR COVERS CAST WITH WORDS "DENVER WATER RECYCLES" AND SHALL BE COATED WITH A FUSION BONDED EPOXY COATING, PANTONE 2577U (IN COLOR.)
MS 13	DRY BARREL FIRE HYDRANTS
MS 23	BRASS AND BRONZE GOODS
MS 29	RESTRAINT DEVICE

- TRACER WIRE, 12 GAUGE, SHALL BE INSTALLED ON ALL NON-METALLIC WATER MAINS.
- FOR ALL PIPE INSTALLATIONS, THE DEPTH OF COVER OVER THE PIPE, MEASURED FROM OFFICIAL STREET GRADE TO THE TOP OF THE PIPE, SHALL BE A MINIMUM OF 4-1/2 FEET AND SHALL BE KNOWN AS THE COVER OVER THE PIPE. IF DIFFICULTIES ARISE WHEN CROSSING INTERFERENCE, AND WHERE SPECIFICALLY APPROVED BY DENVER WATER, DEVIATIONS FROM 4-1/2 FEET OF COVER WILL BE PERMITTED. THE COVER OVER THE PIPE SHALL BE A MINIMUM OF 4-1/2 FEET AND A MAXIMUM OF 10 FEET. REFER TO STANDARD DRAWING SHEET 16.
- ANY CHANGES IN ALIGNMENT AND GRADE SHALL BE AUTHORIZED BY DENVER WATER AND SHALL BE ACCOMPLISHED BY THE INSTALLATION OF ADDITIONAL FITTINGS. THE DEFLECTION OF JOINTS IS PERMITTED ONLY WHEN INSTALLING PIPE ON HORIZONTAL OR VERTICAL CURVES.
- THE CONTRACTOR SHALL ADJUST ALL VALVE BOXES AND FIRE HYDRANTS TO THE FINAL FINISHED GRADE.
- ALL BENDS, TEES, FIRE HYDRANTS, BLOW-OFFS, AND PLUGS AT DEAD-END MAINS SHALL BE PROTECTED FROM THRUST WITH MECHANICAL RESTRAINT AND CONCRETE THRUST BLOCKS IN ACCORDANCE WITH DENVER WATER'S ENGINEERING STANDARD DRAWINGS SHEET 28 AND 32.
- ALL VALVES ARE TO BE LOCATED ON PROPERTY LINE EXTENSIONS, EXCEPT FOR TAPPING FEES WHERE AN ADDITIONAL VALVE SHALL BE PLACED ON THE TAPPING TEE. OTHER VALVE LOCATIONS MAY BE REQUIRED AS SHOWN ON THE PLANS.
- WHEN IT IS NECESSARY TO LOWER OR RAISE WATER LINES AT STORM DRAINS AND OTHER UTILITY CROSSINGS, A MINIMUM CLEARANCE OF 1.5 FEET SHALL BE MAINTAINED BETWEEN THE OUTSIDE OF THE PIPES.
- THE CONTRACTOR SHALL HAVE ONE SIGNED COPY OF THE APPROVED WATER PLANS IN HIS/HER POSSESSION AT ALL TIMES.
- ONLY ONE POINT OF CONNECTION WILL BE ALLOWED UNTIL THE TESTING OF THE NEW INSTALLATIONS IS COMPLETE.
- NEWLY INSTALLED WATER MAINS AND FIRELINES SHALL BE HYDROSTATICALLY TESTED IN ACCORDANCE WITH DENVER WATER ENGINEERING STANDARDS, SECTION 8.25.
- PRIOR TO THE INSTALLATION OF WATER MAINS, ROAD CONSTRUCTION MUST HAVE PROGRESSED TO AT LEAST THE SUB-GRADE STATE. SUB-GRADE IS DEFINED AS AN ELEVATION OF NO MORE THAN 7 INCHES BELOW THE FINISHED STREET GRADE.
- THE CONTRACTOR IS RESPONSIBLE FOR:
  - NOTIFYING CUSTOMERS WHO MAY BE AFFECTED BY A WATER OUTAGE DURING CONSTRUCTION.
  - OBTAINING, AT THE CONTRACTOR'S EXPENSE, APPLICABLE LICENSES, PERMITS, BONDS, ETC. THAT ARE REQUIRED FOR THE MAIN INSTALLATION/SYSTEM MODIFICATION.
  - CONTACT DENVER WATER'S CONSTRUCTION ENGINEERING PERSONNEL FOR THE PRE-CONSTRUCTION MEETING AND INSPECTION, 303-628-6038, AT LEAST 48 HOURS PRIOR TO BEGINNING CONSTRUCTION. IN THE EVENT OF AN EMERGENCY IN DENVER OR IN A TOTAL SERVICE AREA AFTER WORKING HOURS, CALL DENVER WATER'S WESTSIDE DISPATCHER: 303-628-6390. IN A MASTER METER DISTRICT, PLEASE CONTACT THE REPRESENTATIVE OF THE DISTRICT IN WHICH THE PROJECT IS TAKING PLACE.
  - PAYING ALL ADDITIONAL CHARGES FOR INSPECTION OUTSIDE NORMAL WORK HOURS.

NOTE: BE ADVISED THAT ON OCCASION VALVES IN OUR SYSTEM MAY BE INOPERABLE. ON SUCH OCCASIONS, IT MAY BECOME NECESSARY TO BACK UP AN ADDITIONAL BLOCK FOR THE SHUT OUT. IF THAT OCCURS, MAKE ADDITIONAL NOTIFICATIONS TO CUSTOMERS WITH THE MANDATORY 24 HOURS ADVANCE NOTICE. WHEN VALVE MAINTENANCE IS REQUIRED, A DELAY OF SEVERAL DAYS SHOULD BE EXPECTED.

### TAP AND METER NOTES (FOR DENVER, TOTAL SERVICE, AND READ AND BILL AREAS ONLY. IN MASTER METER DISTRICTS, PLEASE REFER TO THE SPECIFICATION FOR THAT DISTRICT).

- BEFORE ANY TAPS ARE MADE FROM MAINS, APPLICATION(S) FOR THE TAPS MUST BE RECEIVED AND APPROVED BY THE DISTRIBUTOR AND BY DENVER WATER.
- DENVER WATER WILL MAKE ALL TAPS THAT ARE 2 INCHES AND SMALLER.
- INDIVIDUAL SERVICE LINE PRVS ARE REQUIRED WHEN AREA PRESSURE EXCEEDS 80 PSI.
- SERVICES AND METERS:
  - THE CONTRACTOR SHALL HOLD AN ON-SITE PRE-CONSTRUCTION CONFERENCE WITH THE METER INSPECTOR FOR ALL TAPS, SERVICE LINES, AND METERS LARGER THAN ONE INCH, AND FOR PROJECTS INVOLVING MORE THAN ONE TAP AND SERVICE. TO SCHEDULE A PRE-CONSTRUCTION CONFERENCE CALL 303-628-6145.
  - A COPY OF THESE PLANS WITH DENVER WATER'S APPROVAL STICKER MUST BE PRESENT ON-SITE AT THE TIME THE TAP IS MADE AND AT THE TIME THE METER IS INSPECTED OR INSTALLED.
  - PRIOR TO THE TAP BEING MADE, THE CURB VALVE, METER JOKE, AND METER PIT/VAULT SHALL BE IN PLACE. THE CONTRACTOR WILL HAVE 3 ADDITIONAL WORKING DAYS TO COMPLETE THE INSTALLATION OF SERVICE LINE. DENVER WATER METER INSPECTIONS WILL MOBILIZE TO THE PREMISE 3 WORKING DAYS AFTER THE TAP IS MADE TO CONDUCT THE METER INSPECTION.
  - A SOIL AMENDMENT INSPECTION WILL BE REQUIRED PRIOR TO THE COMPLETION OF THE CERTIFICATE OF OCCUPANCY. CONTACT CONSERVATION AT 303-628-6670 FOR INFORMATION AND TO SCHEDULE A SOIL AMENDMENT INSPECTION.
  - METERS CANNOT BE SET OR INSPECTED, OR SERVICES ACTIVATION, UNTIL THE REQUIREMENTS FOR BACKFLOW PREVENTION HAVE BEEN COMPLETED. CONTACT THE BACKFLOW PREVENTION PROGRAM PERSONNEL AT 303-628-5940 FOR FURTHER INFORMATION.
  - ALLOW AT LEAST 3 WORKING DAYS ADVANCE NOTICE WHEN SCHEDULING TAPS. TO SCHEDULE A TAP CALL 303-628-6701; FOR QUESTIONS RELATED TO A METER INSPECTION CALL 303-628-6145. SERVICE ACTIVATION WILL TAKE PLACE WHEN THE SERVICE AND METER SETTING PASS INSPECTION.
  - ALL METER AND AUTOMATIC METER READING DEVICE LOCATIONS SHALL BE APPROVED BY A DENVER WATER METER INSPECTOR, EXCEPT IN MASTER METER DISTRIBUTOR DISTRICTS.
  - METER PITS AND VAULTS MUST BE SET FLUSH WITH THE FINAL GRADE OF THE LANDSCAPE, INCLUDING PROPER DEPTH OF SOIL AMENDMENT. IF FINAL GRADING HAS NOT BEEN COMPLETED AT THE TIME OF METER INSPECTION, THE OWNER WILL BE REQUIRED TO RAISE OR LOWER THE METER PIT/VAULT WHEN FINAL GRADE IS ESTABLISHED. ADJUSTMENT OF THE PIT MAY REQUIRE ADJUSTMENT OF THE METER SETTING WITHIN THE PIT.
  - METER SETTING, VALVES, AND SERVICE LINES FROM THE MAIN TO THE BACKFLOW PREVENTER ASSEMBLY, IF PRESENT, OR TO 5 FEET AFTER THE METER VAULT, MUST MEET ALL APPLICABLE ENGINEERING STANDARDS IN EFFECT AT THE TIME OF ACTIVATION. IF NECESSARY TO COMPLY WITH CURRENT STANDARDS, MODIFICATIONS MAY BE REQUIRED FROM THE DETAILS ON THESE PLANS.
  - NO PRESENT OR FUTURE FENCES OR WALLS ARE PERMITTED BETWEEN THE RIGHT OF WAY (ROW) OR EASEMENT AND THE METER SETTING. THERE SHALL BE NO PERMANENT OBSTRUCTIONS WITHIN 5 FEET OF THE OUTSIDE WALL OF THE METER PIT OR VAULT.
  - TAP RELOCATION (FROM WHAT IS SHOWN ON THESE PLANS) MAY BE NECESSARY TO AVOID PAVED AREAS OR OTHER OBSTRUCTIONS THAT ARE NOT SHOWN ON THE PLANS. DEVIATIONS FROM THESE PLANS AND STANDARDS MUST BE APPROVED PRIOR TO CONSTRUCTION.
  - INSIDE THE CITY OF DENVER AND IN TOTAL SERVICE AND READ & BILL DISTRIBUTOR DISTRICTS, METERS MUST BE FURNISHED WITH AUTOMATIC METER READING (AMR) DEVICES AS SPECIFIED BY DENVER WATER. THE AMR DEVICES WILL BE INSTALLED BY DENVER WATER AT THE TIME OF SERVICE ACTIVATION.

- METER PITS AND VAULTS SHALL HAVE APPROPRIATE LIDS BASED ON THE LOCATION AND THE APPLICATION. CONTACT METER INSPECTION AT 303-628-6145 TO DETERMINE THE CORRECT LID CONFIGURATION.
- THE CONTRACTOR SHALL PROVIDE A REMOTE AMR DEVICE MOUNTING BOX WHEN REQUIRED. INSTALL A DOUBLE-GANG 4X4 ELECTRICAL JUNCTION BOX; MOUNT AS DIRECTED 7 FEET ABOVE GRADE. INSTALL BELDEN #9451 CABLE IN 3/4 INCH OR LARGER CONDUIT FROM THE METER TO THE MOUNTING BOX. TWO BOXES AND TWO CABLES ARE REQUIRED FOR COMPOUND METERS.
- INSIDE THE CITY OF DENVER, ALL MULTI-FAMILY DWELLINGS WITH A SINGLE TAP, SERVICE LINE, AND METER ARE REQUIRED TO SUB-METER EACH INDIVIDUAL UNIT (SEC 401.3.2 OF DENVER MODIFICATIONS TO THE INTERNATIONAL PLUMBING CODE, ORDINANCE NUMBER 576, SERIES OF 2004). CALL THE CITY AND COUNTY OF DENVER PLUMBING INSPECTOR FOR INFORMATION AT 720-865-2625.
- INSIDE THE CITY OF DENVER, ALL SERVICE LINES MUST BE INSTALLED TO AVOID EXISTING OR PROPOSED STREET TREES. CONTACT THE CITY AND COUNTY OF DENVER'S FORESTER AT 720-913-0647 FOR INFORMATION.
- EXISTING SERVICES MUST BE METERED AT ALL TIMES UNTIL THE TAP HAS BEEN CUT AT THE MAIN AND WITNESSED BY DENVER WATER.

### CROSS-CONNECTION CONTROL REQUIREMENTS:

THE LICENSEES LISTED BELOW SHALL BE IN CONFORMANCE WITH DENVER WATER'S ENGINEERING STANDARDS, CHAPTER 5.04, CROSS-CONNECTION CONTROL AND BACKFLOW PREVENTION. BACKFLOW PREVENTION ASSEMBLIES ARE REQUIRED TO BE INSTALLED ON THE FOLLOWING WATER SERVICE LINES:

- COMMERCIAL PROPERTIES:** REAL ESTATE ZONED FOR BUSINESSES AND/OR INDUSTRIAL USE THAT CONSIST OF SIX OR MORE UNITS WITH A DOMESTIC, FIRELINE, OR DEDICATED WATER IRRIGATION SERVICE TAP (DEFINED AS SUCH FOR CROSS-CONNECTION PURPOSES).
    - DOMESTIC, DEDICATED IRRIGATION, FIRELINE AND/OR RECYCLED WATER SERVICE LINES.
  - MULTI-FAMILY RESIDENTIAL:** A DWELLING WITH TWO TO FIVE UNITS WITH A DOMESTIC, FIRELINE, AND/OR DEDICATED WATER SERVICE TAP (DEFINED AS SUCH FOR CROSS-CONNECTION PURPOSES).
    - PREMISES OVER THREE STORIES/GREATER THAN 30 FEET, FIRE PROTECTION SYSTEM, COMMON -BOILER, AUXILIARY WATER, SWIMMING POOL AND IRRIGATION SYSTEMS.
  - SINGLE FAMILY RESIDENTS:** A SINGLE UNIT DWELLING (DEFINED AS SUCH FOR CROSS-CONNECTION PURPOSES)
    - DUAL WATER SUPPLY AGREEMENT.
- A. ALL BACKFLOW PREVENTION ASSEMBLIES SHALL BE A MODEL MANUFACTURED IN COMPLIANCE WITH AWWA C510 AND C511 AND SHALL HAVE MET THE SPECIFICATIONS BY THE UNIVERSITY OF CALIFORNIA FOUNDATION FOR CROSS-CONNECTION CONTROL AND HYDRAULIC RESEARCH:

FOUNDATION FOR CROSS-CONNECTION CONTROL AND HYDRAULIC RESEARCH  
SCHOOL OF ENGINEERING MC-2531  
UNIVERSITY OF SOUTHERN CALIFORNIA  
P.O. BOX 77902  
LOS ANGELES, CA 90007  
FOUNDATION OFFICE: (866) 545-6340  
[HTTP://WWW.USC.EDU/DEPT/FCCCHR/](http://www.usc.edu/dept/fccchr/)

- THE LICENSEE IS REQUIRED TO HAVE A CERTIFIED AMERICAN BACKFLOW PREVENTION ASSOCIATION (ABPA) OR AMERICAN SOCIETY OF SANITARY ENGINEERING (ASSE) TESTER INSPECT AND TEST THE EXISTING AND/OR NEWLY INSTALLED CONTAINMENT BACKFLOW PREVENTION ASSEMBLIES ON THE DEDICATED WATER SERVICE LINES (DOMESTIC, DEDICATED IRRIGATION, FIRELINE, AND RECYCLED) UPON INSTALLATION AND ANNUALLY THEREAFTER.
- THE ABPA OR ASSE CERTIFIED BACKFLOW TESTER IS RESPONSIBLE TO MEET THE REQUIREMENTS LISTED IN THE ENGINEERING STANDARDS, CHAPTER 5.05.
  - IF THE ABPA OR ASSE CERTIFIED BACKFLOW TESTER IS TESTING A BACKFLOW PREVENTION ASSEMBLY INSTALLED ON A RECYCLED WATER SERVICE LINE, THE TESTER IS REQUIRED TO HAVE A DEDICATED RECYCLED WATER TEST GAUGE.
- WITHIN 48 HOURS OF DENVER WATER SETTING THE METER AND TURNING ON THE WATER SERVICE, THE ABPA OR ASSE CERTIFIED BACKFLOW TESTER IS REQUIRED TO SUBMIT THE CONTAINMENT BACKFLOW ASSEMBLY TEST REPORT(S) TO THE CROSS-CONNECTION CONTROL OFFICE:
  - PHONE: 303-628-5969
  - FAX: 303-794-8325
  - E-MAIL: [CROSSCONNECTIONCONTROL@DENVERWATER.ORG](mailto:CROSSCONNECTIONCONTROL@DENVERWATER.ORG)
  - MAILING ADDRESS: DENVER WATER  
ATTN: CROSS-CONNECTION CONTROL  
6100 W. QUINCY AVENUE  
DENVER, CO 80235
- THERE SHALL BE NO UNPROTECTED TAKEOFFS FROM THE SERVICE LINE AHEAD OF ANY METER OR AHEAD OF A BACKFLOW PREVENTION ASSEMBLY LOCATED AT THE POINT OF DELIVERY TO THE CUSTOMER'S WATER SYSTEM.
- NO BRANCH LINES OR TAPS ARE ALLOWED ON DEDICATED COMMERCIAL IRRIGATION WATER SERVICE LINES OR RECYCLED WATER SERVICE LINES FOR DOMESTIC (POTABLE) USE (E.G., DRINKING FOUNTAINS, WATER PLAY FEATURES, SWIMMING POOL, RESTROOM FACILITIES, ETC.):
  - BETWEEN THE IRRIGATION TAP AND THE METER.
  - BETWEEN THE METER AND THE BACKFLOW PREVENTION ASSEMBLY.
  - DOWNSTREAM FROM THE BACKFLOW PREVENTION ASSEMBLY.

- COMMERCIAL IRRIGATION WATER SERVICE LINE TAPS:**
  - COMPLY WITH THE CROSS-CONNECTION CONTROL REQUIREMENTS LISTED ABOVE (A-F).
  - REQUIRE AN APPROVED USC FCCCHR REDUCED PRESSURE PRINCIPLE (RP) BACKFLOW PREVENTION ASSEMBLY TO BE INSTALLED 5 FEET DOWNSTREAM FROM THE METER PIT AS AN ABOVE GROUND INSTALLATION BEFORE ANY CONNECTIONS. REFER TO THE MANUFACTURER'S INSTRUCTIONS FOR HEIGHT AND ORIENTATION REQUIREMENTS.
  - IF THE BACKFLOW PREVENTION ASSEMBLY CANNOT BE INSTALLED 5 FEET DOWNSTREAM FROM THE METER PIT, INCLUDE A VARIANCE LETTER JUSTIFYING THE NEED FOR RELOCATION.

- RECYCLED WATER SERVICE LINES TAPS:**
  - BACKFLOW PREVENTION ASSEMBLIES ARE REQUIRED TO BE INSTALLED ON COMMERCIAL RECYCLED WATER SERVICE LINE TAPS:
    - IF CHEMICAL INJECTION IS USED DOWNSTREAM FROM THE METER.
    - IF PUMPS ARE USED DOWNSTREAM FROM THE METER.
    - IF THE EXISTING OR PROPOSED SYSTEM POSES A RISK TO THE INTEGRITY OF THE RECYCLED WATER SYSTEM.
  - COMPLY WITH THE CROSS-CONNECTION CONTROL REQUIREMENTS LISTED ABOVE (A-F).
  - REQUIRE AN APPROVED USC FCCCHR REDUCED PRESSURE PRINCIPLE (RP) BACKFLOW PREVENTION ASSEMBLY TO BE INSTALLED 5 FEET DOWNSTREAM FROM THE METER PIT AS AN ABOVE GROUND INSTALLATION BEFORE ANY CONNECTIONS. REFER TO THE MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR HEIGHT AND ORIENTATION REQUIREMENTS.
  - IF THE BACKFLOW PREVENTION ASSEMBLY CANNOT BE INSTALLED 5 FEET DOWNSTREAM FROM THE METER PIT, INCLUDE A VARIANCE LETTER JUSTIFYING THE NEED FOR RELOCATION.
  - BACKFLOW PREVENTION ASSEMBLIES INSTALLED ON RECYCLED WATER SERVICE LINES SHALL BE IDENTIFIED AS "RECYCLED WATER".

- RECYCLED OR RAW WATER (DITCH WATER, POND, WELL, ETC.) USED FOR IRRIGATION ON THE PREMISES:**
  - COMPLY WITH THE CROSS-CONNECTION CONTROL REQUIREMENTS LISTED ABOVE (A-F).
  - REQUIRES AN APPROVED USC FCCCHR BACKFLOW PREVENTION ASSEMBLY (CONTAINMENT) TO BE INSTALLED 5 FEET DOWNSTREAM FROM THE METER PIT ON ANY POTABLE WATER SERVICE LINE.
  - THE BACKFLOW ASSEMBLY TYPE IS DETERMINED BY THE 'DEGREE OF HAZARD' DOWNSTREAM FROM THE METER; REFER TO DENVER WATER'S ENGINEERING STANDARDS, 1.06, DEGREE OF HAZARD, OR CONTACT CROSS-CONNECTION CONTROL AT 303-628-5940.
- IT IS AT THE SOLE DISCRETION OF DENVER WATER'S CROSS-CONNECTION CONTROL SECTION TO APPROVE A VARIANCE REQUEST RELATED TO A PROPOSED BACKFLOW PREVENTION ASSEMBLY INSTALLATION.

### HEALTH NOTES/WATER QUALITY:

- THE COLORADO DEPARTMENT OF PUBLIC HEALTH & ENVIRONMENT (CDPHE) REGULATES ASBESTOS ACTIVITIES THROUGH THE AIR POLLUTION CONTROL DIVISION (APCD) AND THE SOLID WASTE AND MATERIALS MANAGEMENT DIVISION (SWMMD) WHEN SOIL CONTAMINATION IS INVOLVED. DENVER WATER WILL REQUIRE CONTRACTORS AND DEVELOPERS TO FOLLOW THE PROCEDURES BELOW WHEN CEMENT ASBESTOS PIPE IS ENCOUNTERED:
  - THE PIPE MUST BE REMOVED FROM THE EXCAVATION FOR PROPER DISPOSAL.
  - THE CONTRACTOR/DEVELOPER WILL MANAGE THE PIPE IN ACCORDANCE WITH THE FOLLOWING REGULATIONS:
    - COLORADO AIR REGULATIONS NO 8 - CONTROL OF HAZARDOUS AIR POLLUTANTS
    - OSHA 29 CFR 1910.1001 - GENERAL INDUSTRY STANDARDS - ASBESTOS
    - OSHA 29 CFR 1926.1101 - CONSTRUCTION STANDARDS - ASBESTOS
  - IF LARGE AMOUNTS OF CEMENT ASBESTOS PIPE ARE ANTICIPATED TO BE REMOVED, THE MATERIAL MUST BE MANAGED BY AN APPROPRIATE ASBESTOS ABATEMENT CONTRACTOR (160 SQUARE FEET OR 260 LINEAR FEET WILL REQUIRE A PERMIT).

NOTE: CEMENT ASBESTOS PIPE IS CONSIDERED A NON-FRIABLE ASBESTOS MATERIAL, DEFINED AS CONTAINING MORE THAN 1% ASBESTOS BY WEIGHT, AND CANNOT BE CRUMBLED, PULVERIZED, OR REDUCED TO POWDER BY HAND PRESSURE. THEREFORE, A RELEASE OF ASBESTOS FIBERS IS NOT LIKELY DURING NORMAL USE AND HANDLING OF THIS MATERIAL.
- DENVER WATER PERSONNEL ARE NOT RESPONSIBLE FOR WORK SITE SAFETY OR THE COMPLIANCE/ENFORCEMENT OF SAFETY REGULATIONS AND STANDARDS ESTABLISHED BY OTHER AGENCIES. ALL SAFETY COMPLIANCE/ENFORCEMENT AT THE WORK SITE SHALL BE THE CONTRACTOR'S SOLE RESPONSIBILITY.
- THE WATER QUALITY CONTROL DIVISION OF THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT (CDPHE) REQUIRES ALL WATER LINE CONTRACTORS TO POSSESS A CURRENT DISCHARGE PERMIT FOR DISCHARGES OF CHLORINATED AND PROCESS WATERS ASSOCIATED WITH THE INSTALLATION OF NEW MAINS OR CONDUITS. CONTACT CDPHE WATER QUALITY CONTROL DIVISION AT 303-692-3539 FOR INFORMATION ON OBTAINING THE REQUIRED PERMIT.
- CHLORINATION AND FLUSHING: ALL WATER MAINS SHALL BE INSTALLED AND CHLORINATED IN ACCORDANCE WITH DENVER WATER'S ENGINEERING STANDARDS, SECTION 8.24. THE LINES SHALL BE CHLORINATED IN ACCORDANCE WITH AWWA C-651, "DISINFECTING WATER MAINS". THE PREFERRED METHOD IS TO USE SUFFICIENT CHLORINE TABLETS TO PRODUCE A 25 MG/L SOLUTION. TABLETS SHOULD BE ATTACHED TO THE TOP OF THE PIPE WITH AN APPROVED ADHESIVE CERTIFIED TO NSF STANDARD 61. PRIOR TO PIPE INSTALLATION IN THE TRENCH, CHLORINATION OF 16 INCH AND LARGER PIPE REQUIRED CHLORINE SLURRY. THE CHLORINATION OF ANY FINISHED PIPELINE SHALL BE COMPLETED PRIOR TO HYDROSTATIC TESTING.

### IRRIGATION NOTES:

- IRRIGATION OF MEDIANS AND OTHER PUBLIC LANDSCAPED AREAS LESS THAN 25 FEET IN WIDTH MUST BE DONE IN ACCORDANCE WITH DENVER WATER OPERATING RULE 14.02.3. (CALL DW CONSERVATION SECTION AT 303-628-6343 FOR INFORMATION REGARDING IRRIGATION SYSTEMS.)
  - FOR STRIPS OF LAND LESS THAN 6 FEET IN WIDTH - SPRAY IRRIGATION SHALL BE PROHIBITED. LOW-FLOW IRRIGATION SYSTEMS ARE REQUIRED.
  - FOR STRIPS OF LAND BETWEEN 6 FEET AND 15 FEET IN WIDTH - ONLY LOW FLOW IRRIGATION, OR SPRAY IRRIGATION USING LOW-ANGLE SPRAY NOZZLES DESIGNED FOR THE SPECIFIC WIDTH TO BE IRRIGATED SHALL BE PERMITTED. ALL SPRAY HEADS MUST BE PRESSURE REDUCING AND DESIGNED TO PREVENT LOW HEAD DRAINAGE.
  - FOR STRIPS OF LAND MORE THAN 15 FEET IN WIDTH - ONLY GEAR-DRIVEN ROTORS WITH LOW ANGLE NOZZLES MAY BE USED TO IRRIGATE TURF AREAS. PLANTING BEDS MAY BE IRRIGATED WITH LOW-FLOW OR SPRAY IRRIGATION. ALL SPRAY HEADS MUST BE PRESSURE REDUCING AND DESIGNED TO PREVENT LOW HEAD DRAINAGE.
- IRRIGATION SERVICE LINES REQUIRE AN APPROVED UNIVERSITY OF SOUTHERN CALIFORNIA (USC) REDUCED PRESSURE PRINCIPLE (RP) BACKFLOW PREVENTION ASSEMBLY (CONTAINMENT) TO BE INSTALLED 5 FEET DOWNSTREAM FROM THE METER PIT AS AN ABOVE GROUND INSTALLATION BEFORE ANY CONNECTIONS. REFER TO THE MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR HEIGHT AND ORIENTATION REQUIREMENTS.
- IF RECYCLED OR RAW WATER (DITCH WATER, POND, WELL, ETC.) IS USED FOR IRRIGATION ON THE PREMISES, AN APPROVED UNIVERSITY OF SOUTHERN CALIFORNIA (USC) BACKFLOW PREVENTION ASSEMBLY (CONTAINMENT) SHALL BE INSTALLED 5 FEET DOWNSTREAM FROM THE METER PIT ON ANY POTABLE WATER SERVICE LINE. THE BACKFLOW ASSEMBLY TYPE IS DETERMINED BY THE DEGREE OF HAZARD DOWNSTREAM FROM THE METER (RP-HIGH HAZARD INSTALLED ABOVE GROUND OR DC-LOW HAZARD INSTALLED BELOW GROUND - 60 INCH DIAMETER MANHOLE). FOR ADDITIONAL INFORMATION, PLEASE REFERENCE DENVER WATER'S ENGINEERING STANDARDS, 6.11, OR CONTACT CROSS-CONNECTION CONTROL AT 202-620-5940.
- A SOIL AMENDMENT WILL BE REQUIRED ON EVERY PROPERTY REQUIRING NEW WATER SERVICE.

DISCLAIMER: DENVER WATER STANDARD OPERATING PROCEDURES REPRESENT RECOMMENDED PRACTICES THAT SHOULD BE APPLICABLE TO MOST SITUATIONS ENCOUNTERED. THESE PROCEDURES SHOULD BE FOLLOWED TO THE EXTENT APPLICABLE; HOWEVER, THEY BY NO MEANS REPRESENT THE ONLY METHOD TO PERFORM THE TASKS THEY DESCRIBE. IT IS UNDERSTOOD THAT FIELD CONDITIONS, EMERGENCIES, AND OTHER CIRCUMSTANCES MAY REQUIRE DEVIATION FROM STANDARD OPERATING PROCEDURES.

### To be completed by Denver Water

Denver Water's review of these plans relates only to Denver Water requirements, and does not include a full analysis of soil conditions, support or load factors, or any other matters. Any modification of these plans must be resubmitted to Denver Water for review prior to construction. The Professional Engineer, Contractors, and Owners designing and constructing this proposed water distribution system shall be solely responsible for the adequacy of the design, installation, and materials utilized if this water distribution system for any specific site location.

Date	I.D. No.
Contract No.	Map No.
<input type="checkbox"/> Approved for Construction Approval Valid for 1 year	
Sales Administrator	

### WATER PLAN BY:

**ICON ENGINEERING, INC.**  
8100 South Platte Street, Suite 300 Englewood, CO 80152  
Phone: (303) 228-0821 / Fax: (303) 228-7409  
[www.iconeng.com](http://www.iconeng.com)

CALL UTILITY NOTIFICATION CENTER OF COLORADO  
1-800-922-1987  
CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES

**Denver Parks + Recreation**

SHEET TITLE:  
**Denver Water Notes**

PROJECT:  
**Harvard Gulch State Home Park Irrigation Renovation**

SCALE: N.A.

DESIGNED BY: KDB

DRAWN BY: KDB

CHECKED BY: KDB

DATE: 11-09-12

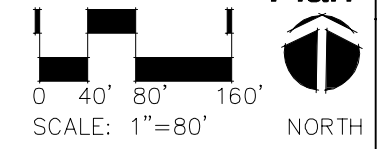
REVISIONS:

IRRIGATION DESIGN BY:  
**Applied Design Services**  
9721 Bayou Ridge Trail  
Parker, Colorado 80134  
(303) 841-7077  
Fax - 841-8191

SHEET NUMBER: **WP-1A**

# Harvard Gulch State Home Park Water Tap Detail Layout Plan

CALL UTILITY NOTIFICATION  
CENTER OF COLORADO  
1-800-922-1987  
CALL 2-BUSINESS DAYS IN ADVANCE  
BEFORE YOU DIG, GRADE, OR EXCAVATE  
FOR THE MARKING OF UNDERGROUND  
MEMBER UTILITIES



**To be completed by Denver Water**

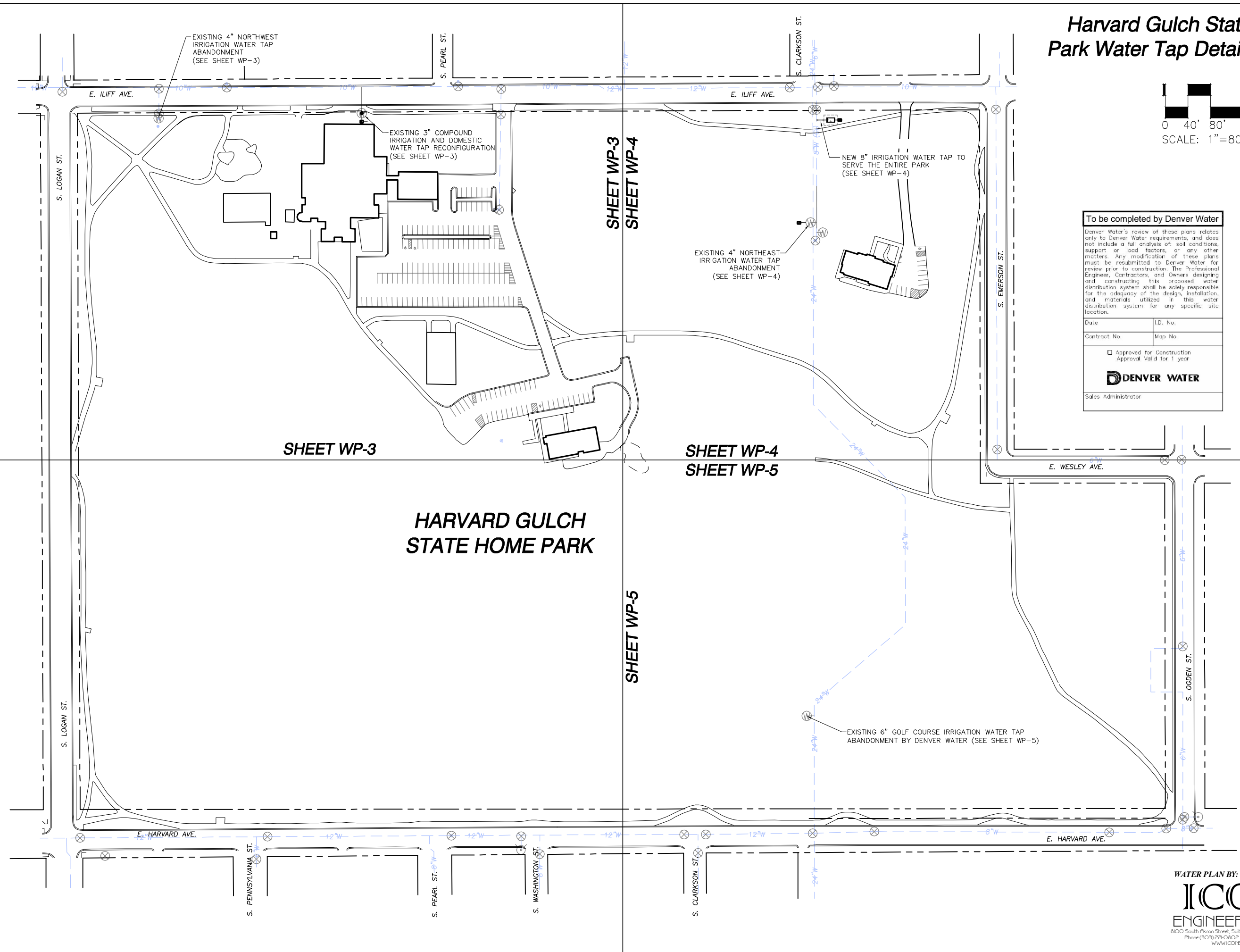
Denver Water's review of these plans relates only to Denver Water requirements, and does not include a full analysis of soil conditions, support or load factors, or any other matters. Any modification of these plans must be resubmitted to Denver Water for review prior to construction. The Professional Engineer, Contractors, and Owners designing and constructing this proposed water distribution system shall be solely responsible for the adequacy of the design, installation, and materials utilized in this water distribution system for any specific site location.

Date	I.D. No.
Contract No.	Map No.

Approved for Construction  
Approval Valid for 1 year

**DENVER WATER**

Sales Administrator



## HARVARD GULCH STATE HOME PARK

**Denver Parks + Recreation**

**SHEET TITLE:**  
Overall Water Plan

**PROJECT:**  
Harvard Gulch State Home  
Park Irrigation Renovation

**SCALE:** N.A.

**DESIGNED BY:** KDB

**DRAWN BY:** KDB

**CHECKED BY:** KDB

**DATE:** 11-09-12

**REVISIONS:**

**IRRIGATION DESIGN BY:**  
Applied Design Services  
9721 Bayou Ridge Trail  
Parker, Colorado 80134  
(303) 841-7077  
Fax - 841-8191

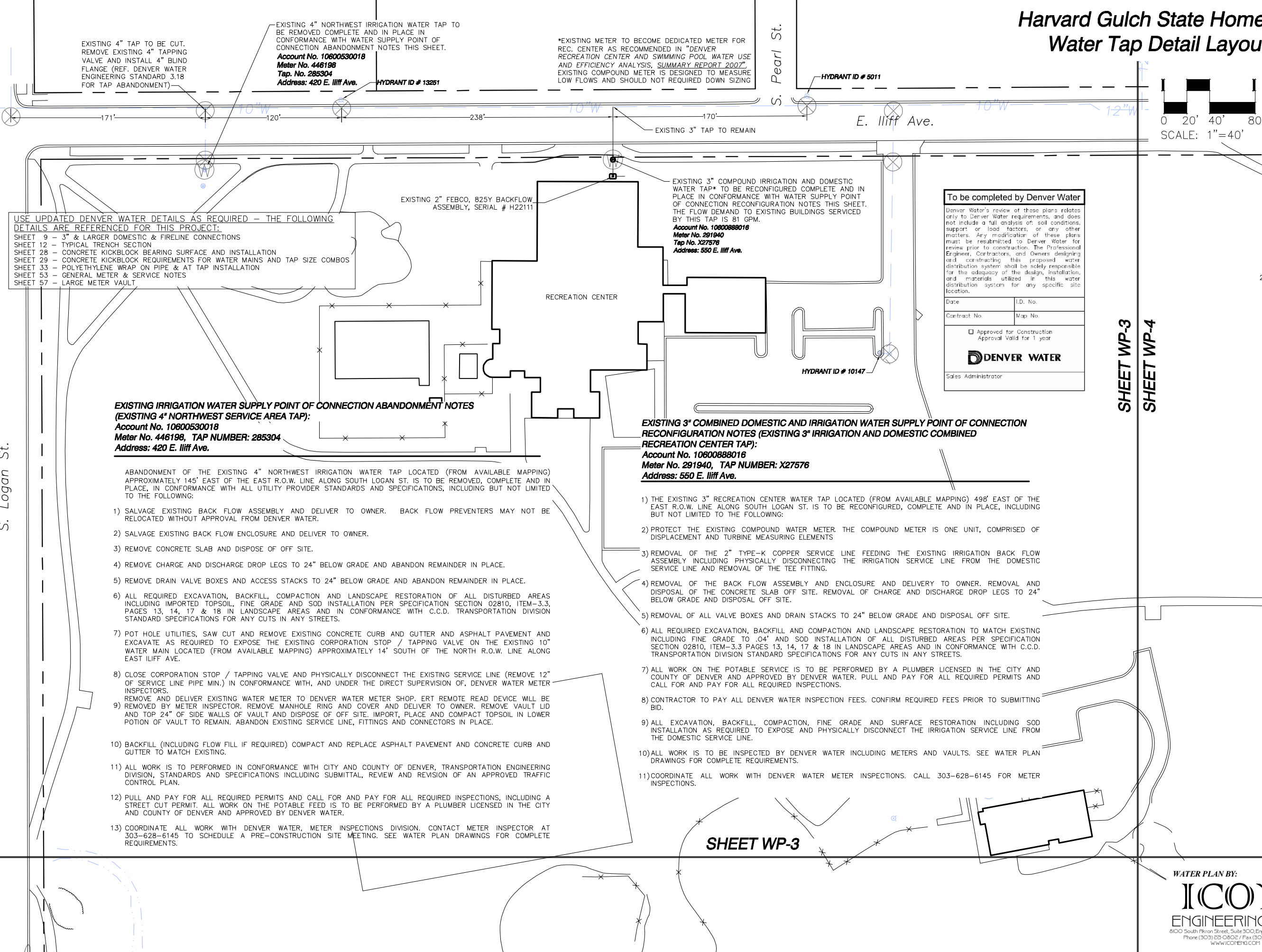
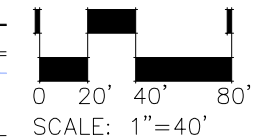
**SHEET NUMBER:** WP-2

WATER PLAN BY:  
**ICON**  
ENGINEERING, INC.  
8100 South Platte Street, Suite 300, Englewood, CO 80151  
Phone (303) 228-0802 / Fax (303) 228-1019  
WWW.ICONENR.COM

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# Harvard Gulch State Home Park Water Tap Detail Layout Plan

CALL UTILITY NOTIFICATION  
CENTER OF COLORADO  
1-800-922-1987  
CALL 2-BUSINESS DAYS IN ADVANCE  
BEFORE YOU DIG, GRADE, OR EXCAVATE  
FOR THE MARKING OF UNDERGROUND  
MEMBER UTILITIES



USE UPDATED DENVER WATER DETAILS AS REQUIRED - THE FOLLOWING DETAILS ARE REFERENCED FOR THIS PROJECT:  
SHEET 9 - 3" & LARGER DOMESTIC & FIRELINE CONNECTIONS  
SHEET 12 - TYPICAL TRENCH SECTION  
SHEET 28 - CONCRETE KICKBLOCK BEARING SURFACE AND INSTALLATION  
SHEET 29 - CONCRETE KICKBLOCK REQUIREMENTS FOR WATER MAINS AND TAP SIZE COMBOS  
SHEET 33 - POLYETHYLENE WRAP ON PIPE & AT TAP INSTALLATION  
SHEET 53 - GENERAL METER & SERVICE NOTES  
SHEET 57 - LARGE METER VAULT

**EXISTING IRRIGATION WATER SUPPLY POINT OF CONNECTION ABANDONMENT NOTES (EXISTING 4" NORTHWEST SERVICE AREA TAP):**  
Account No. 10600530018  
Meter No. 446198, TAP NUMBER: 285304  
Address: 420 E. Iliff Ave.

ABANDONMENT OF THE EXISTING 4" NORTHWEST IRRIGATION WATER TAP LOCATED (FROM AVAILABLE MAPPING) APPROXIMATELY 145' EAST OF THE EAST R.O.W. LINE ALONG SOUTH LOGAN ST. IS TO BE REMOVED, COMPLETE AND IN PLACE, IN CONFORMANCE WITH ALL UTILITY PROVIDER STANDARDS AND SPECIFICATIONS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

- 1) SALVAGE EXISTING BACK FLOW ASSEMBLY AND DELIVER TO OWNER. BACK FLOW PREVENTERS MAY NOT BE RELOCATED WITHOUT APPROVAL FROM DENVER WATER.
- 2) SALVAGE EXISTING BACK FLOW ENCLOSURE AND DELIVER TO OWNER.
- 3) REMOVE CONCRETE SLAB AND DISPOSE OF OFF SITE.
- 4) REMOVE CHARGE AND DISCHARGE DROP LEGS TO 24" BELOW GRADE AND ABANDON REMAINDER IN PLACE.
- 5) REMOVE DRAIN VALVE BOXES AND ACCESS STACKS TO 24" BELOW GRADE AND ABANDON REMAINDER IN PLACE.
- 6) ALL REQUIRED EXCAVATION, BACKFILL, COMPACTION AND LANDSCAPE RESTORATION OF ALL DISTURBED AREAS INCLUDING IMPORTED TOPSOIL, FINE GRADE AND SOD INSTALLATION PER SPECIFICATION SECTION 02810, ITEM-3.3, PAGES 13, 14, 17 & 18 IN LANDSCAPE AREAS AND IN CONFORMANCE WITH C.C.D. TRANSPORTATION DIVISION STANDARD SPECIFICATIONS FOR ANY CUTS IN ANY STREETS.
- 7) POT HOLE UTILITIES, SAW CUT AND REMOVE EXISTING CONCRETE CURB AND GUTTER AND ASPHALT PAVEMENT AND EXCAVATE AS REQUIRED TO EXPOSE THE EXISTING CORPORATION STOP / TAPPING VALVE ON THE EXISTING 10" WATER MAIN LOCATED (FROM AVAILABLE MAPPING) APPROXIMATELY 14' SOUTH OF THE NORTH R.O.W. LINE ALONG EAST ILLIFF AVE.
- 8) CLOSE CORPORATION STOP / TAPPING VALVE AND PHYSICALLY DISCONNECT THE EXISTING SERVICE LINE (REMOVE 12" OF SERVICE LINE PIPE MIN.) IN CONFORMANCE WITH, AND UNDER THE DIRECT SUPERVISION OF, DENVER WATER METER INSPECTORS. REMOVE AND DELIVER EXISTING WATER METER TO DENVER WATER METER SHOP. ERT REMOTE READ DEVICE WILL BE REMOVED BY METER INSPECTOR. REMOVE MANHOLE RING AND COVER AND DELIVER TO OWNER. REMOVE VAULT LID AND TOP 24" OF SIDE WALLS OF VAULT AND DISPOSE OF OFF SITE. IMPORT, PLACE AND COMPACT TOPSOIL IN LOWER PORTION OF VAULT TO REMAIN. ABANDON EXISTING SERVICE LINE, FITTINGS AND CONNECTORS IN PLACE.
- 9) REMOVE AND DELIVER EXISTING WATER METER TO DENVER WATER METER SHOP. ERT REMOTE READ DEVICE WILL BE REMOVED BY METER INSPECTOR. REMOVE MANHOLE RING AND COVER AND DELIVER TO OWNER. REMOVE VAULT LID AND TOP 24" OF SIDE WALLS OF VAULT AND DISPOSE OF OFF SITE. IMPORT, PLACE AND COMPACT TOPSOIL IN LOWER PORTION OF VAULT TO REMAIN. ABANDON EXISTING SERVICE LINE, FITTINGS AND CONNECTORS IN PLACE.
- 10) BACKFILL (INCLUDING FLOW FILL IF REQUIRED) COMPACT AND REPLACE ASPHALT PAVEMENT AND CONCRETE CURB AND GUTTER TO MATCH EXISTING.
- 11) ALL WORK IS TO BE PERFORMED IN CONFORMANCE WITH CITY AND COUNTY OF DENVER, TRANSPORTATION ENGINEERING DIVISION, STANDARDS AND SPECIFICATIONS INCLUDING SUBMITTAL, REVIEW AND REVISION OF AN APPROVED TRAFFIC CONTROL PLAN.
- 12) PULL AND PAY FOR ALL REQUIRED PERMITS AND CALL FOR AND PAY FOR ALL REQUIRED INSPECTIONS, INCLUDING A STREET CUT PERMIT. ALL WORK ON THE POTABLE FEED IS TO BE PERFORMED BY A PLUMBER LICENSED IN THE CITY AND COUNTY OF DENVER AND APPROVED BY DENVER WATER.
- 13) COORDINATE ALL WORK WITH DENVER WATER, METER INSPECTIONS DIVISION. CONTACT METER INSPECTOR AT 303-628-6145 TO SCHEDULE A PRE-CONSTRUCTION SITE MEETING. SEE WATER PLAN DRAWINGS FOR COMPLETE REQUIREMENTS.

EXISTING 4" NORTHWEST IRRIGATION WATER TAP TO BE REMOVED COMPLETE AND IN PLACE IN CONFORMANCE WITH WATER SUPPLY POINT OF CONNECTION ABANDONMENT NOTES THIS SHEET.  
Account No. 10600530018  
Meter No. 446198  
Tap No. 285304  
Address: 420 E. Iliff Ave.  
HYDRANT ID # 13251

\*EXISTING METER TO BECOME DEDICATED METER FOR REC. CENTER AS RECOMMENDED IN "DENVER RECREATION CENTER AND SWIMMING POOL WATER USE AND EFFICIENCY ANALYSIS, SUMMARY REPORT 2007". EXISTING COMPOUND METER IS DESIGNED TO MEASURE LOW FLOWS AND SHOULD NOT REQUIRED DOWN SIZING

EXISTING 3" COMPOUND IRRIGATION AND DOMESTIC WATER TAP\* TO BE RECONFIGURED COMPLETE AND IN PLACE IN CONFORMANCE WITH WATER SUPPLY POINT OF CONNECTION RECONFIGURATION NOTES THIS SHEET. THE FLOW DEMAND TO EXISTING BUILDINGS SERVICED BY THIS TAP IS 81 GPM.  
Account No. 10600888016  
Meter No. 291940  
Tap No. X27576  
Address: 550 E. Iliff Ave.

**EXISTING 3" COMBINED DOMESTIC AND IRRIGATION WATER SUPPLY POINT OF CONNECTION RECONFIGURATION NOTES (EXISTING 3" IRRIGATION AND DOMESTIC COMBINED RECREATION CENTER TAP):**  
Account No. 10600888016  
Meter No. 291940, TAP NUMBER: X27576  
Address: 550 E. Iliff Ave.

- 1) THE EXISTING 3" RECREATION CENTER WATER TAP LOCATED (FROM AVAILABLE MAPPING) 498' EAST OF THE EAST R.O.W. LINE ALONG SOUTH LOGAN ST. IS TO BE RECONFIGURED, COMPLETE AND IN PLACE, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
- 2) PROTECT THE EXISTING COMPOUND WATER METER. THE COMPOUND METER IS ONE UNIT, COMPRISED OF DISPLACEMENT AND TURBINE MEASURING ELEMENTS
- 3) REMOVAL OF THE 2" TYPE-K COPPER SERVICE LINE FEEDING THE EXISTING IRRIGATION BACK FLOW ASSEMBLY INCLUDING PHYSICALLY DISCONNECTING THE IRRIGATION SERVICE LINE FROM THE DOMESTIC SERVICE LINE AND REMOVAL OF THE TEE FITTING.
- 4) REMOVAL OF THE BACK FLOW ASSEMBLY AND ENCLOSURE AND DELIVERY TO OWNER. REMOVAL AND DISPOSAL OF THE CONCRETE SLAB OFF SITE. REMOVAL OF CHARGE AND DISCHARGE DROP LEGS TO 24" BELOW GRADE AND DISPOSAL OFF SITE.
- 5) REMOVAL OF ALL VALVE BOXES AND DRAIN STACKS TO 24" BELOW GRADE AND DISPOSAL OFF SITE.
- 6) ALL REQUIRED EXCAVATION, BACKFILL AND COMPACTION AND LANDSCAPE RESTORATION TO MATCH EXISTING INCLUDING FINE GRADE TO .04" AND SOD INSTALLATION OF ALL DISTURBED AREAS PER SPECIFICATION SECTION 02810, ITEM-3.3 PAGES 13, 14, 17 & 18 IN LANDSCAPE AREAS AND IN CONFORMANCE WITH C.C.D. TRANSPORTATION DIVISION STANDARD SPECIFICATIONS FOR ANY CUTS IN ANY STREETS.
- 7) ALL WORK ON THE POTABLE SERVICE IS TO BE PERFORMED BY A PLUMBER LICENSED IN THE CITY AND COUNTY OF DENVER AND APPROVED BY DENVER WATER. PULL AND PAY FOR ALL REQUIRED PERMITS AND CALL FOR AND PAY FOR ALL REQUIRED INSPECTIONS.
- 8) CONTRACTOR TO PAY ALL DENVER WATER INSPECTION FEES. CONFIRM REQUIRED FEES PRIOR TO SUBMITTING BID.
- 9) ALL EXCAVATION, BACKFILL, COMPACTION, FINE GRADE AND SURFACE RESTORATION INCLUDING SOD INSTALLATION AS REQUIRED TO EXPOSE AND PHYSICALLY DISCONNECT THE IRRIGATION SERVICE LINE FROM THE DOMESTIC SERVICE LINE.
- 10) ALL WORK IS TO BE INSPECTED BY DENVER WATER INCLUDING METERS AND VAULTS. SEE WATER PLAN DRAWINGS FOR COMPLETE REQUIREMENTS.
- 11) COORDINATE ALL WORK WITH DENVER WATER METER INSPECTIONS. CALL 303-628-6145 FOR METER INSPECTIONS.

**To be completed by Denver Water**

Denver Water's review of these plans relates only to Denver Water requirements, and does not include a full analysis of soil conditions, support or load factors, or any other matters. Any modification of these plans must be resubmitted to Denver Water for review prior to construction. The Professional Engineer, Contractors, and Owners designing and constructing this proposed water distribution system shall be solely responsible for the adequacy of the design, installation, and materials utilized in this water distribution system for any specific site location.

Date	I.D. No.
Contract No.	Map No.
<input type="checkbox"/> Approved for Construction Approval Valid for 1 year	
Sales Administrator	

**Denver Parks + Recreation**

SHEET TITLE:  
**Water Plan - Northwest Area**

PROJECT:  
**Harvard Gulch State Home Park Irrigation Renovation**

SCALE: N.A.  
DESIGNED BY: KDB  
DRAWN BY: KDB  
CHECKED BY: KDB  
DATE: 11-09-12  
REVISIONS:

IRRIGATION DESIGN BY:  
**Applied Design Services**  
9721 Bayou Ridge Trail  
Parkers, Colorado 80134  
(303) 841-7077  
Fax - 841-8191

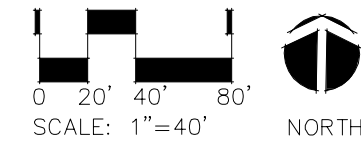
SHEET NUMBER: **WP-3**

WATER PLAN BY:  
**ICON ENGINEERING, INC.**  
8100 South Platte Street, Suite 300, Englewood, CO 80151  
Phone (303) 228-0802 / Fax (303) 228-1019  
WWW.ICONENG.COM

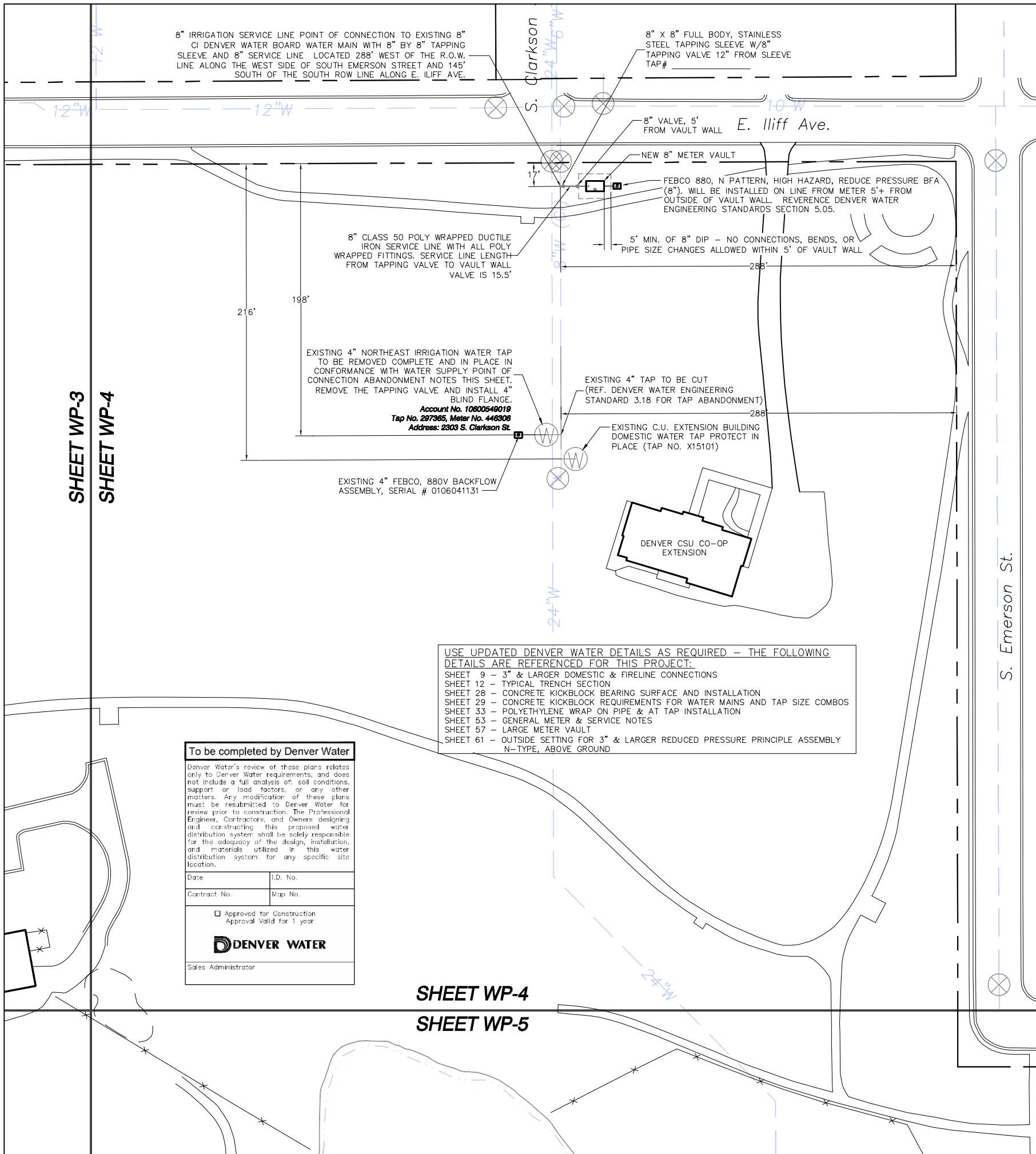


# Harvard Gulch State Home Park Water Tap Detail Layout Plan

CALL UTILITY NOTIFICATION  
CENTER OF COLORADO  
1-800-922-1987  
CALL 2-BUSINESS DAYS IN ADVANCE  
BEFORE YOU DIG, GRADE, OR EXCAVATE  
FOR THE MARKING OF UNDERGROUND  
MEMBER UTILITIES



- NEW WATER SUPPLY POINT OF CONNECTION INSTALLATION NOTES:**
- ALL WORK IS TO BE PERFORMED IN STRICT CONFORMANCE WITH ALL DENVER WATER BOARD STANDARDS AND SPECIFICATIONS LATEST EDITION.
- NEW 8" IRRIGATION WATER TAP IS TO BE COMPLETE AND IN PLACE, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
- EXCAVATION AS REQUIRED TO EXPOSE THE EXISTING 8" WATER MAIN LOCATED (FROM AVAILABLE MAPPING) APPROXIMATELY 288' WEST OF THE WEST R.O.W. LINE ALONG SOUTH EMERSON ST.
  - EXCAVATION AS REQUIRED AND INSTALLATION OF A 8" BY 8" TAPPING SLEEVE, TAPPING VALVE, 8" CLASS 51 POLY WRAPPED DUCTILE IRON SERVICE LINE WITH ALL POLY WRAPPED FITTINGS, 8" PROPERTY LINE VALVE, 8" METER, WATER METER VAULT WITH RISER, RIM, MANHOLE COVER AND REMOTE READ DEVICE, INCLUDING LANDSCAPE RESTORATION WITH IMPORTED TOPSOIL AS REQUIRED, FINE GRADE AND SOD INSTALLATION, INCLUDING ALL MISC. CONNECTORS, FITTINGS, SUPPORTS AND RESTRAINT.
  - ALL UTILITY PROVIDER COORDINATION INCLUDING ALL METER PURCHASE, METER CALIBRATION AND WET TAP LABOR COSTS AND ASSOCIATED FEES. COORDINATE NEW TAP INSTALLATION WITH DENVER WATER, WATER SALES DEPARTMENT AND WITH DENVER WATER. CONTACT DENVER WATER METER INSPECTION AT 303-628-6145 FOR ASSISTANCE.
  - ALL WORK ON THE POTABLE SERVICE IS TO BE PERFORMED BY A PLUMBER LICENSED IN THE CITY AND COUNTY OF DENVER AND APPROVED BY DENVER WATER. PULL AND PAY FOR ALL REQUIRED PERMITS AND CALL FOR AND PAY FOR ALL REQUIRED INSPECTIONS.
  - ALL SYSTEM DEVELOPMENT FEES FOR THE NEW 8" IRRIGATION WATER TAP ARE WAIVED. CONTRACTOR TO PAY ALL DENVER WATER REVIEW, WATER TAP, METER PURCHASE, METER CALIBRATION AND INSPECTION FEES. CONFIRM REQUIRED FEES PRIOR TO SUBMITTING BID.
  - ALL WORK IS TO BE INSPECTED BY DENVER WATER INCLUDING METERS AND VAULTS. SEE WATER PLAN DRAWINGS FOR COMPLETE REQUIREMENTS. CALL 303-628-6145 FOR METER INSPECTIONS.
  - ALL LANDSCAPE RESTORATION WORK PER SPECIFICATIONS SECTION 02810, ITEM-3.3, PAGES 13, 14, 17 & 18.
- EXISTING IRRIGATION WATER SUPPLY POINT OF CONNECTION ABANDONMENT NOTES  
(EXISTING 4" NORTHEAST SERVICE AREA TAP):**  
Account No. 10600549019  
Meter No. 446906, Tap No. 297385  
Address: 2303 S. Clarkson St.
- ABANDONMENT OF THE EXISTING 4" NORTHEAST IRRIGATION WATER TAP LOCATED (FROM AVAILABLE MAPPING) APPROXIMATELY 288' WEST OF THE WEST R.O.W. LINE ALONG SOUTH EMERSON ST. IS TO BE REMOVED, COMPLETE AND IN PLACE, IN CONFORMANCE WITH ALL UTILITY PROVIDER STANDARDS AND SPECIFICATIONS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
- SALVAGE EXISTING BACK FLOW ASSEMBLY AND DELIVER TO OWNER. BACK FLOW PREVENTERS MAY NOT BE RELOCATED WITHOUT APPROVAL FROM DENVER WATER.
  - SALVAGE EXISTING BACK FLOW ENCLOSURE AND DELIVER TO OWNER.
  - REMOVE CONCRETE SLAB AND DISPOSE OF OFF SITE.
  - REMOVE CHARGE AND DISCHARGE DROP LEGS TO 24" BELOW GRADE AND ABANDON REMAINDER IN PLACE.
  - REMOVE DRAIN VALVE BOXES AND ACCESS STACKS TO 24" BELOW GRADE AND ABANDON REMAINDER IN PLACE.
  - ALL REQUIRED EXCAVATION, BACKFILL, COMPACTION AND LANDSCAPE RESTORATION OF ALL DISTURBED AREAS INCLUDING IMPORTED TOPSOIL, FINE GRADE AND SOD INSTALLATION PER SPECIFICATIONS SECTION 02810, ITEM 3.3, PAGES 13, 14, 17 & 18 IN LANDSCAPE AREAS AND IN CONFORMANCE WITH C.C.D. TRANSPORTATION DIVISION STANDARD SPECIFICATIONS FOR ANY CUTS IN ANY STREETS.
  - POT HOLE UTILITIES, AND EXCAVATE AS REQUIRED TO EXPOSE THE EXISTING CORPORATION STOP / TAPPING VALVE ON THE EXISTING 8" WATER MAIN LOCATED (FROM AVAILABLE MAPPING) APPROXIMATELY 288' WEST OF THE WEST R.O.W. LINE ALONG SOUTH EMERSON ST. AND LOCATED APPROXIMATELY 221' SOUTH OF THE SOUTH R.O.W. LINE ALONG EAST ILIFF AVE.
  - CLOSE CORPORATION STOP / TAPPING VALVE AND PHYSICALLY DISCONNECT THE EXISTING SERVICE LINE (REMOVE 12" OF SERVICE LINE PIPE MIN.) IN CONFORMANCE WITH, AND UNDER THE DIRECT SUPERVISION OF, DENVER WATER METER INSPECTORS.
  - REMOVE AND DELIVER EXISTING WATER METER TO DENVER WATER METER SHOP. ERT REMOTE READ DEVICE WILL BE REMOVED BY METER INSPECTOR. REMOVE MANHOLE RING AND COVER AND DELIVER TO OWNER. REMOVE VAULT LID AND TOP 24" OF SIDE WALLS OF VAULT AND DISPOSE OF OFF SITE. IMPORT, PLACE AND COMPACT TOPSOIL IN LOWER PORTION OF VAULT TO REMAIN. ABANDON EXISTING SERVICE LINE, FITTINGS AND CONNECTORS IN PLACE.
  - BACKFILL COMPACT AND RESTORE ALL DISTURBED TURF GRASS AREAS TO MATCH EXISTING.
  - PULL AND PAY FOR ALL REQUIRED PERMITS AND CALL FOR AND PAY FOR ALL REQUIRED INSPECTIONS, INCLUDING A STREET CUT PERMIT. ALL WORK ON THE POTABLE FEED IS TO BE PERFORMED BY A PLUMBER LICENSED IN THE CITY AND COUNTY OF DENVER AND APPROVED BY DENVER WATER.
  - COORDINATE ALL WORK WITH DENVER WATER METER INSPECTIONS. CALL 303-628-6145 FOR METER INSPECTIONS.



SHEET WP-3  
SHEET WP-4

SHEET WP-4  
SHEET WP-5

**Denver Parks + Recreation**

SHEET TITLE:  
Water Plan - Northeast Area

PROJECT:  
Harvard Gulch State Home  
Park Irrigation Renovation

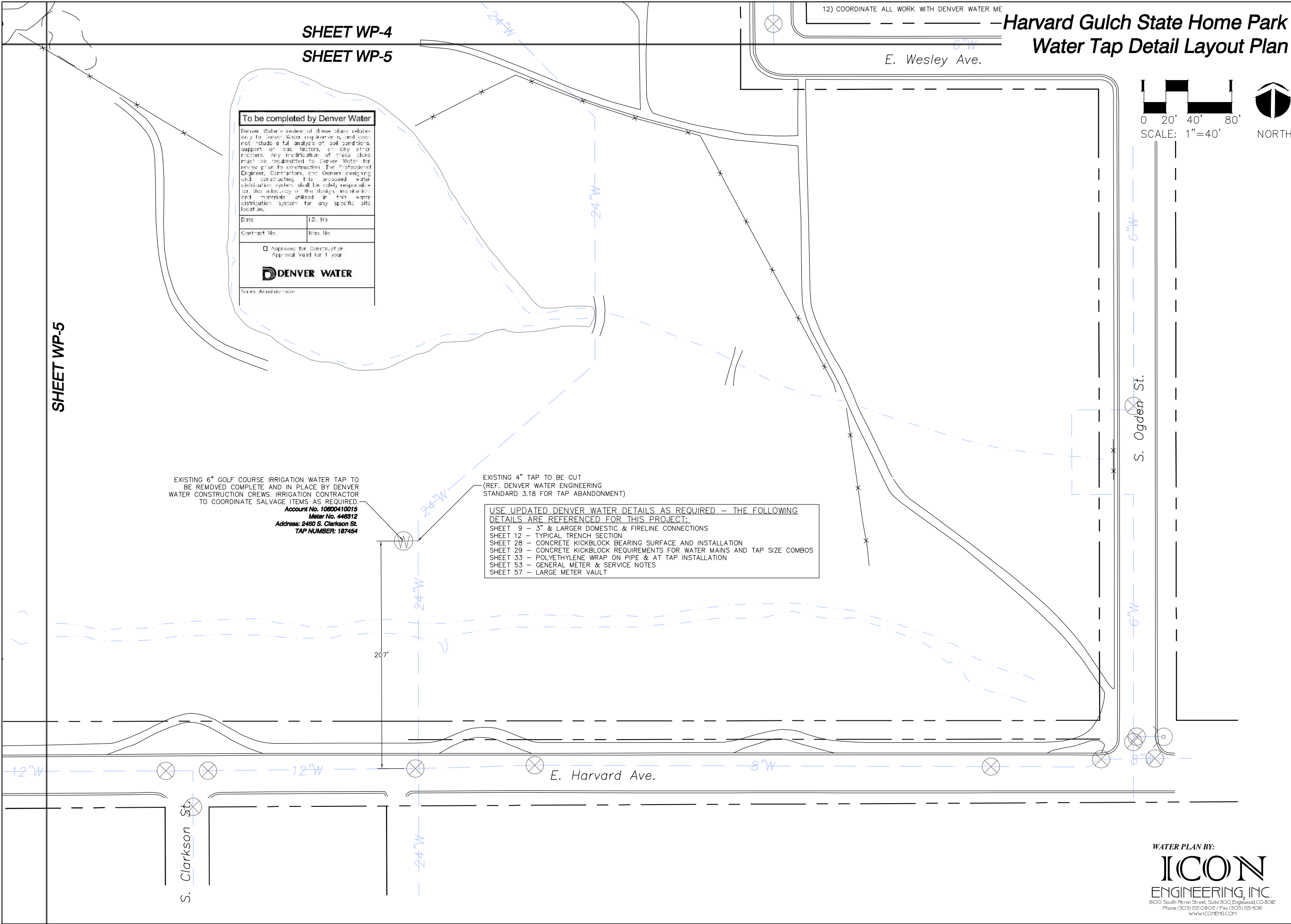
SCALE: N.A.  
DESIGNED BY: KDB  
DRAWN BY: KDB  
CHECKED BY: KDB  
DATE: 11-09-12  
REVISIONS:

IRRIGATION DESIGN BY:  
Applied Design Services  
9721 Bayou Ridge Trail  
Parker, Colorado 80134  
(303) 841-7077  
Fax - 841-8191

SHEET NUMBER: WP-4

WATER PLAN BY:  
**ICON**  
ENGINEERING, INC.  
8100 South Platte Street, Suite 300, Englewood, CO 80151  
Phone (303) 228-0802 / Fax (303) 228-1019  
WWW.ICONENGINEERING.COM

P:\P12034\GP\wp\FINAL SHEET SET\Harvard Park Water Plan WP1-WP5-REV11-9-12.dwg, 12/10/2012 10:15:08 AM, abarringer, AcroPlot.pc3, 1:2,000:4



12) COORDINATE ALL WORK WITH DENVER WATER ME

# Harvard Gulch State Home Park Water Tap Detail Layout Plan

CALL UTILITY NOTIFICATION  
CENTER OF COLORADO  
1-800-922-1987

CALL 2-BUSINESS DAYS IN ADVANCE  
BEFORE YOU DIG, GRADE, OR EXCAVATE  
FOR THE MARKING OF UNDERGROUND  
MEMBER UTILITIES

SHEET WP-4  
SHEET WP-5

**To be completed by Denver Water**

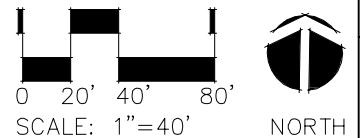
Denver Water's review of these plans relates only to Denver Water regulations, and does not include a full analysis of soil conditions, support or oak factors, or any other matters. Any modification of these plans must be resubmitted to Denver Water for review prior to construction. The Professional Engineer, Contractors, and Owners designing and constructing this proposed water distribution system shall be solely responsible for the adequacy of the design, installation, and materials utilized in this water distribution system for any specific site location.

Date	ID. No.
Contract No.	Map No.

Approved for Construction  
Approval valid for 1 year

**DENVER WATER**

State Accreditation



NORTH

EXISTING 6" GOLF COURSE IRRIGATION WATER TAP TO BE REMOVED COMPLETE AND IN PLACE BY DENVER WATER CONSTRUCTION CREWS. IRRIGATION CONTRACTOR TO COORDINATE SALVAGE ITEMS AS REQUIRED.

Account No. 10800410015  
Meter No. 446812  
Address: 2450 S. Clarkson St.  
TAP NUMBER: 187454

EXISTING 4" TAP TO BE CUT  
(REF. DENVER WATER ENGINEERING STANDARD 3.18 FOR TAP ABANDONMENT)

USE UPDATED DENVER WATER DETAILS AS REQUIRED - THE FOLLOWING DETAILS ARE REFERENCED FOR THIS PROJECT:

- SHEET 9 - 3" & LARGER DOMESTIC & FIRELINE CONNECTIONS
- SHEET 12 - TYPICAL TRENCH SECTION
- SHEET 28 - CONCRETE KICKBLOCK BEARING SURFACE AND INSTALLATION
- SHEET 29 - CONCRETE KICKBLOCK REQUIREMENTS FOR WATER MAINS AND TAP SIZE COMBOS
- SHEET 33 - POLYETHYLENE WRAP ON PIPE & AT TAP INSTALLATION
- SHEET 53 - GENERAL METER & SERVICE NOTES
- SHEET 57 - LARGE METER VAULT

## Denver Parks + Recreation

SHEET TITLE:  
**Water Plan - Southeast Area**

PROJECT:  
**Harvard Gulch State Home Park Irrigation Renovation**

SCALE: N.A.

DESIGNED BY: KDB

DRAWN BY: KDB

CHECKED BY: KDB

DATE: 11-09-12

REVISIONS:  
NO. 1, 10/12/10, ADD DENVER WATER APPROVAL BLOCK, ADDRESS DENVER WATER COMMENTS, KDB

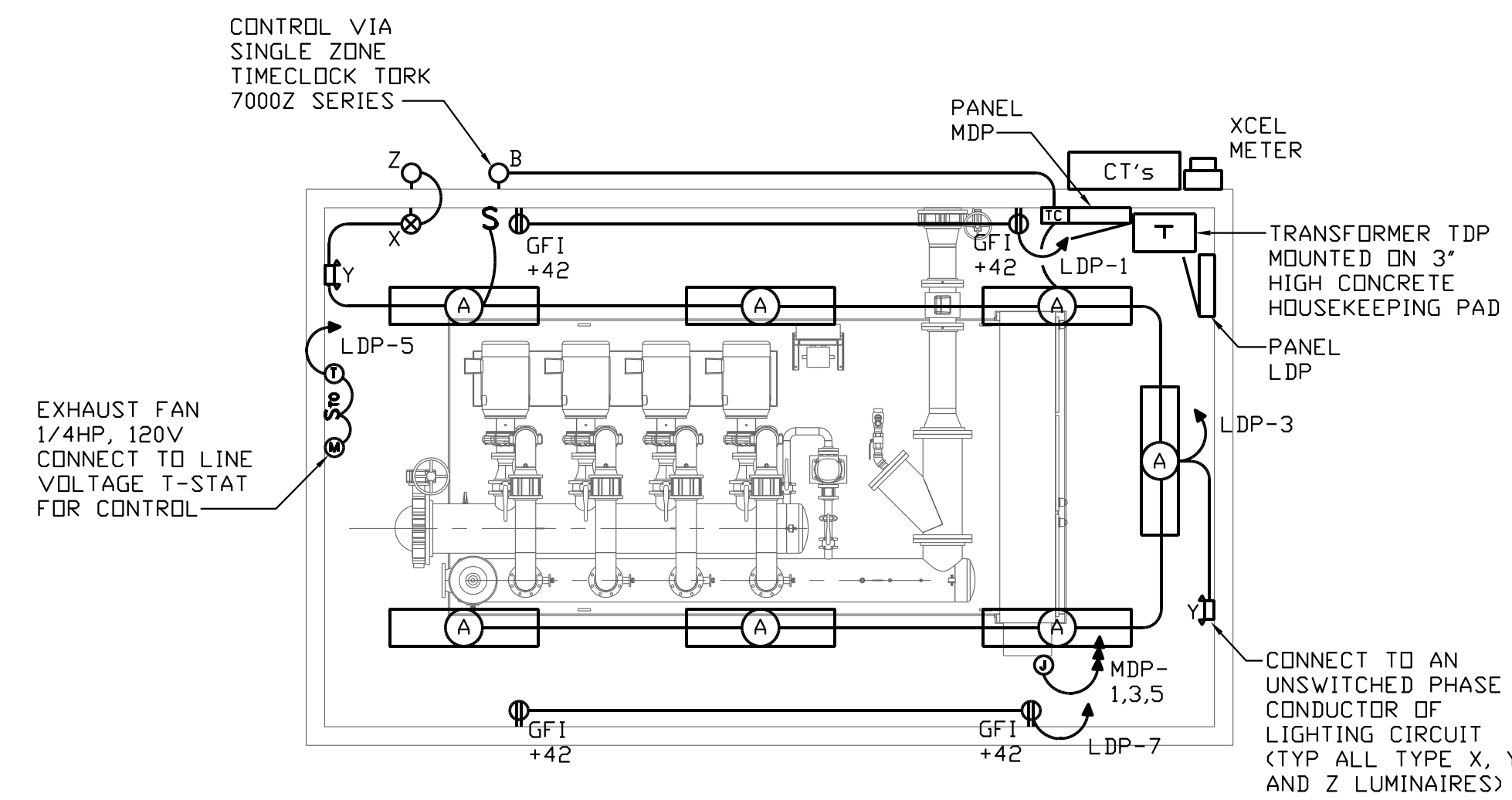
IRRIGATION DESIGN BY:  
**Applied Design Services**  
9721 Bayou Ridge Trail  
Parker, Colorado 80134  
(303) 841-7077  
Fax - 841-8191

WATER PLAN BY:  
**ICON ENGINEERING, INC.**  
8100 South Platte Street, Suite 300, Englewood, CO 80151  
Phone (303) 628-0802 / Fax (303) 628-1019  
WWW.ICONENG.COM

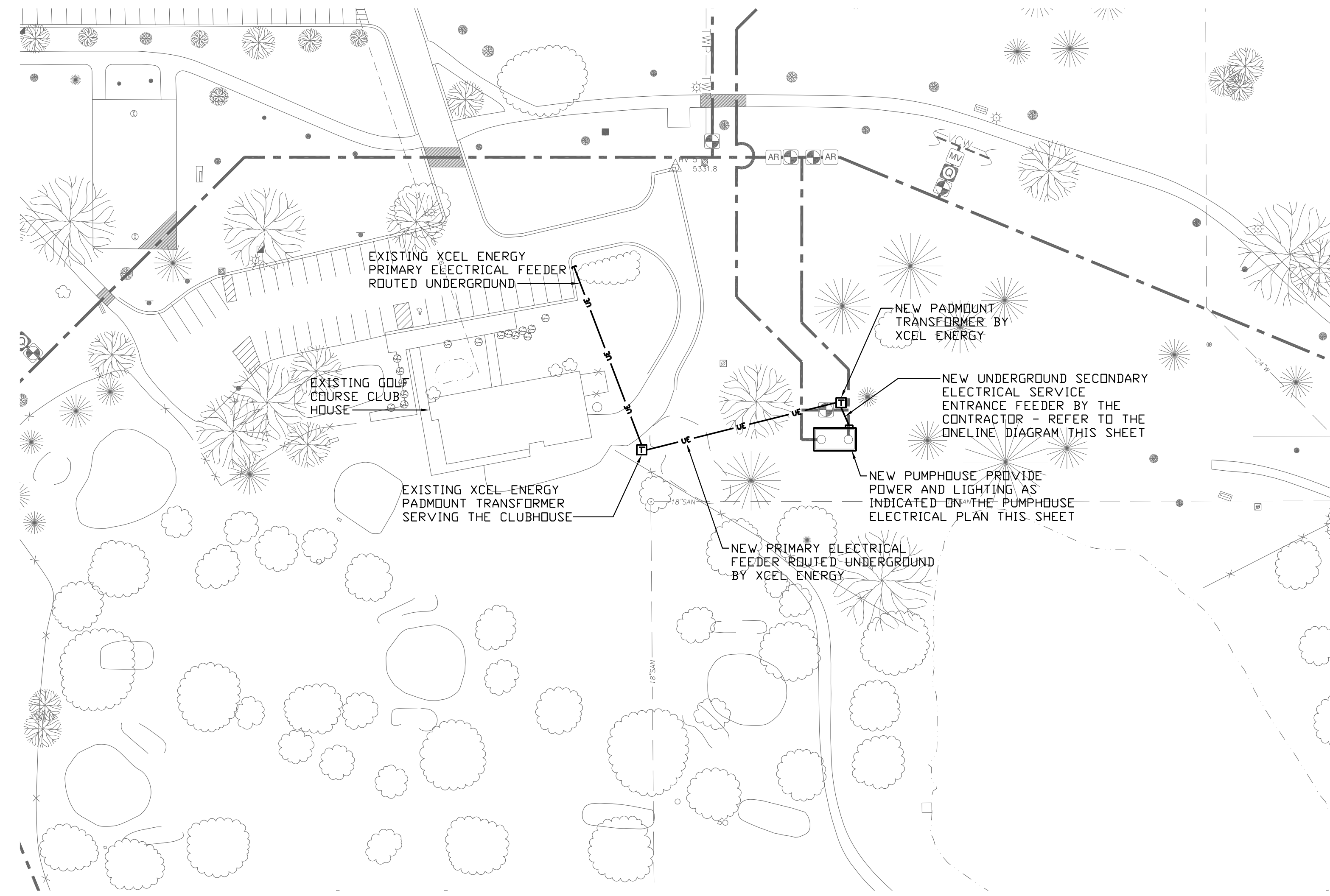
SHEET NUMBER: **WP-5**



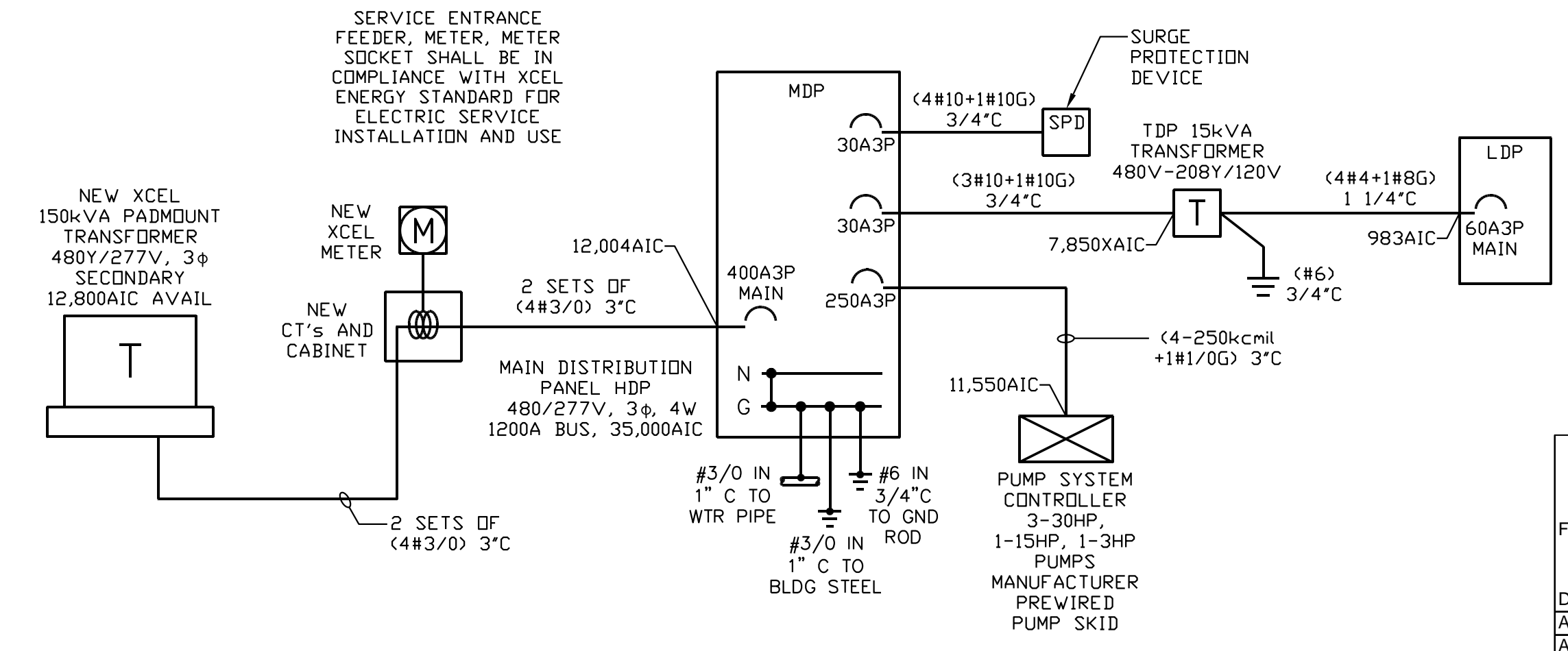
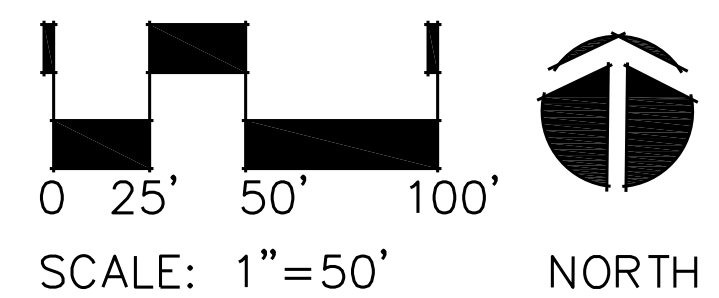
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MEMBER UTILITIES



**PUMP HOUSE ELECTRICAL PLAN**  
SCALE: 1/4"=1'-0"



**SITE ELECTRICAL PLAN**  
SCALE: 1"=50'-0"



**ELECTRICAL ONE-LINE DIAGRAM**  
NOT TO SCALE

**Harvard Gulch Pump Station - Short Circuit Summary**  
Point-to-Point \* Feeder Summary

Device Description	Phase	Length	Isc Avail	# Runs	C	V(L-L)	Isc
At Panel MDP	3	40	12800	2	13923	480	<b>12004</b>
At Pump Control Panel	3	15	12004	1	16483	480	<b>11550</b>
At 15kVA Transformer	3	12	12004	1	981	480	<b>7850</b>

Transformer	Phase	% Imp	Isc Avail	kva	Vp(L-L)	Vs(L-L)	Isc
Through 15kVA Trans	3	3.9	7850	15	480	208	<b>1009</b>

Device Description	Phase	Length	Isc Avail	# Runs	C	V(L-L)	Isc
At Panel LDP	3	12	1009	1	3806	208	<b>983</b>

**Harvard Gulch Pump Station Luminaire Schedule**

Key	Qty	Lamp(s) Specification	Description	Finish	Mount	Manufacturer	Specification Catalog Number	Volt
A	2	F032T8, 4100K 85 CRI	SURFACE/PENDANT MOUNTED ENCLOSED GASKETED FLUORESCENT INDUSTRIAL LUMINAIRE, FIBERGLASS HOUSING, 4' LONG	WHITE	SURFACE/PENDANT	COLUMBIA LITHONIA METALUX	LUN4-232-EU	UNIV
B	1	70W MH, PULSE START 4000K	WALL MOUNTED COMPACT FULL CUT-OFF WALL PACK, LESS THAN 10" WIDE, MEDIUM THROW DIST, WET LOCATION	BRONZE	WALL 9'-0" AFG	HUBBELL OR EQUAL	LCC-70PB-1	120
Y		LAMPS INCLUDED	WALL MOUNTED EMERGENCY BATTERY BACK-UP LUMINAIRE, HARSH ENVIRONMENT, SEALED AND GASKETED, CORROSION RESISTANT HARDWARE, THERMOPLASTIC HOUSING, ADJUSTABLE LAMP HEADS, 30W DAMP LOCATION, SELF DIAGNOSTIC TESTING	CHARCOAL GRAY	WALL 8'-0" AFF	DUAL-LITE LITHONIA OR EQUAL	N4X4-I	120
X		LED INCLUDED	WALL MOUNTED EXT SIGN WITH BATTERY BACK-UP, LED COLOR TO MEET LOCAL CODE, CAST ALUM HOUSING, HEAVY DUTY HOUSING, WET LOCATION, INTEGRAL BATTERY BACK-UP, TEST SWITCH	WHITE	WALL ABOVE DOORS	DUAL-LITE LITHONIA OR EQUAL	SCWLS(R)GWE	120
Z		LED INCLUDED	WALL MOUNTED EXTERIOR RATED EMERGEN LUMINAIRE, INTEGRAL BATTERY, SELF TESTING DIAGNOSTICS, COLD WEATHER OPERATION CONTRACTOR TO MOUNT FLUSH ON WALL	BRONZE	WALL ABOVE DOORS	DUAL-LITE	PG-Z-HTR	120

Not all parts and pieces may be identified in the catalog number. It shall be the Contractor's and Supplier/Manufacturer's responsibility to ensure all necessary parts, pieces, and hardware are provided with the luminaire for a complete installation.  
Fluorescent luminaires shall have a disconnecting means installed per 410.130.G internal to the luminaire.

Name: **MDP** Mnt Method: **Surface**  
 Volt: **480/277** Bus Rating: **400**  
 Ph: **3** Main Breaker: **250**  
 Wire: **4** AIC Rating: **14,000**

Code	Description	Load VA	Dem	Per Phase	Load Summary
1	Lighting	680	125%	Ph A 54800 VA	
2	Rec up to 10,000	720	100%	Ph B 54800 VA	
3	Motor	720	100%	Ph C 54800 VA	
4	Heater		100%	Connected	164400 VA
5	Kitchen		100%	Code Demand	164400 VA
6	Miscellaneous	149400	100%		
7	Sub Panel	15000	100%	Code Demand	197.98 Amps

Name: **LDP** Mnt Method: **Surface**  
 Volt: **208/120** Bus Rating: **100**  
 Ph: **3** Main Breaker: **60**  
 Wire: **4** AIC Rating: **10,000**

Code	Description	Load VA	Dem	Per Phase	Load Summary
1	2 Recept	360	20 1	1 20	Spare
3	1 Lighting	680	20 1	1 20	Spare
5	3 Exhaust Fan	720	15 1	1 20	Spare
7	2 Recept	360	20 1	1 20	Spare
9	Space	20	1	1 20	Spare
11	Space	20	1	1 20	Spare
13	Space	20	1	1 20	Spare
15	Space	20	1	1 20	Spare
17	Space	20	1	1 20	Spare
19	Space	20	1	1 20	Spare
21	Space	20	1	1 20	Spare
23	Space	20	1	1 20	Spare
4	Heater		100%	Connected	2120 VA
5	Kitchen		100%	Code Demand	2470 VA
6	Miscellaneous		100%		
7	Sub Panel		100%	Code Demand	6.86 Amps

**Denver Parks + Recreation**

SHEET TITLE: **HARVARD GULCH - IRRIGATION Site Electrical BOOSTER PUMP ELECTRICAL**

SCALE: 1"=50'

DESIGNED BY: AEI

DRAWN BY: AEI

CHECKED BY: DJA

DATE: 10-15-10

REVISIONS: Issue For Construction

PREPARED BY: **ackerman engineering, inc.**  
 19542 W 59th Ave, Suite A  
 Golden, Colorado 80403  
 Phone: 303-278-7977  
 Fax: 303-278-9009  
 www.aecconsulting.com

SHEET NUMBER: E01



# PROJECT GENERAL NOTES

## GENERAL

Furnish and install all materials and equipment and provide all labor required and necessary to complete the work shown on drawings and/or listed below and all other work and miscellaneous items, not specifically mentioned, but inferred for a complete installation, including all accessories and appurtenances required for testing the system. It is the intent of the drawings that all systems be complete and ready for operation.

## STANDARDS FOR INSTALLATION

All materials shall be new, listed, labeled, and conform with the current applicable industry standards. Workmanship and neat appearance shall be as important as electrical and mechanical operation. Defective or damaged materials shall be replaced or repaired prior to final acceptance in a manner meeting approval of the Owner/Architect/Engineer and at no additional cost to Owner.

The latest editions of the following standards are minimum requirements.

- Underwriters' Laboratories, Inc. (UL)
- National Electrical Manufacturer's Association (NEMA)
- American National Standards Institute (ANSI)
- Institute of Electrical and Electronic Engineers (IEEE)
- Electrical Testing Laboratories (ETL)
- Independent Testing Laboratories (ITL)
- National Electrical Contractors Association (NECA)
- National Electrical Code (NEC)

Terms "Listed and Labeled": As defined in the "National Electrical Code," Article 100.

Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

All work and materials shall comply with latest rules, codes and regulations, including but not limited to the following: OSHA, National Electrical Code (NEC), National Electrical Safety Code and all other applicable Federal, State, and local laws and regulations.

## DRAWINGS

Drawings indicate general arrangement of circuits, locations of equipment, panelboards and other work. Drawings and specifications are complementary each to the other, and what is called for by one shall be binding as if called for by both. Data presented on drawings is as accurate as planning can determine, but accuracy is not guaranteed and field verification of all dimensions, locations, levels, etc. to suit field conditions is directed.

## JOB CONDITIONS

Review the existing conditions of the project site and adjust all work to conform to the existing conditions.

## RECORD DOCUMENTS

Maintain one set of project record drawings indicating installed conditions for: Major raceway systems, size and location; locations of control devices; distribution and branch electrical circuitry; and fuse and circuit breaker size and arrangements. Equipment locations (exposed and concealed), dimensioned from prominent project features. Show all substitutions, modifications, and actual equipment and materials installed.

## OPERATIONAL CHECK

Check cleanliness of all interiors and all parts. Remove any excess packing, shipping bolts, etc.

Tighten all points of connection.

Verify proper operating conditions of all equipment mechanically and electrically.

At the completion of the work, the Contractor shall remove all waste material, rubbish, and other debris from and about the work, as well as all tools, construction equipment, machinery and surplus materials, and shall leave the work "broom clean," unless otherwise specified, and ready for occupancy by the Owner. Such cleanup shall include, as applicable and without limitation, the following:

Removal of all marks, stains, fingerprints, and other soil or dirt from any and all painted or decorated equipment and adjacent surfaces.

Cleaning and polishing of all hardware, including removal of all stains, dust, dirt, paint.

Restoration to their original condition, all portions of the site which were not designated for alteration by the Contract Documents but which have been affected by the Contractor's operations.

Removal of all temporary construction or protection and removal from the premises of all items of any nature whatsoever which were installed or used for temporary purposes during the construction.

If the Contractor fails to properly clean up, the Owner may do so and the cost thereof shall be charged to the Contractor.

## GUARANTEE

Leave entire electrical system installed under this Division in proper working order. Replace, without additional charge, any work materials or equipment provided under this Division which develops defects within one year from date of final acceptance. Guarantee all materials and equipment against defects in composition, design or workmanship.

## BASIC ELECTRICAL MATERIALS AND METHODS

### RACEWAYS

EMT: Electrical metallic tubing; ANSI C80.3, zinc-coated steel, with set-screw compression fittings.

RMC: Rigid metal conduit; galvanized rigid steel; ANSI C80.1.

RNC: Rigid nonmetallic conduit; NEMA TC 2, Schedule 40 PVC (Schedule 80 PVC where indicated on the drawings), with NEMA TC3 fittings.

LFMC: Liquidtight flexible metallic conduit, zinc-coated steel with sunlight-resistant and mineral-oil-resistant plastic jacket, UL 514C.

Raceway Fittings: Specifically designed for raceway type with which used.

Raceway Application Outdoor Installations:

- Exposed: RMC.
- Underground: RNC.
- Connections to vibrating equipment: LFMC
- Boxes and Enclosures: NEMA 250, Type 3R or Type 4, unless otherwise indicated.

Use RMC elbows and risers up to above grade equipment for all below grade feeder installations.

Install continuous underground plastic warning tape during trench backfilling, for exterior underground power, control, signal, and communication lines located directly above power and communication lines. Locate 6 to 8 inches (150 to 200 mm) below finished grade. If width of multiple lines installed in a common trench or concrete envelope does not exceed 16 inches (400 mm), overall, use a single line marker.

### WIRES, CABLES, AND CONNECTIONS

Conductors, No. 10 AWG and Smaller: Solid or stranded copper.

Conductors, Larger than No. 10 AWG: Stranded copper.

Insulation: Thermoplastic, rated 600 V, 75 deg C minimum, Type THW, THHN-THWN, or USE depending on application.

Factory applied insulation color the entire length of all conductors.

Wire Connectors and Splices: Units of size, ampacity rating, material, type, and class suitable for service indicated.

Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

### SUPPORTING DEVICES

Material: Cold-formed steel, with corrosion-resistant coating.

Metal Items for Use Outdoors or in Damp Locations: Hot-dip galvanized steel.

Slotted-Steel Channel: Flange edges turned toward web, and 9/16-inch-diameter slotted holes at a maximum of 2 inches o.c., in webs. Strength rating to suit structural loading.

Slotted Channel Fittings and Accessories: Recommended by the manufacturer for use with the type and size of channel with which used.

Expansion Anchors: Carbon-steel wedge or sleeve type.

Toggle Bolts: All-steel springhead type.

### ELECTRICAL IDENTIFICATION

Colored Adhesive Marking Tape for Raceways, Wires, and Cables: Self-adhesive vinyl tape, not less than 1 inch wide by 3 mils thick.

Tap Markers for Conductors: Vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.

Detectable Underground Warning Tape: Permanent, bright-colored, continuous-printed, vinyl tape compounded for permanent direct-burial service, manufactured specifically for marking and identifying underground utilities, and with the following features:

- Not less than 6 inches wide by 4 mils thick.
- Embedded continuous metallic strip or core.
- Printed legend that indicates type of underground line.

Tag and label all circuits: identify source and circuit numbers in each cabinet, pull-box, junction box, and outlet box.

Secondary Service, Feeder, and Branch-Circuit Conductors: Color-code throughout the secondary electrical system. Factory apply color the entire length of all conductors.

Color-code 208/120-volt system as follows:

- Phase A: Black
- Phase B: Red
- Phase C: Blue
- Neutral: White
- Ground: Green

Color-code 480/277-volt system as follows:

- Phase A: Brown
- Phase B: Orange
- Phase C: Yellow
- Neutral: White with a colored stripe or gray
- Ground: Green

Equipment Identification Labels: Engraved plastic laminate. Install on each unit of equipment, including central or master unit of each system. Apply labels for each unit of the following categories of equipment using mechanical fasteners:

Panelboards, electrical cabinets, and enclosures:  
1/4 inch lettering for equipment designation  
1/8 inch lettering to identify voltage rating, fault current rating, and source.

Individual Control Equipment (timeclocks, contactors) Circuit Breakers and Switches in Panelboards:

1/8 inch lettering to identify circuit and load served, including location.  
1/8 inch lettering to identify voltage rating, fault current rating, and source.

Individual Circuit Breakers, Enclosed Disconnect Switches, and Motor Starters:

1/8 inch lettering to identify load served.  
1/8 inch lettering to identify voltage rating, fault current rating, and source.

Transformers:

1/4 inch lettering to identify equipment designation.  
1/8 inch lettering to identify primary and secondary voltages, primary source, and secondary load and location.  
1/8 inch lettering to identify load served and source.

### PANELBOARDS

Manufacturers: Subject to compliance with requirements, provide products by one of the following:  
Eaton Corp.; Cutler-Hammer Products.  
General Electric Co.  
Westinghouse/Siemens/ITE  
Square D Co.

Enclosures: Flush- and surface-mounted cabinets. NEMA 250, Type 4, to meet environmental conditions at installed location.

Front: Entire front trim hinged (piano type hinge) to box and with standard hinged door within hinged trim cover and secured to box with screws. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.

Finish: Manufacturer's standard enamel finish over corrosion-resistant treatment or primer coat.

Directory Card: With transparent protective cover, mounted inside metal frame, inside panelboard door. (Panel schedules shall be typed and include device type and room(s) served).

Bus: Hard-drawn copper, 98 percent conductivity.

Main and Neutral Lugs: Mechanical type suitable for use with conductor material.

Equipment Ground Bus: Adequate for feeder and branch-circuit equipment ground conductors; bonded to box.

Future Devices: Mounting brackets, bus connections, and necessary appurtenances required for future installation of devices.

Fully rated to interrupt symmetrical short-circuit current available at terminals.

Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

Doors: Front mounted with concealed hinges; secured with flush latch with tumbler lock; keyed alike.

Molded-Case Circuit Breaker: NEMA AB 1, with interrupting capacity to meet available fault currents.

Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits.

Molded-Case Circuit-Breaker Features and Accessories. Standard frame sizes, trip ratings, and number of poles.

Lugs: Mechanical style, suitable for number, size, trip ratings, and material of conductors.

Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HACR for heating, air-conditioning, and refrigerating equipment.

### SURGE PROTECTION DEVICE

The following manufacturers are approved for this project:

- Liebert Corporation
- Current Technologies

Enclosure: The unit case shall be an enclosure rated UL94-V0, the best rating for resistance to flammability available. Further, the enclosure shall be designed and tested to NEMA 12, 4 and 4X standards.

Connections: The unit shall be designed to be installed using the flexible conduit provided by the SPD manufacturer. All parallel connections to the SPD shall be kept as short as possible. The connection to the SPD shall be made using #10 AWG maximum (ring terminal shall be provided).

## Standard Features:

—Unit Status Indicators — The unit shall have an integral status circuit that monitors the operational status of all modes of protection, including Line to Neutral, Line to Ground and Neutral to Ground. No manual testing is required to confirm the integrity of the suppression and filter systems. If the unit does fail, the green LED will go out, the red LED will be lit, and the alarm will sound.

—Audible Alarm — Unit shall be equipped with an audible alarm that is activated during a fault condition. In conjunction with the alarm, an alarm enable/disable feature shall be provided to silence the alarm.

—Undervoltage Detection —SPD shall be equipped with 70% undervoltage detection.

—Phase Loss Monitoring —SPD shall be equipped with phase loss monitoring.

—Power Loss Monitoring —SPD shall be equipped with power loss monitoring.

Fusing: All suppression components shall be individually fused and rated to allow maximum specified surge current capacity. Devices that utilize a single fuse to protect two or more suppression paths are not excepted. Individual surge components shall be sand packed and shall be UL listed to be capable of interrupting up to 200 kA symmetrical fault current with 480 VAC applied. Replaceable fusing is unacceptable. Overcurrent protection that limits specified surge currents is not acceptable.

Performance Ratings:  
Branch Panel SPD: (Selection Required)  
65kA Surge Rating per Mode (65), (80)  
130kA Surge Rating per Phase (65), (80), (130), (160)

Noise Attenuation: The filter shall provide an attenuation of 63 db max from 10 kHz to 100MHz, per 50 Ohm Insertion Loss Methodology from MIL 220A. The system shall provide up to 120-dB 60 insertion loss from 100 kHz to 100 MHz when used in a coordinated facility system

Protection Modes: The SPD shall provide protection as follows: All modes, L-N or L-L, L-G and N-G (where applicable). Note: L = Line, G = Ground, N = Neutral

UL 1449 ratings: The maximum UL 1449 listed surge ratings for each and/or all of the specified protection modes shall not exceed the following:

System Voltage 277/480

UL 1449 Second Edition SVR L-N 800 N-G 800 L-G 800 L-L 1500

UL 1449 Third Edition VPR L-N 1000 N-G 900 L-G 1000 L-L 1800

UL 1449 Nominal Discharge Current: The UL 1449 Nominal Discharge Current Rating shall be a minimum of 20kA.

### ELECTRICAL EQUIPMENT INSTALLATION

Materials and Components: Install level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.

Equipment: Install to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.

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**Denver Parks + Recreation**

**SHEET TITLE:**  
**HARVARD GULTCH - IRRIGATION Electrical Specifications**

**PROJECT:**  
**BOOSTER PUMP ELECTRICAL**

SCALE: NONE

DESIGNED BY: AEI

DRAWN BY: AEI

CHECKED BY: DJA

DATE: 10-15-10

REVISIONS:  
Issue For Construction

PREPARED BY:

 **ackerman  
engineering, inc.**  
19542 W 59th Ave, Suite A  
Golden, Colorado 80403  
Phone: 303-278-7977  
Fax: 303-278-9009  
www.aecconsulting.com

SHEET NUMBER: E02



CITY & COUNTY OF DENVER DEPARTMENT  
OF PARKS & RECREATION

Harvard Gulch / State Home Park  
Irrigation Renovation

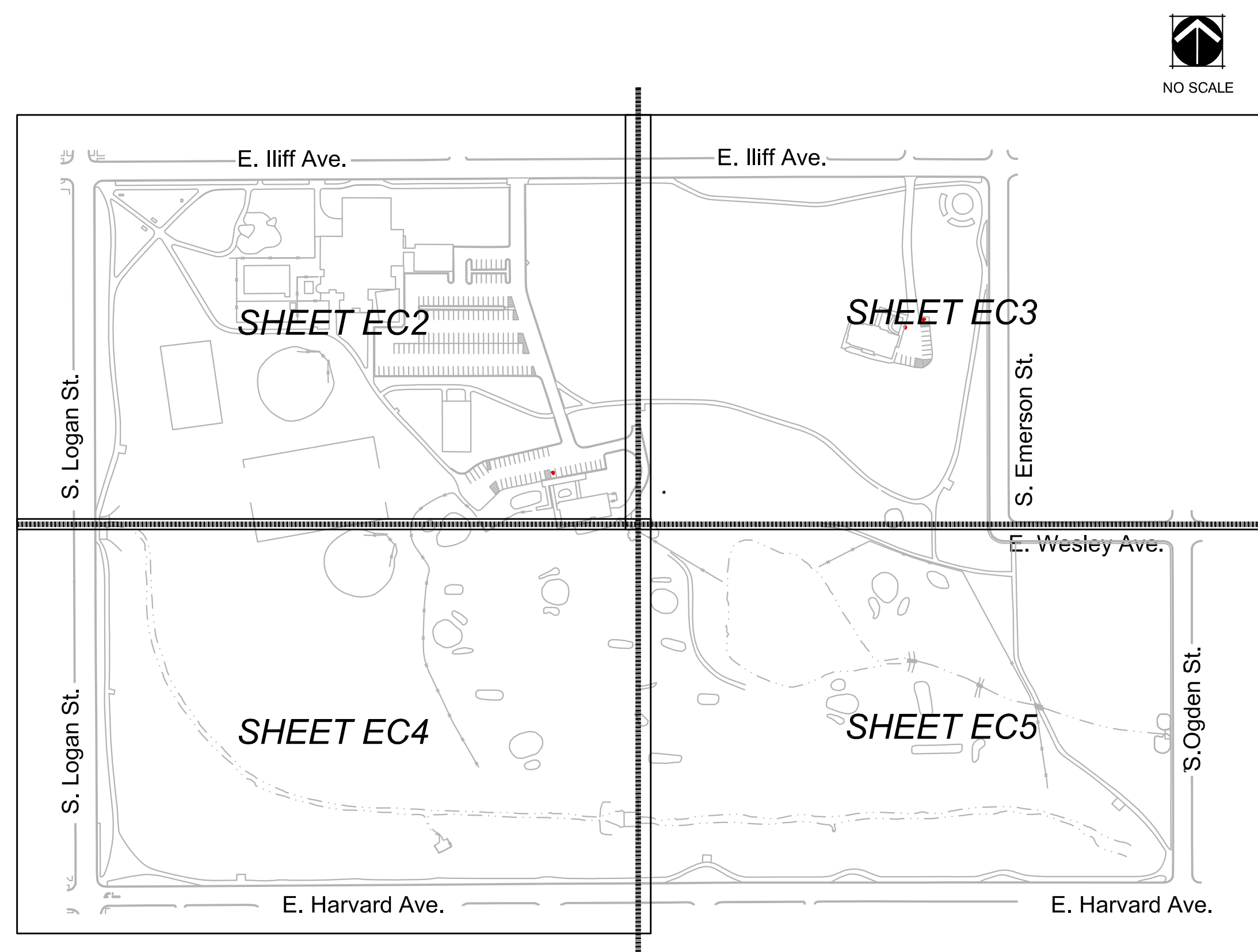
Contract No. - CE00013

Date: September 1, 2009

APPROVALS:

Manager of Public Works	Date
Manager of Parks and Recreation	Date
City Engineer	Date
Director of Engineering	Date
Director of Division of Small Business Opportunity	Date

LOCATION MAP AND SHEET KEY



STANDARD EROSION CONTROL NOTES:

**STANDARD NOTE # 1**  
"THE PERMITTEE AND/OR CONTRACTOR SHALL REMOVE ALL SEDIMENT, MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO OR ACCUMULATE IN, THE FLOWLINES, STORM DRAINAGE APPURTENANCES, AND PUBLIC RIGHTS OF WAYS OF THE CITY AND COUNTY OF DENVER AS A RESULT OF CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS SITE DEVELOPMENT OR CONSTRUCTION PROJECT. SAID REMOVAL SHALL BE CONDUCTED IN A TIMELY MANNER."

**STANDARD NOTE # 2**  
"THE CONTRACTOR SHALL PREVENT SEDIMENT, DEBRIS AND ALL OTHER POLLUTANTS FROM ENTERING THE STORM SEWER SYSTEM DURING ALL DEMOLITION, EXCAVATION, TRENCHING, BORING, GRADING, OR OTHER CONSTRUCTION OPERATIONS THAT ARE PART OF THIS PROJECT. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR REMEDIATION OF ANY ADVERSE IMPACTS TO THE MUNICIPAL SEPARATE STORM SEWER SYSTEM, RECEIVING WATERS, WATERWAYS, WETLANDS, AND OR OTHER PUBLIC OR PRIVATE PROPERTIES, RESULTING FROM WORK DONE AS PART OF THIS PROJECT."

**STANDARD NOTE # 3**  
"SOIL STABILIZATION MEASURES SHALL BE IMPLEMENTED WITHIN FOURTEEN (14) DAYS FOLLOWING COMPLETION OF GRADING ACTIVITIES. STABILIZATION OF DISTURBED AREAS ADJACENT TO RECEIVING WATERS OR WITH SLOPES 3 TO 1 OR GREATER SHALL BE COMPLETED WITHIN SEVEN (7) DAYS FOLLOWING COMPLETION OF GRADING ACTIVITIES. NOTE: FEDERAL AND STATE REGULATIONS MAY SOON REQUIRE STABILIZATION WITHIN SEVEN (7) DAYS OF COMPLETION OF GRADING ACTIVITIES. IN SUCH CASES, THE SHORTER TIMEFRAME SHALL APPLY TO PROJECTS WITHIN DENVER AS WELL."

**STANDARD NOTE # 4**  
"THE DEVELOPER, GENERAL CONTRACTOR, GRADING CONTRACTOR AND/OR THEIR AUTHORIZED AGENTS SHALL INSURE THAT ALL LOADS OF CUT AND FILL MATERIAL IMPORTED TO OR EXPORTED FROM THIS SITE SHALL BE PROPERLY COVERED TO PREVENT LOSS OF THE MATERIAL DURING TRANSPORT ON PUBLIC RIGHTS OF WAY." (SEC.49-552; REVISED MUNICIPAL CODE)

**STANDARD NOTE # 5**  
"THE USE OF REBAR TO ANCHOR BEST MANAGEMENT PRACTICES IS PROHIBITED." STEEL FENCE POSTS MAY BE USED ON A CASE BY CASE BASIS AND REQUIRES APPROVAL FROM THE CITY AND COUNTY OF DENVER SWMP REVIEWER OR THE STORMWATER ENFORCEMENT INVESTIGATOR PRIOR TO INSTALLATION."

**STANDARD NOTE # 6**  
"SOILS THAT WILL BE STOCKPILED FOR MORE THAN THIRTY (30) DAYS SHALL BE PROTECTED FROM WIND AND WATER EROSION WITHIN FOURTEEN (14) DAYS OF STOCKPILE CONSTRUCTION. STABILIZATION OF STOCKPILES LOCATED WITHIN 100 FEET OF RECEIVING WATERS, OR WITH SLOPES 3 TO 1 OR GREATER SHALL BE COMPLETED WITHIN SEVEN (7) DAYS FOLLOWING STOCKPILE CONSTRUCTION. STABILIZATION AND PROTECTION OF THE STOCKPILE MAY BE ACCOMPLISHED BY ANY OF THE FOLLOWING: MULCHING, TEMPORARY/PERMANENT REVEGETATION OPERATIONS, CHEMICAL SOIL STABILIZER APPLICATION (REQUIRES DENVER PUBLIC WORKS APPROVAL), OR EROSION CONTROL MATTING/GEOTEXTILES. IF STOCKPILES ARE LOCATED WITHIN 100 FEET OF RECEIVING WATERS, A DRAINAGEWAY OR THE SITE PERIMETER, ADDITIONAL SEDIMENT CONTROLS SUCH SHALL BE REQUIRED."

**STANDARD NOTE # 7**  
"APPROVED EROSION AND SEDIMENT CONTROL 'BEST MANAGEMENT PRACTICES' SHALL BE MAINTAINED AND KEPT IN GOOD REPAIR FOR THE DURATION OF THIS PROJECT. AT A MINIMUM, THE PERMITTEE OR CONTRACTOR SHALL PRODUCE AND RETAIN WEEKLY WRITTEN INSPECTION RECORDS FOR ALL BMPs AND AFTER SIGNIFICANT PRECIPITATION EVENTS. ALL NECESSARY MAINTENANCE AND REPAIR SHALL BE COMPLETED IMMEDIATELY. ADDITIONALLY, STREET SWEEPING IS TO BE COMPLETED BY THE CLOSE OF THE BUSINESS DAY OR (AND) ON AN AS NEEDED BASIS THROUGHOUT THE DAY."

**STANDARD NOTE # 8**  
"WATER USED IN THE CLEANING OF CEMENT TRUCK DELIVERY CHUTES SHALL BE DISCHARGED INTO A PREDEFINED, CONCRETE WASHOUT AREA ON THE JOB SITE. BERMED CONTAINMENT OR COMMERCIALY AVAILABLE CONCRETE WASHOUT DEVICES THAT FULLY CONTAIN ALL WASH WATER ARE ACCEPTABLE. WASH WATER DISCHARGED INTO THE CONTAINMENT AREA OR DEVICE SHALL BE ALLOWED TO INFILTRATE, EVAPORATE, AND OR BE DISPOSED OF IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS. DRIED CEMENT WASTE IS TO BE REMOVED FROM THE CONTAINMENT AREA AND PROPERLY DISPOSED."

SHOULD THE USE OF A PREDEFINED BERMED CONTAINMENT AREA OR APPROVED WASHOUT DEVICE BE TECHNICALLY INFEASIBLE DUE TO THE PROJECT SIZE, OR LACK OF AN AREA WITH A SUITABLE GROUND SURFACE FOR ESTABLISHING CONTAINMENT, PROPER DISPOSAL OF CONCRETE WASHOUT AND WASH WATER AT THE JOB SITE SHALL CONFORM TO THE APPROVED TECHNIQUES AND PRACTICES IDENTIFIED IN THE COLORADO DEPARTMENT OF PUBLIC HEALTH & ENVIRONMENT'S TRAINING VIDEO ENTITLED 'BUILDING FOR A CLEANER ENVIRONMENT, READY MIX WASHOUT TRAINING' AND ITS ACCOMPANYING MANUAL ENTITLED, 'READY MIX WASHOUT GUIDEBOOK, VEHICLE AND EQUIPMENT WASHOUT AT CONSTRUCTION SITES.'

THE DIRECT OR INDIRECT DISCHARGE OF WATER CONTAINING WASTE CEMENT TO THE STORM SEWER SYSTEM IS PROHIBITED." (SEC.56-102A, C; REVISED MUNICIPAL CODE, CITY AND COUNTY OF DENVER).

**STANDARD NOTE # 9**  
"THE CONTRACTOR SHALL PROTECT ALL STORM SEWER FACILITIES ADJACENT TO ANY LOCATION WHERE PAVEMENT CUTTING OPERATIONS INVOLVING WHEEL CUTTING, SAW CUTTING, OR ABRASIVE WATER JET CUTTING ARE TO TAKE PLACE."

THE CONTRACTOR SHALL REMOVE AND PROPERLY DISPOSE OF ALL WASTE PRODUCTS GENERATED BY SAID CUTTING OPERATIONS ON A DAILY BASIS OR AS NEEDED THROUGHOUT THE WORK DAY."

THE DISCHARGE OF ANY WATER CONTAMINATED BY WASTE PRODUCTS FROM CUTTING OPERATIONS TO THE STORM SEWER SYSTEM IS PROHIBITED." (SEC.56-102A, C; REVISED MUNICIPAL CODE, CITY AND COUNTY OF DENVER)

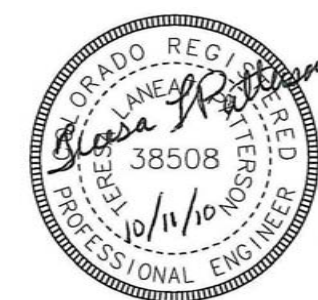
**STANDARD NOTE # 10**  
"PAVED AND IMPERVIOUS SURFACES WHICH ARE ADJACENT TO CONSTRUCTION SITES MUST BE SWEEPED ON A DAILY BASIS AND AS NEEDED DURING THE DAY WHEN SEDIMENT AND OTHER MATERIALS ARE TRACKED OR DISCHARGED ONTO THEM. EITHER SWEEPING BY HAND OR USE OF STREET SWEEPERS IS ACCEPTABLE. STREET SWEEPERS USING WATER WHILE SWEEPING IS PREFERRED IN ORDER TO MINIMIZE DUST. FLUSHING OFF PAVED SURFACES WITH WATER IS PROHIBITED." (SEC.56-102A, C; REVISED MUNICIPAL CODE, CITY AND COUNTY OF DENVER)

DRAWING INDEX:

- Sheet No. EC1 - Erosion Control Legends and Notes Plan
- Sheet No. EC2 - Erosion Control Plan
- Sheet No. EC3 - Erosion Control Plan
- Sheet No. EC4 - Erosion Control Plan
- Sheet No. EC5 - Erosion Control Plan
- Sheet No. EC6 - Erosion Control Details

P.E. Certification:

"I HEREBY CERTIFY THAT THIS CONSTRUCTION ACTIVITIES STORMWATER MANAGEMENT PLAN FOR HARVARD GULCH PARK PROJECT # EC-\_\_\_\_\_ WAS PREPARED BY ME (OR UNDER MY DIRECT SUPERVISION) IN ACCORDANCE WITH THE PROVISIONS OF THE CONSTRUCTION ACTIVITIES STORMWATER DISCHARGE PERMIT FOR THE CITY AND COUNTY OF DENVER. I UNDERSTAND THAT THE CITY AND COUNTY OF DENVER DOES NOT AND WILL NOT ASSUME LIABILITY FOR DRAINAGE FACILITIES DESIGN."



*Teresa L. Patterson*

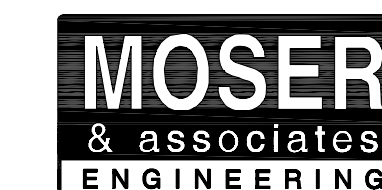
TERESA PATTERSON, P.E.  
ENGINEER OF RECORD  
STATE OF COLORADO NO. 38508

DATE 10/11/10

Owners Certification:

"THIS CONSTRUCTION ACTIVITIES STORMWATER MANAGEMENT PLAN HAS BEEN SUBMITTED AS THE APPLICATION FOR A CONSTRUCTION ACTIVITIES STORMWATER DISCHARGE PERMIT FILED WITH THE WASTEWATER MANAGEMENT DIVISION OF THE CITY AND COUNTY OF DENVER. I UNDERSTAND THAT ADDITIONAL EROSION CONTROL, SEDIMENT CONTROL AND WATER QUALITY ENHANCING MEASURES MAY BE REQUIRED OF THE OWNER AND HIS OR HER AGENTS DUE TO UNFORESEEN POLLUTANT DISCHARGES OR IF THE SUBMITTED PLAN DOES NOT FUNCTION AS INTENDED. THE REQUIREMENTS OF THIS PLAN SHALL BE THE OBLIGATION OF THE LAND OWNER AND/OR HIS SUCCESSORS OR HEIRS; UNTIL SUCH TIME AS THE PLAN IS PROPERLY COMPLETED, MODIFIED, OR VOIDED."

OWNER OR AUTHORIZED AGENT \_\_\_\_\_ DATE \_\_\_\_\_  
REPRESENTING \_\_\_\_\_



720 SOUTH COLORADO BOULEVARD  
SUITE 410 S  
DENVER, CO 80246  
PHONE (303) 757-3655  
FAX (303) 300-1635

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Denver Parks + Recreation  
PROJECT: HARVARD GULCH STATE HOME PARK IRRIGATION RENOVATION  
SHEET TITLE: Erosion Control Cover Sheet

SCALE:	N/A
DESIGNED BY:	TLP
DRAWN BY:	ACT
CHECKED BY:	TLP
DATE:	
REVISIONS:	
PREPARED BY:	IRRIGATION DESIGN BY: Applied Design Services 9721 Bayou Ridge Trail Parker, Colorado 80134 (303) 841-7077 Fax - 841-8191
SHEET NUMBER:	EC1

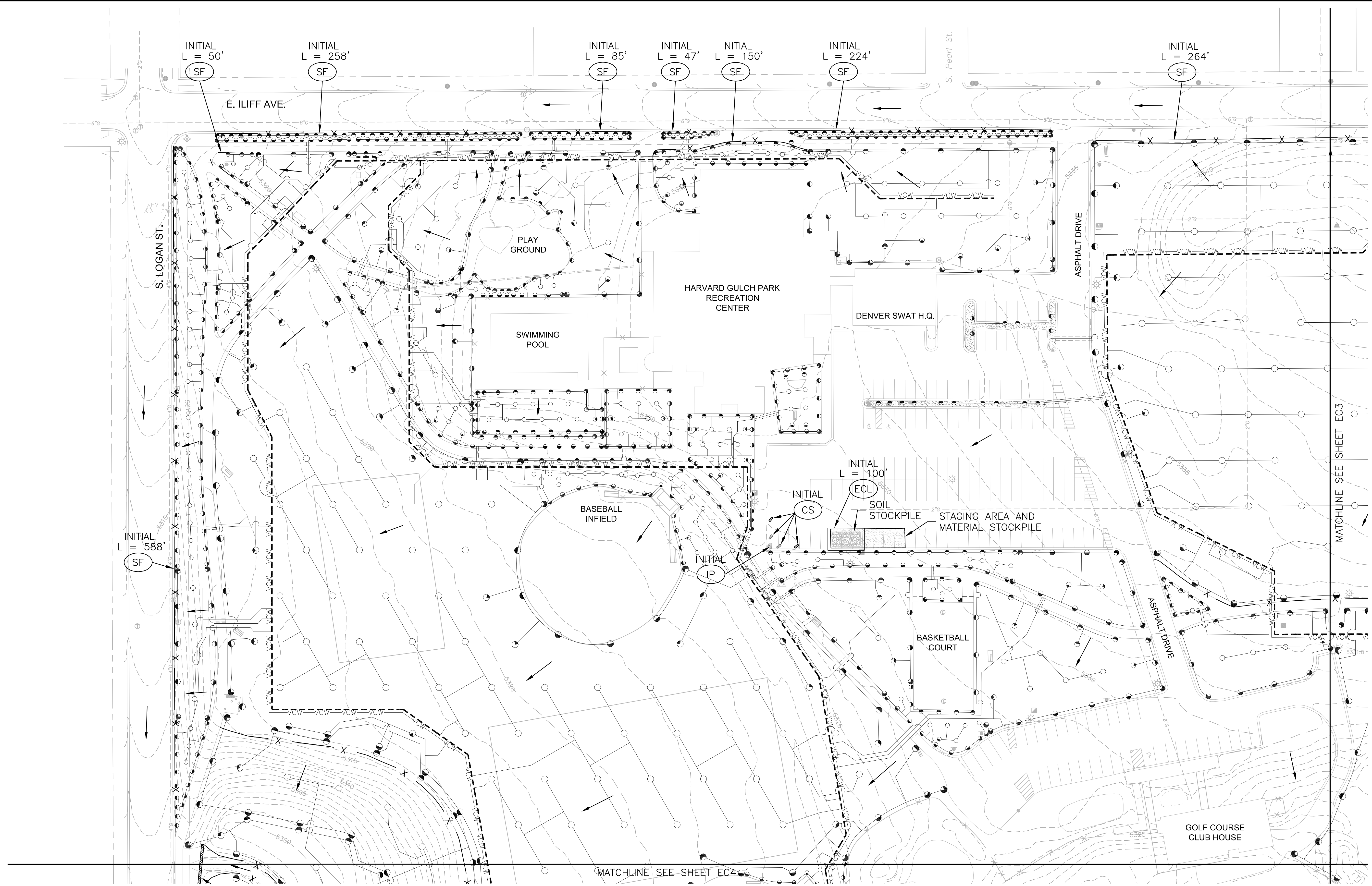


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MEMBER UTILITIES

**Denver Parks + Recreation**  
PROJECT: **HARVARD GULCH STATE HOME  
PARK IRRIGATION RENOVATION**  
SHEET TITLE: **Erosion Control Plan**

SCALE: 1"=40'  
DESIGNED BY: TLP  
DRAWN BY: ACT  
CHECKED BY: TLP  
DATE:  
REVISIONS:

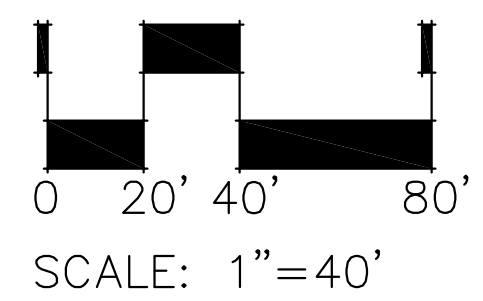
PREPARED BY:  
IRRIGATION DESIGN BY:  
*Applied Design Services*  
9721 Bayou Ridge Trail  
Parker, Colorado 80134  
(303) 841-7077  
Fax - 841-8191  
SHEET NUMBER: **EC2**



**BMP LEGEND**

NOTE:  
1. SILT FENCE MUST BE REMOVED  
AFTER SOD IS INSTALLED AND  
CURB SOCKS MUST BE REMOVED  
AFTER SITE IS STABILIZED.

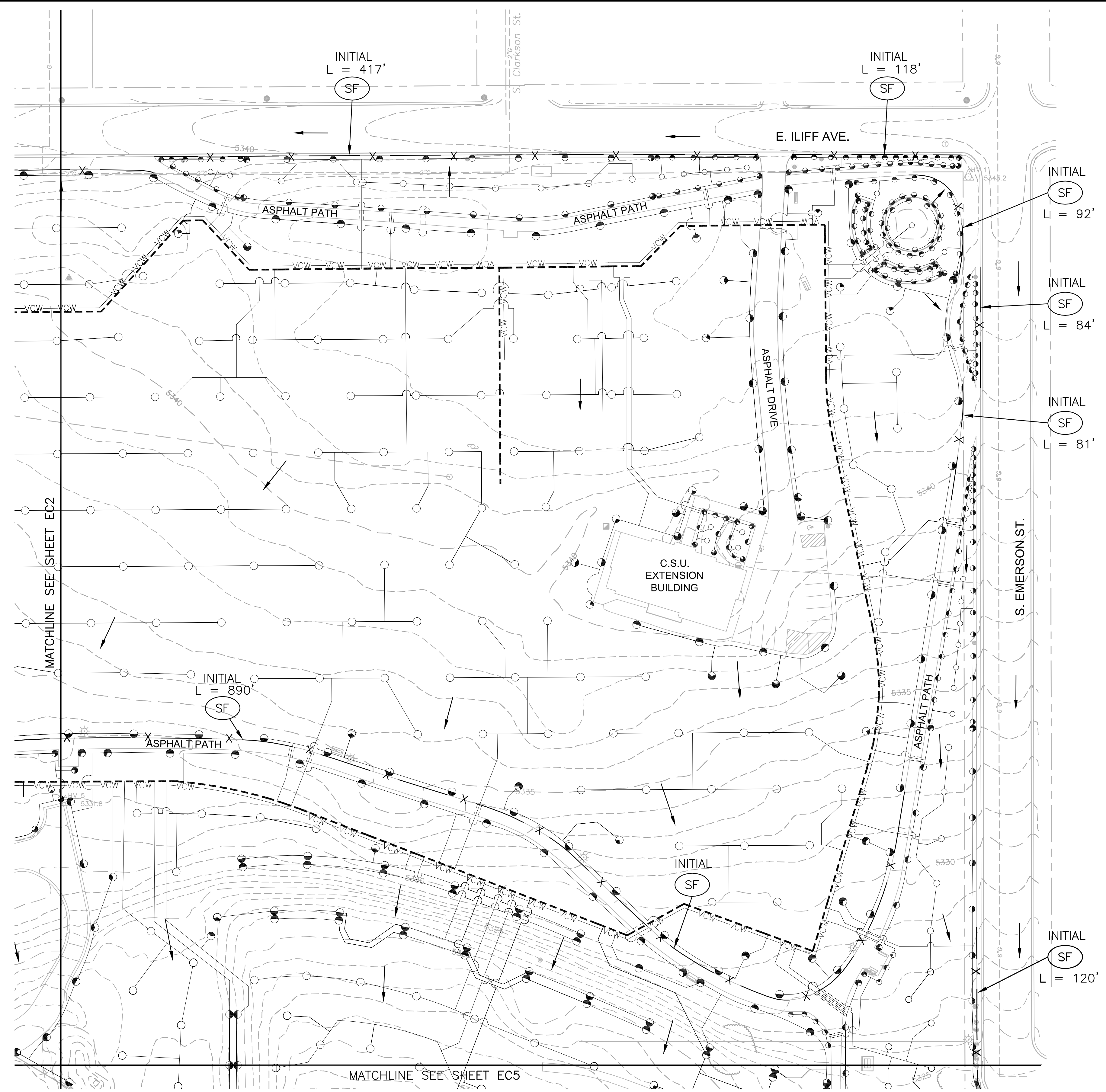
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|--|-------|---------------------|--|-------|----------------------|
|  | (CD)  | CHECK DAM           |  | (IP)  | INLET PROTECTION     |
|  | (CS)  | CURB SOCK           |  | (RCD) | REINFORCED CHECK DAM |
|  | (ECL) | EROSION CONTROL LOG |  | (SF)  | SILT FENCE           |
|  |       |                     |  |       | FLOW ARROW           |



**MOSER & ASSOCIATES ENGINEERING**  
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DENVER, CO 80246  
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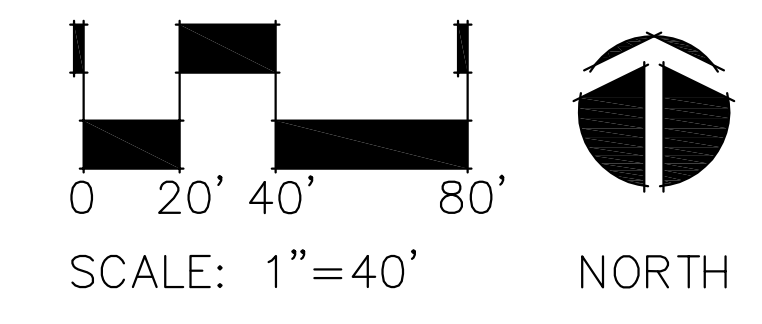
**Denver Parks + Recreation**  
PROJECT: **HARVARD GULCH STATE HOME PARK IRRIGATION RENOVATION**  
SHEET TITLE: **Erosion Control Plan**

SCALE: 1"=40'  
DESIGNED BY: TLP  
DRAWN BY: ACT  
CHECKED BY: TLP  
DATE:  
REVISIONS:



NOTE:  
1. SILT FENCE MUST BE REMOVED AFTER SOD IS INSTALLED AND CURB SOCKS MUST BE REMOVED AFTER SITE IS STABILIZED.

- BMP LEGEND**
- CD CHECK DAM
  - CS CURB SOCK
  - ECL EROSION CONTROL LOG
  - IP INLET PROTECTION
  - RCD REINFORCED CHECK DAM
  - SF SILT FENCE
  - FLOW ARROW



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IRRIGATION DESIGN BY:  
*Applied Design Services*  
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Fax - 841-8191  
SHEET NUMBER: **EC3**

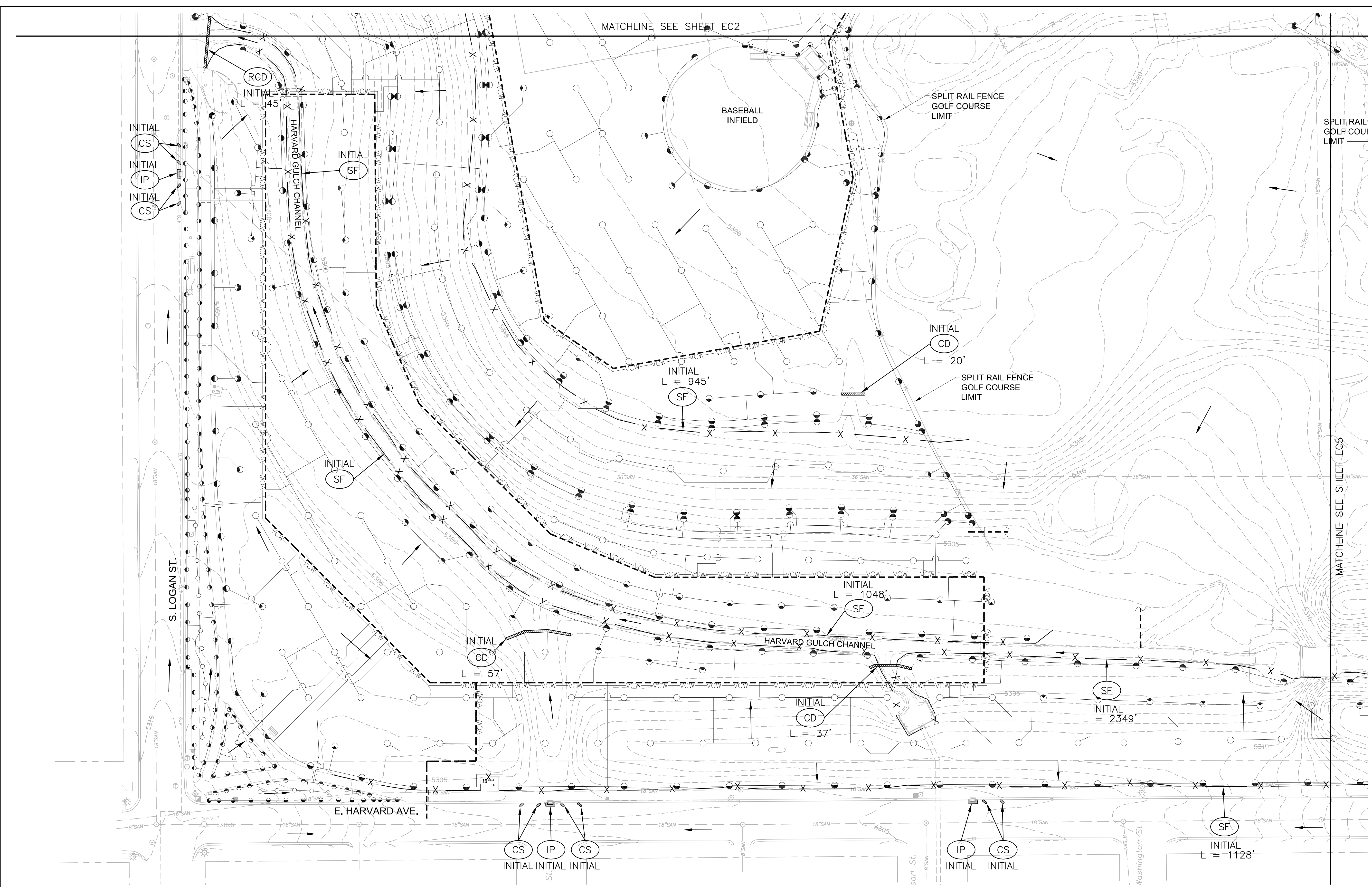


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CENTER OF COLORADO  
1-800-922-1987  
CALL 2-BUSINESS DAYS IN ADVANCE  
BEFORE YOU DIG, GRADE, OR EXCAVATE  
FOR THE MARKING OF UNDERGROUND  
MEMBER UTILITIES

**Denver Parks + Recreation**  
PROJECT: **HARVARD GULCH STATE HOME  
PARK IRRIGATION RENOVATION**  
SHEET TITLE: **Erosion Control Plan**

SCALE: 1"=40'  
DESIGNED BY: TLP  
DRAWN BY: ACT  
CHECKED BY: TLP  
DATE:  
REVISIONS:

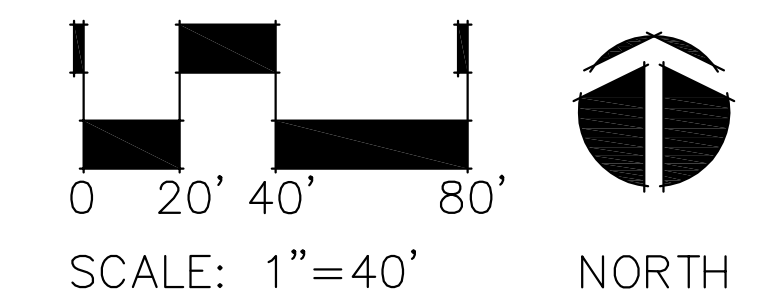
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SHEET NUMBER: **EC4**



NOTE:  
1. SILT FENCE MUST BE REMOVED  
AFTER SOD IS INSTALLED AND  
CURB SOCKS MUST BE REMOVED  
AFTER SITE IS STABILIZED.

**BMP LEGEND**

	CD	CHECK DAM		IP	INLET PROTECTION
	CS	CURB SOCK		RCD	REINFORCED CHECK DAM
	ECL	EROSION CONTROL LOG		SF	SILT FENCE
					FLOW ARROW

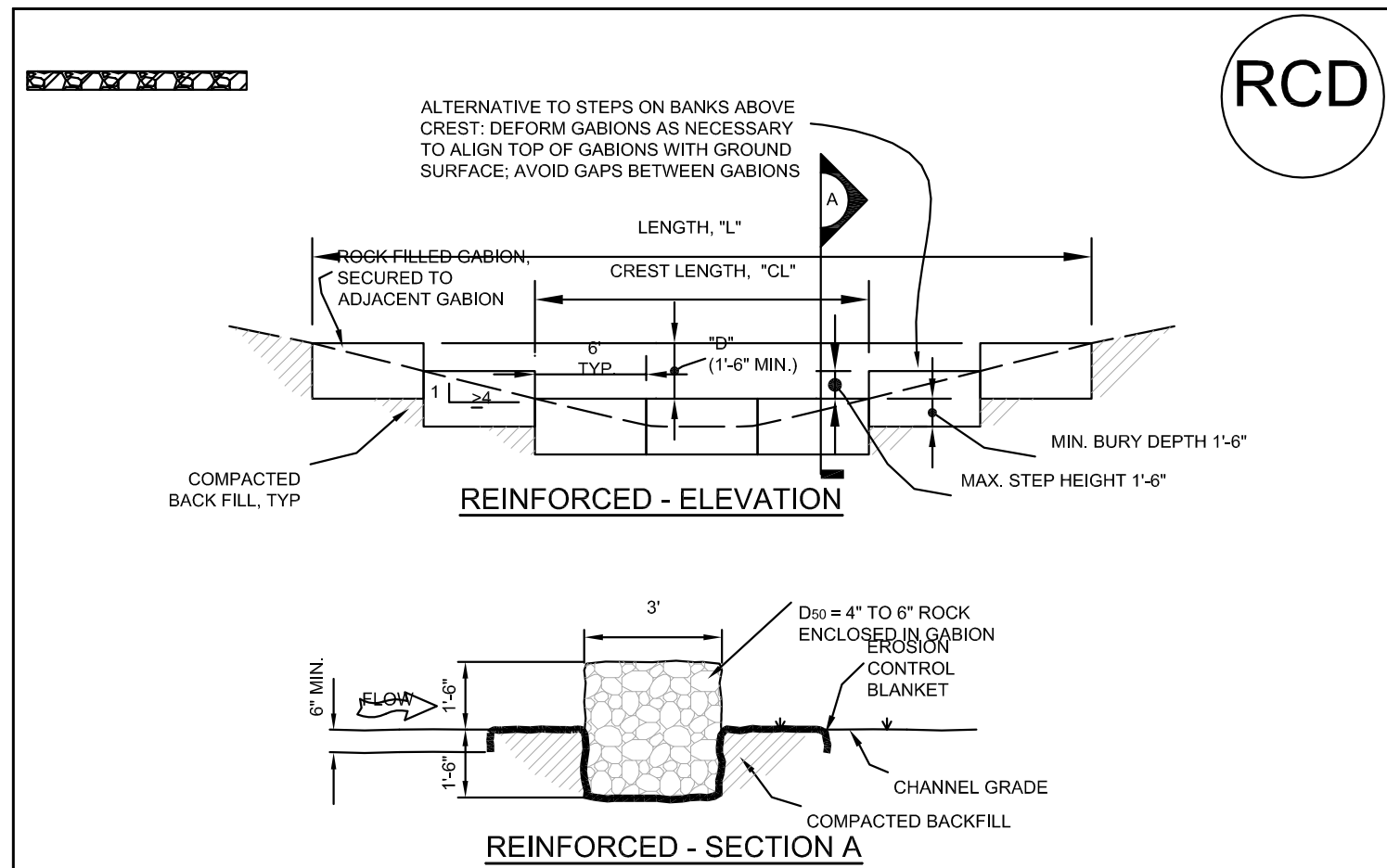


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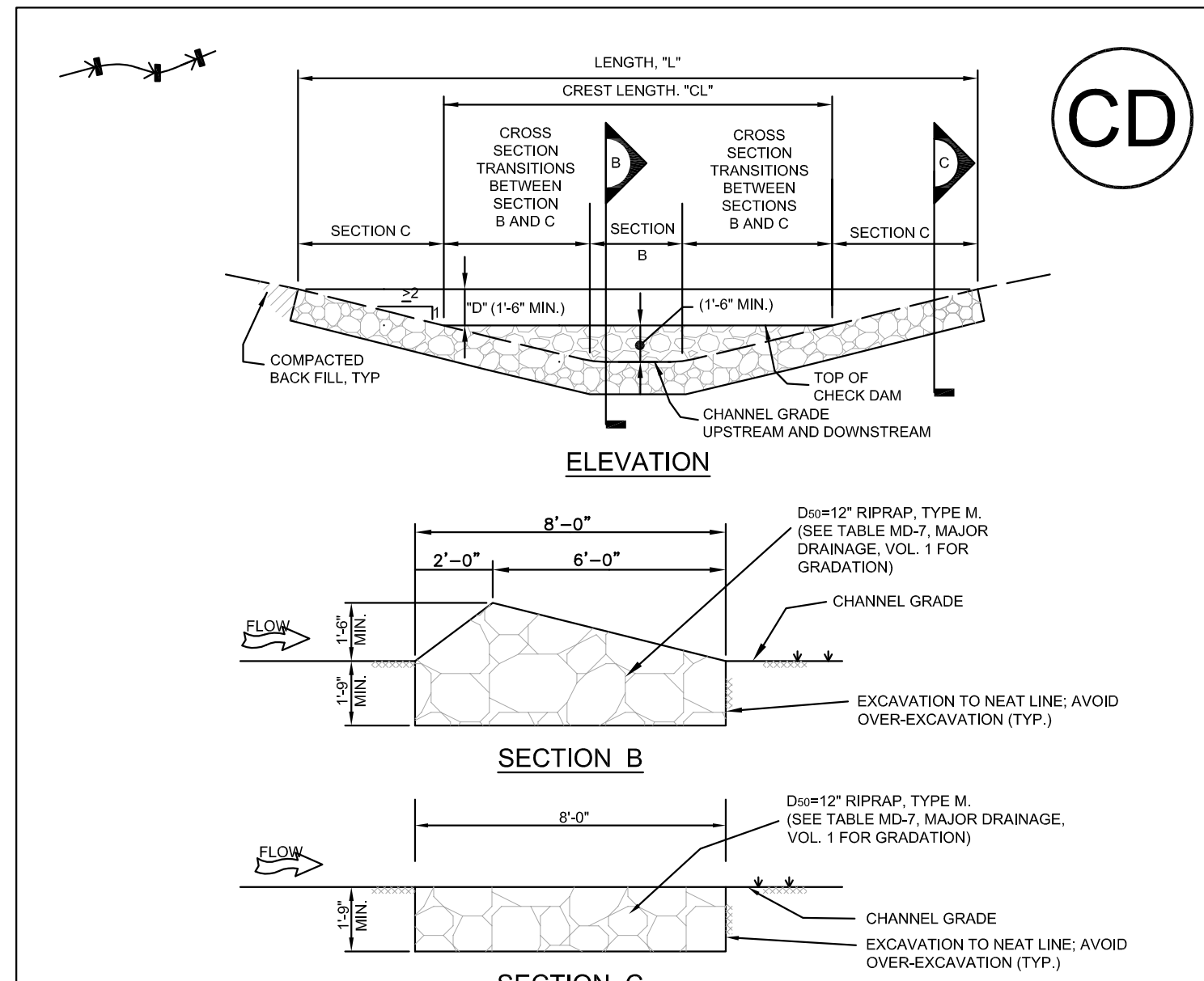




- REINFORCED CHECK DAM INSTALLATION NOTES**
- SEE PLAN VIEW FOR:
    - LOCATIONS OF CHECK DAMS.
    - CHECK DAM TYPE (CHECK DAM OR REINFORCED CHECK DAM).
    - LENGTH, "L", CREST LENGTH, "CL", AND DEPTH, "D".
  - CHECK DAMS INDICATED ON INITIAL GESC PLAN SHALL BE INSTALLED AFTER CONSTRUCTION FENCE, BUT PRIOR TO ANY UPSTREAM LAND-DISTURBING ACTIVITIES.
  - REINFORCED CHECK DAMS, GABIONS SHALL HAVE GALVANIZED TWISTED WIRE NETTING WITH A MAXIMUM OPENING DIMENSION OF 4-1/2" AND A MINIMUM WIRE THICKNESS OF 0.10" WIRE "HOG RINGS" AT 4" SPACINGS OR OTHER APPROVED MEANS SHALL BE USED AT ALL GABION SEAMS AND TO SECURE THE GABION TO THE ADJACENT GABION.
  - ROCK FILL IN BASKETS WILL BE 4" TO 6" IN SIZE.
  - THE CHECK DAM SHALL BE TRENCHED INTO THE GROUND A MINIMUM OF 1'-6".
  - EROSION BLANKET SHALL BE PLACED IN THE REINFORCED CHECK DAM TRENCH EXTENDING A MINIMUM OF 1'-6" ON BOTH THE UPSTREAM AND DOWNSTREAM SIDES OF THE REINFORCED CHECK DAM.

- REINFORCED CHECK DAM MAINTENANCE NOTES**
- THE SWAMP MANAGER SHALL INSPECT CHECK DAMS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT AS NECESSARY.
  - SEDIMENT ACCUMULATED UPSTREAM OF CHECK DAMS SHALL BE REMOVED WHEN THE SEDIMENT DEPTH UPSTREAM OF CHECK DAM IS WITHIN 1/2 OF THE HEIGHT OF THE CREST.
  - CHECK DAMS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS APPROVED BY THE LOCAL JURISDICTION.
  - WHEN CHECK DAMS ARE REMOVED, EXCAVATIONS SHALL BE FILLED WITH SUITABLE COMPACTED BACKFILL, ANY DISTURBED AREA SHALL BE COVERED WITH TOP SOIL, DRILL SEEDED AND COVERED WITH EROSION CONTROL BLANKET OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE LOCAL JURISDICTION.

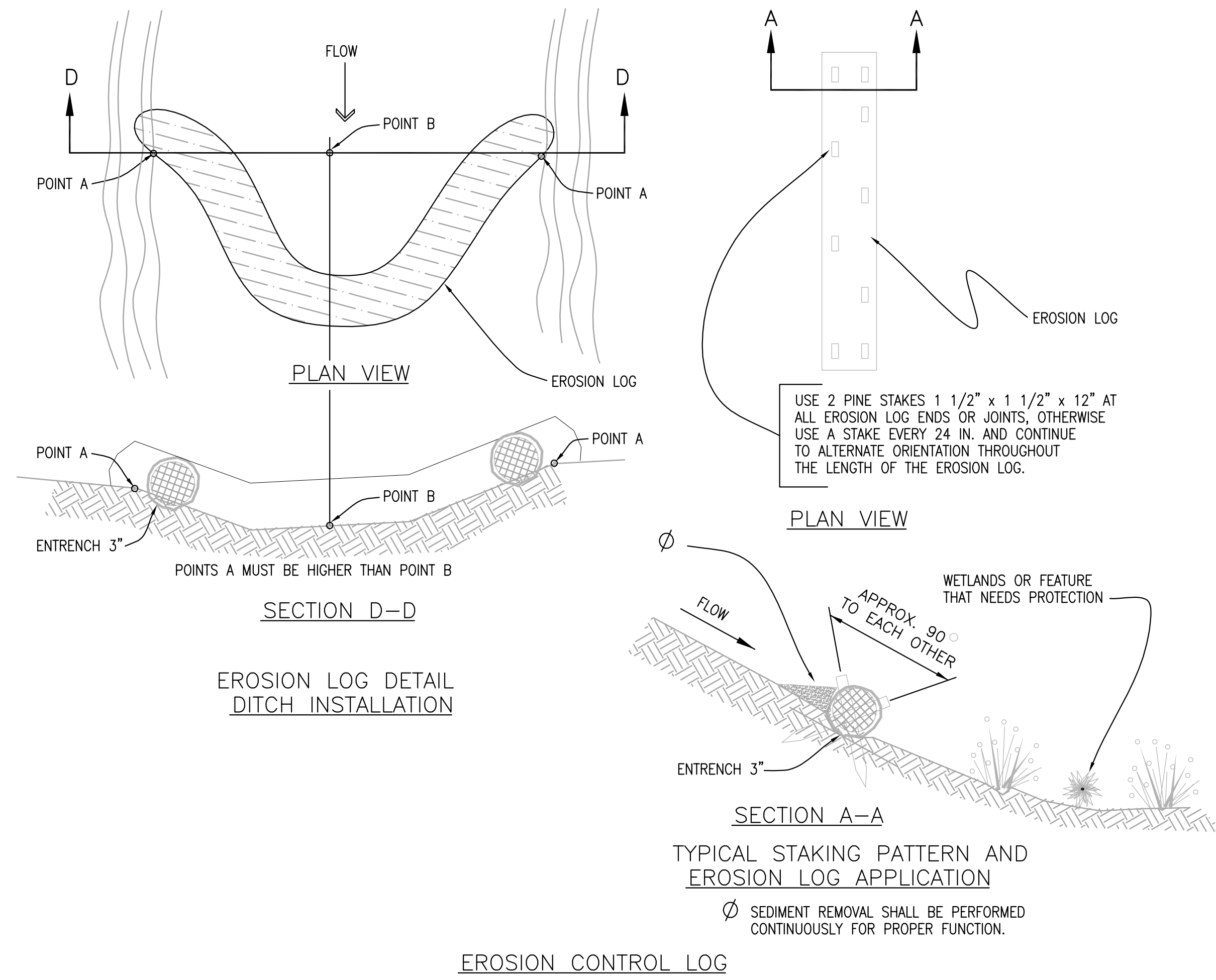
DETAIL BASED ON DETAILS PROVIDED BY DOUGLAS COUNTY  
 Urban Drainage and Flood Control District  
 Drainage Criteria Manual (V.3)  
 Figure C5-18  
 REINFORCED CHECK DAM



- CHECK DAM INSTALLATION NOTES**
- SEE PLAN VIEW FOR:
    - LOCATIONS OF CHECK DAMS.
    - CHECK DAM TYPE (CHECK DAM OR REINFORCED CHECK DAM).
    - LENGTH, "L", CREST LENGTH, "CL", AND DEPTH, "D".
  - CHECK DAMS INDICATED ON INITIAL GESC PLAN SHALL BE INSTALLED AFTER CONSTRUCTION FENCE, BUT PRIOR TO ANY UPSTREAM LAND DISTURBING ACTIVITIES.
  - RIPRAP UTILIZED FOR CHECK DAMS SHALL HAVE A D<sub>50</sub> MEDIAN STONE SIZE OF 12".
  - RIPRAP PAD SHALL BE TRENCHED INTO THE GROUND A MINIMUM OF 1'-6".
  - THE ENDS OF THE CHECK DAM SHALL BE A MINIMUM OF 1'-6" HIGHER THAN THE CENTER OF THE CHECK DAM.

- CHECK DAM MAINTENANCE NOTES**
- THE SWAMP MANAGER SHALL INSPECT CHECK DAMS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT AS NECESSARY.
  - SEDIMENT ACCUMULATED UPSTREAM OF CHECK DAMS SHALL BE REMOVED WHEN THE SEDIMENT DEPTH UPSTREAM OF CHECK DAM IS WITHIN 1/2 OF THE HEIGHT OF THE CREST.
  - CHECK DAMS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS APPROVED BY THE COUNTY.
  - WHEN CHECK DAMS ARE REMOVED, EXCAVATIONS SHALL BE FILLED WITH SUITABLE COMPACTED BACK FILL, ANY DISTURBED AREA SHALL BE SEEDED AND MULCHED AND COVERED WITH EROSION CONTROL BLANKET OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE LOCAL JURISDICTION.

DETAIL BASED ON DETAILS PROVIDED BY DOUGLAS COUNTY, COLORADO  
 URBAN DRAINAGE AND FLOOD CONTROL DISTRICT  
 DRAINAGE CRITERIA MANUAL (V.3)  
 Figure C5-17  
 CHECK DAM

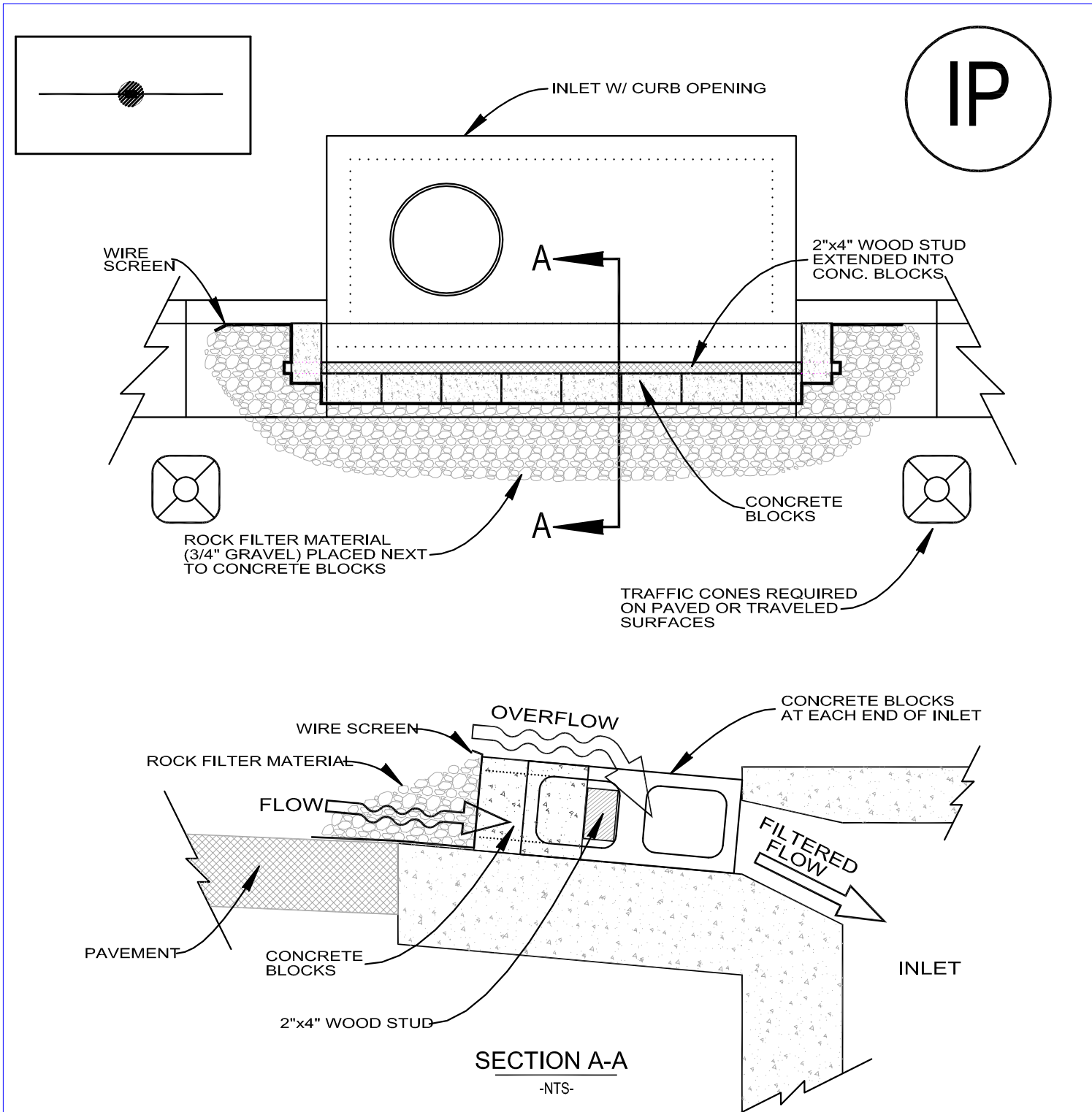


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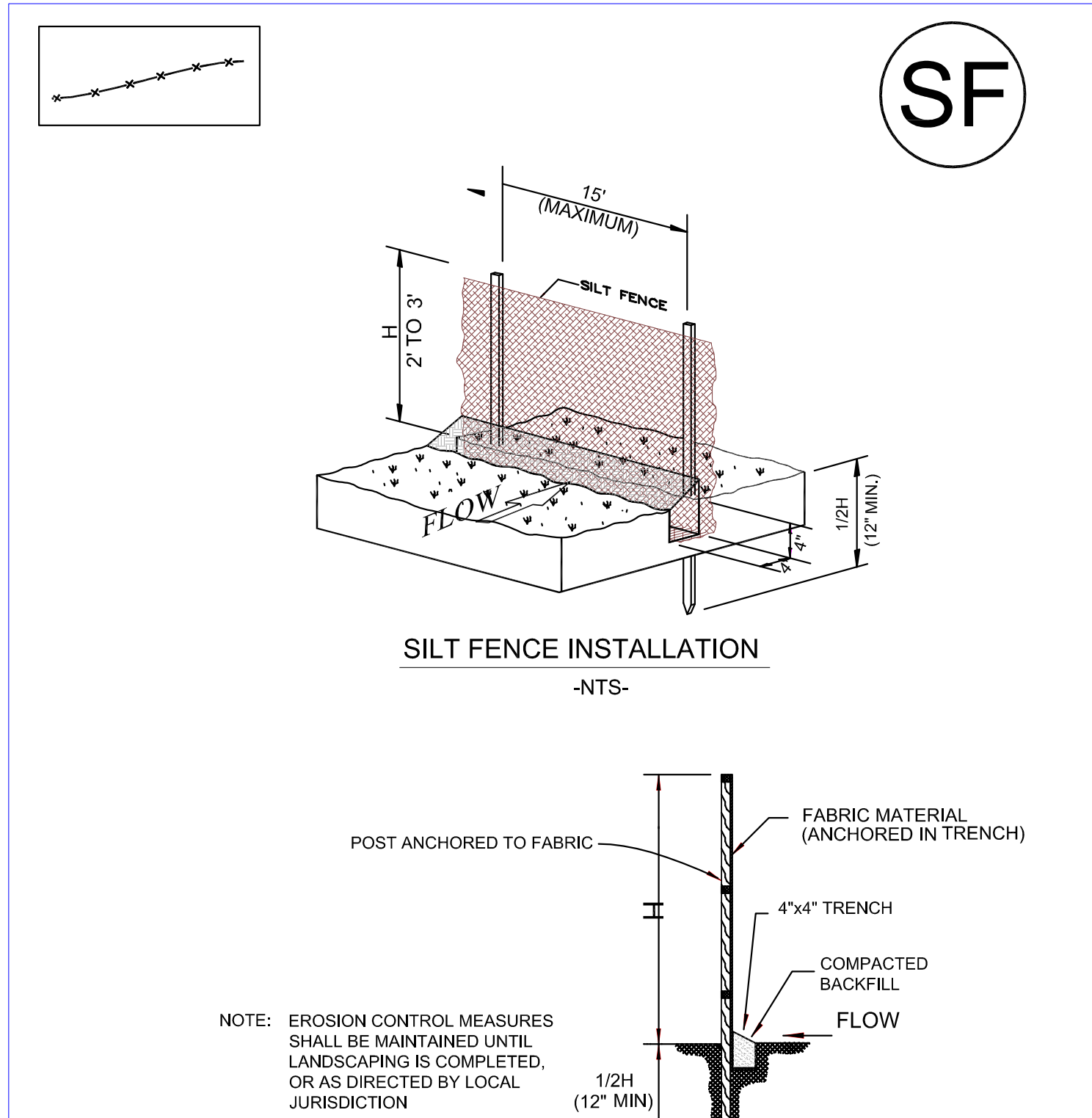
**Denver Parks + Recreation**

**PROJECT:** HARVARD GULCH STATE HOME PARK IRRIGATION RENOVATION

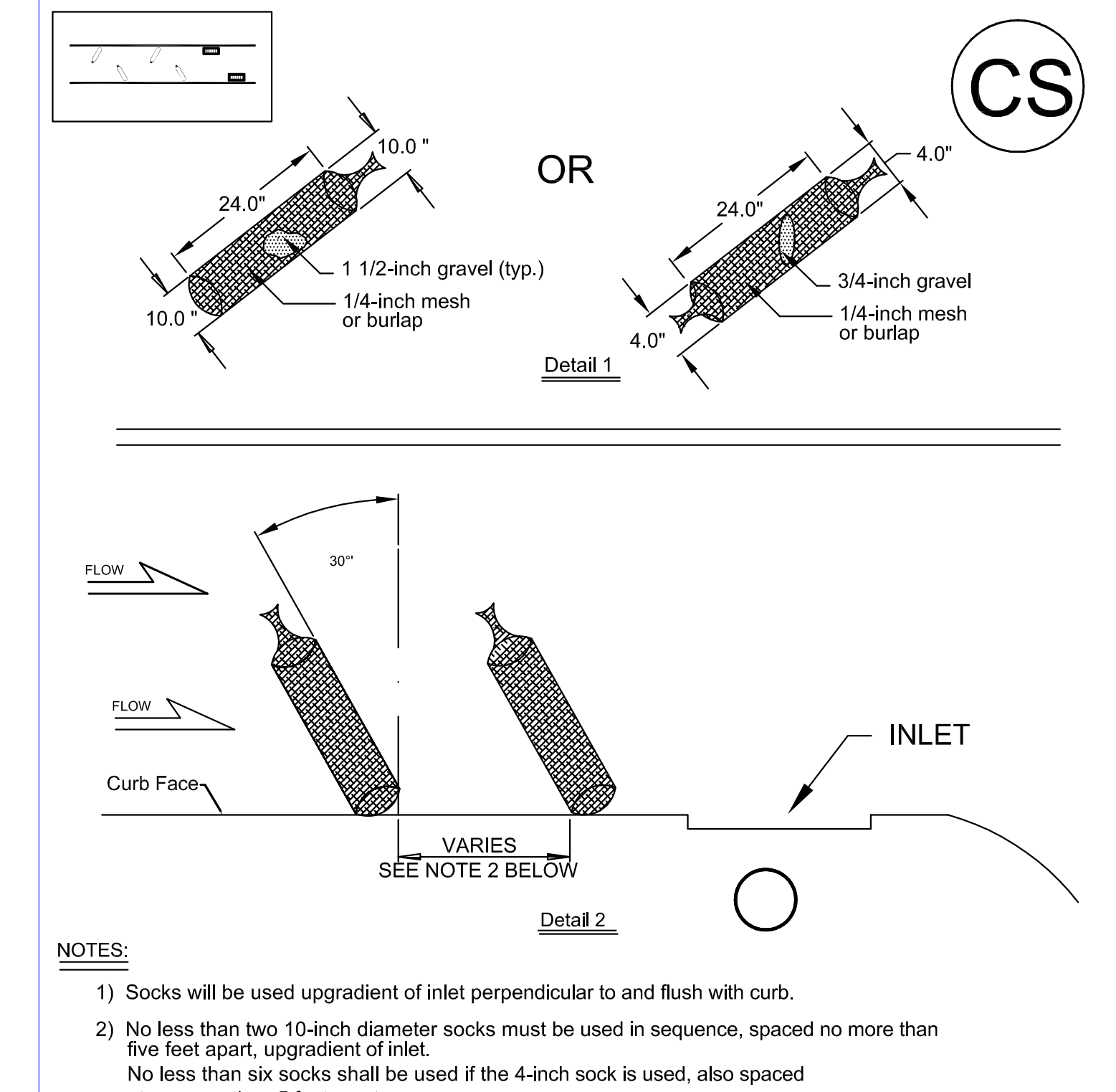
**SHEET TITLE:** Erosion Control Details



Urban Drainage and Flood Control District  
 Drainage Criteria Manual (V.3)  
 Figure C5-20  
 Curb Inlet Gravel Filter - Sump Condition



URBAN DRAINAGE AND FLOOD CONTROL DISTRICT  
 DRAINAGE CRITERIA MANUAL (V.3)  
 Figure C5-10  
 SILTS FENCE EROSION BARRIER



Urban Drainage and Flood Control District  
 Drainage Criteria Manual (V.3)  
 Figure C5-23  
 Inlet Protection-Curb Sock



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**SCALE:** N/A  
**DESIGNED BY:** TLP  
**DRAWN BY:** ACT  
**CHECKED BY:** TLP  
**DATE:**  
**REVISIONS:**

**PREPARED BY:** IRRIGATION DESIGN BY:  
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**SHEET NUMBER:** EC6