

CITY AND COUNTY OF DENVER
STATE OF COLORADO



DENVER
THE MILE HIGH CITY

DEPARTMENT OF TRANSPORTATION &
INFRASTRUCTURE

Contract Documents

Contract Number: 202056331

CCD FY19 HSIP Pkg 1: Yosemite St @ I225 -
Traffic Signals Upgrade

October 21, 2020



NOTICE TO APPARENT LOW BIDDER

**Lumin8 Transportation Technologies, LLC dba W.L. Contractors, LLC
5820 Lamar Street
Arvada CO, 80003**

The EXECUTIVE DIRECTOR OF THE DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE has considered the Bids submitted on **December 10, 2020**, for work to be done and materials to be furnished in and for:

CONTRACT – 202056331 / CCD FY19 HSIP Pkg 1: Yosemite St. @ I225 - Traffic Signals Upgrade

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 total bid items: **Ninety-Three (93) bid items (202-00155 through 700-70589)** the total estimated cost thereof being: **One Million One Hundred Seventy-Eight Thousand Eight Hundred Thirty-Two Dollars and No Cents (\$1,178,832.00).**

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; and
- b. Payment and Performance Bond along with One original 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 the Department of Transportation and Infrastructure, 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 (720-913-1999).



NOTICE TO APPARENT LOW BIDDER

CONTRACT NO. 202056331

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 12th day of January 2021 2020.

CITY AND COUNTY OF DENVER

By: *Eulois Cleckley* for
Eulois Cleckley
Executive Director of the
Department of Transportation and Infrastructure

cc: Treasury, DSBO, PM, Prevailing Wage, PRO, File

CITY AND COUNTY OF DENVER
STATE OF COLORADO



DENVER
THE MILE HIGH CITY

**DEPARTMENT OF TRANSPORTATION &
INFRASTRUCTURE**

Bid Form Package

Contract Number: 202056331

**CCD FY19 HSIP Pkg 1: Yosemite St @ I225 -
Traffic Signals Upgrade**

October 21, 2020

**CITY AND COUNTY OF DENVER
DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE**

**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 the BID FORM PACKAGE.

BIDDER'S CHECKLIST

These forms comprise the Bid Form and Submittal Package. Please note that a copy of the executed bid bond is to be submitted via QuestCDN at the time of bid opening, and that the original bid bond must be mailed and received within 7 calendar days after the bid due date.

Bidders must utilize the Bid Worksheet in the online bidding section of QuestCDN to submit their bid item pricing. The totals from the worksheet are required on page BF-7 of the Submittal Package.

FORM/ PAGE NO.	COMMENTS	COMPLETE
BF-4 – BF-5	a.) Legal name, address, Acknowledgment signature, and attestation (if required)	<input type="checkbox"/>
BF-6+	a.) Complete all blanks b.) Legal name (required)	<input type="checkbox"/> <input type="checkbox"/>
BF-7	a.) Write out bid total/totals in words and figures in the blank form space(s) provided. b.) Calculate Textura® Construction Payment Management System Fee from chart on pg. BF-3; write fee in the space provided.	<input type="checkbox"/> <input type="checkbox"/>
BF-8	a.) Fill in all Bid Bond blanks b.) Signatures required c.) Corporate Seal (if required) d.) Dated e.) Attach Surety Agent's Power of Attorney or Certified/Cashier's check made out to the Manager of Revenue referencing bidder's company and Contract Number	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
BF-9 – BF-12	a.) Each bidder, as a condition of responsiveness to this solicitation, shall <u>complete and return</u> the "Diversity and Inclusiveness in City Solicitations Information Request Form" with their Bid.	<input type="checkbox"/>
BF-13 – BF-21	Complete all CDOT forms, including: a.) Form 1413: Bidder's List b.) Form 1414: Anticipated DBE Participation Plan c.) Form 1415: Commitment Confirmation (submit to CDOT within five (5) calendar days of bid opening) d.) Form 1416: Good Faith Effort Report (if applicable, submit to CDOT within five (5) calendar days of bid opening). e.) Form 605: Contractors Performance Capability Statement (submit to CDOT within five (5) calendar days of bid opening) f.) Form 606: Anti-Collusion Affidavit g.) Form 621: Assignment of Anti-Trust Claims (submit to CDOT within five (5) calendar days of bid opening)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

Textura® Construction Payment Management System (“Textura”)

Bidder recognizes and agrees that it shall be required to use the Textura® Construction Payment Management System (“Textura”) for this Project to request payment from the City and to pay all first tier subcontractors and suppliers and further record payment to all certified subcontractors or suppliers that are listed for participation towards any assigned program goal. All fees associated with Textura are to be paid by the bidder for billings for work performed. Bidders are required, when preparing a bid, to enter the price of Textura on the line provided for the service. The fee is all inclusive of all subcontractor, project and subscription fees associated with Textura. The bidder will calculate the fee based on their total bid (not including any alternates, if applicable) and the table below, and then include it on the line item provided in the bid form labeled “Textura® Construction Payment Management System Fee”. This expense becomes part of the contract and billable to the City. All costs including, but not limited to, costs associated with training, entering data, and/or utilizing Textura other than the Textura Construction Payment Management System Fee are overhead and shall not be reimbursed by the City. Bidder will be responsible for any tax on the Textura fee. As with other taxes, the City will not reimburse bidder for this cost and therefore this cost should be included in bidder’s bid. Textura will invoice the awarded bidder directly.

Project Value	Project Fee (GC + Sub Usage)
\$100,000 – 249,999.99	\$780
\$250,000 - \$499,999.99	\$1,625
\$500,000 - \$999,999.99	\$3,250
\$1,000,000 - \$2,999,999.99	\$5,850
\$3,000,000 - \$4,999,999.99	\$9,100
\$5,000,000 - \$9,999,999.99	\$12,220
\$10,000,000 - \$19,999,999.99	\$20,345
\$20,000,000 - \$49,999,999.99	\$32,500
\$50,000,000 - \$99,999,999.99	\$48,750
\$100,000,000 - \$199,999,999.99	\$69,095
\$200,000,000 - \$299,999,999.99	\$85,345
\$300,000,000 - \$399,999,999.99	\$109,720
\$400,000,000 - \$499,999,999.99	\$142,220
\$500,000,000 - \$999,999,999.99	\$162,500
\$1,000,000,000 - \$1,999,999,999.99	\$345,345
\$2,000,000,000 - \$4,999,999,999.99	\$650,000
\$5,000,000,000 - \$9,999,999,999.99	\$1,015,625
\$10,000,000,000 or greater	\$1,503,125

For more information:

<http://www.denvergov.org/content/denvergov/en/contract-administration/bidding-process.html>

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**CITY AND COUNTY OF DENVER
DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE
BID FORM AND SUBMITTAL PACKAGE ACKNOWLEDGMENT**

CONTRACT NO.: 202056331

FEDERAL AID PROJECT NO.: SHE - M320-125

CCD FY19 HSIP PKG 1: YOSEMITE ST @ I225 - TRAFFIC SIGNALS UPGRADE

BIDDER: WL CONTRACTORS
(Legal Name per Colorado Secretary of State)

ADDRESS: 5920 LAMAR STREET
ARVADA, COLORADO
80003

CONTACT PERSON FOR ALL MATTERS RELATING TO THIS DOCUMENT

NAME: MATT BERNARDI **TITLE:** ESTIMATOR
EMAIL: mbernardi@teamwl.com **PHONE NUMBER:** 303-422-7908

The undersigned bidder states the undersigned bidder received and had an opportunity to fully and thoroughly examine a complete set of the Contract Documents for **Federal Aid Project No. SHE - M320-125, City and County of Denver Contract No. 202056331 - CCD FY19 HSIP Pkg 1: Yosemite St @ I225 - Traffic Signals Upgrade**, made available to the undersigned bidder pursuant to Notice of Invitation for Bids dated October 21, 2020.

The undersigned bidder acknowledges 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 Transportation and Infrastructure 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 the Contract Documents as defined in Paragraph 1 of the contract and including this executed Bid Form and Submittal Package, constitute all of the terms, conditions, and requirements upon which this submission is based. The undersigned bidder further understands 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
- Bid Bond
- Applicable FHWA Contract Forms

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
- Insurance Provision

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: WL CONTRACTORS

ATTEST:

Name: Douglas Freyter

By: [Signature]

By: [Signature]

Title: V.p of operations

[SEAL]

**CITY AND COUNTY OF DENVER
DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE**

BID FORM

**CONTRACT NO.: 202056331
FEDERAL AID PROJECT NO.: SHE - M320-125
CCD FY19 HSIP PKG 1: YOSEMITE ST @ I225 - TRAFFIC SIGNALS UPGRADE**

BIDDER: WL CONTRACTORS
(Legal Name per Colorado Secretary of State)

TO: The Executive Director of the Department of Transportation and Infrastructure
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 **October 21, 2020**, to furnish all required materials, tools, appliances, equipment and plant; to perform all necessary labor and to undertake and complete: **Federal Aid Project No. SHE - M320-125, City and County of Denver Contract No. 202056331 - CCD FY19 HSIP Pkg 1: Yosemite St @ I225 - Traffic Signals Upgrade** 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:

- | | |
|---|---|
| <i>Advertisement of Notice of Invitation for Bids</i> | <i>Federal Requirements</i> |
| <i>Instructions to Bidders</i> | <i>Contractors Performance Capability Statement</i> |
| <i>Bid Bond</i> | <i>Anti-Collusion Affidavit</i> |
| <i>Addenda (as applicable)</i> | <i>Assignment of Anti-Trust Claims</i> |
| <i>CDOT DBE Documents</i> | <i>On-the-Job Training (where applicable)</i> |
| <i>Equal Employment Opportunity Provisions</i> | <i>Required Contract Provisions Federal Aid</i> |
| <i>(Appendices A, B, E and F)</i> | <i>Construction Contracts</i> |
| <i>Bid Form</i> | <i>Contract Form</i> |
| <i>Prevailing Wage Rate Schedule(s)</i> | <i>Contract Drawings</i> |
| <i>Technical Specifications</i> | <i>Accepted Shop Drawings</i> |
| <i>General Contract Conditions</i> | <i>Certificate of Insurance</i> |
| <i>Special Contract Conditions</i> | |
| <i>Performance and Payment Bond</i> | |
| <i>Notice to Apparent Low Bidder</i> | |
| <i>Notice to Proceed</i> | |
| <i>Contractor's Certification of Payment Form</i> | |
| <i>Final/Partial Lien Release Form</i> | |
| <i>Final Receipt</i> | |
| <i>Change Orders (as applicable)</i> | |

CCD FY19 HSIP Pkg 1:Yosemite St @ I225 - Traffic Signals Upgrade				<u>Lumin8 Transportation Technologies, LLC (W.L. Contractors, LLC):</u> Argonaut Insurance Co.	
Contract No. 202056331					
Bid Item	Description	Units	Qty	Unit Bid	Total Bid
202-00155	Removal of Wall	LF	3	\$215.00	\$645.00
202-00190	Removal of Concrete Median Cover Material	SY	215	\$45.00	\$9,675.00
202-00200	Removal of Sidewalk	SY	216	\$43.00	\$9,288.00
202-00203	Removal of Curb and Gutter	LF	730	\$13.00	\$9,490.00
202-00206	Removal of Concrete Curb Ramp	SY	111	\$45.00	\$4,995.00
202-00220	Removal of Asphalt Mat	SY	922	\$39.00	\$35,958.00
202-00453	Removal of Portions of Present Structure (Class 2)	SY	26	\$778.00	\$20,228.00
202-00810	Removal of Ground Sign	EACH	7	\$165.00	\$1,155.00
202-00828	Removal of Traffic Signal Equipment	LS	1	\$12,929.00	\$12,929.00
202-01130	Removal of Guardrail Type 3	LF	45	\$41.50	\$1,867.50
203	Potholing	EACH	60	\$292.00	\$17,520.00
207-00205	Topsoil	CY	115	\$65.00	\$7,475.00
208-00002	Erosion Log Type 1 (12 inch)	LF	200	\$6.50	\$1,300.00
208-00035	Aggregate Bag	LF	200	\$9.50	\$1,900.00
208-00046	Pre-fabricated Concrete Washout Structure (Type 1)	EACH	1	\$3,880.00	\$3,880.00
208-00051	Storm Drain Inlet Protection (Type I)	LF	20	\$20.00	\$400.00
208-00056	Storm Drain Inlet Protection (Type III)	EACH	2	\$242.00	\$484.00
208-00103	Removal and Disposal of Sediment (Labor)	HOUR	120	\$87.00	\$10,440.00
208-00105	Removal and Disposal of Sediment (Equipment)	HOUR	120	\$90.00	\$10,800.00
208-00106	Sweeping (Sediment Removal)	HOUR	20	\$56.00	\$1,120.00
210-00810	Reset Ground Sign	EACH	6	\$167.00	\$1,002.00
210-00815	Reset Sign Panel	EACH	10	\$140.00	\$1,400.00
212-00006	Seeding (Native)	ACRE	0.2	\$2,315.00	\$463.00
212-00032	Soil Conditioning	ACRE	0.2	\$5,247.00	\$1,049.40
216-00201	Soil Retention Blanket (Straw/Coconut) (Biodegradable Class 1)	SY	1000	\$4.25	\$4,250.00
304-06004	Aggregate Base Course (Class 6)	SY	389	\$45.00	\$17,505.00
403-00720	Hot Mix Asphalt (Patching) (Asphalt)	TON	150	\$260.00	\$39,000.00
503-00036	Drilled Shaft (36 Inch)	LF	72	\$385.00	\$27,720.00
503-00048	Drilled Shaft (48 Inch)	LF	34	\$530.00	\$18,020.00
601-03057	Concrete Class DR	CY	5	\$905.00	\$4,525.00

602-00000	Reinforcing Steel	LB	50	\$13.00	\$650.00
606-00301	Guardrail Type 3 (6-3 Post Spacing)	LF	37	\$215.00	\$7,955.00
607-11525	Fence (Plastic)	LF	300	\$3.00	\$900.00
608-00006	Concrete Sidewalk (6 Inch)	SY	269	\$85.50	\$22,999.50
608-00010	Concrete Curb Ramp	SY	281	\$168.00	\$47,208.00
609-21010	Curb and Gutter Type 2 (Section I-B)	LF	18	\$52.00	\$936.00
609-21020	Curb and Gutter Type 2 (Section II-B)	LF	606	\$38.71	\$23,456.44
610-00030	Median Cover Material (Concrete)	SF	1041	\$26.00	\$27,066.00
612-00039	Delineator (Flexible) (Surface Mounted)	EACH	7	\$147.00	\$1,029.00
613	Electric Meter Pedestal Cabinet and Base	EACH	2	\$4,500.00	\$9,000.00
613	Pull Box (Type C)	EACH	4	\$1,075.00	\$4,300.00
613	Luminaire (LED) (5,300 Lumens)	EACH	8	\$635.00	\$5,080.00
613-00207	2 Inch Electrical Conduit (Bridge)(Special)	LF	672	\$7.00	\$4,704.00
613-00306	3 Inch Electrical Conduit (Bored)	LF	1340	\$22.00	\$29,480.00
613-01200	2 Inch Electrical Conduit (Plastic)	LF	20	\$22.00	\$440.00
613-01300	3 Inch Electrical Conduit (Plastic)	LF	230	\$28.00	\$6,440.00
613-10000	Wiring	LS	1	\$11,650.00	\$11,650.00
614	Reset Bluetoad Equipment	EACH	1	\$2,565.00	\$2,565.00
614	Ethernet Managed Field Switch	EACH	2	\$5,335.00	\$10,670.00
614-00011	Sign Panel (Class I)	SF	136	\$26.00	\$3,536.00
614-00012	Sign Panel (Class II)	SF	25	\$33.00	\$825.00
614-00035	Sign Panel (Special)	SF	34	\$33.00	\$1,122.00
614-01582	Steel Sign Support (2-1/2 in Round)(Post and Slipbase)	LF	96	\$38.00	\$3,648.00
614-70150	Pedestrian Signal Face (16) (Countdown)	EACH	12	\$550.00	\$6,600.00
614-70336	Traffic Signal Face (12-12-12)	EACH	24	\$755.00	\$18,120.00
614-70448	Traffic Signal Face (12-12-12-12)	EACH	4	\$1,075.00	\$4,300.00
614-72855	Traffic Signal Controller Cabinet	EACH	2	\$23,315.00	\$46,630.00
614-72860	Pedestrian Push Button	EACH	12	\$232.00	\$2,784.00
614-72863	Pedestrian Push Button Post Assembly	EACH	3	\$1,020.00	\$3,060.00
614-72866	Fire Preemption Unit and Timer (System)	EACH	2	\$7,846.00	\$15,692.00
614-72886	Intersection Detection System (Camera)	EACH	6	\$9,580.00	\$57,480.00
614-81000	Traffic Signal-Light Pole Steel	EACH	2	\$6,100.00	\$12,200.00
614-81150	Traffic Signal-Light Pole Steel (1-50 Foot Mast Arm)	EACH	2	\$27,800.00	\$55,600.00
614-81155	Traffic Signal-Light Pole Steel (1-55 Foot Mast Arm)	EACH	2	\$29,655.00	\$59,310.00

614-81160	Traffic Signal-Light Pole Steel (1-60 Foot Mast Arm)	EACH	1	\$35,800.00	\$35,800.00
614-81165	Traffic Signal-Light Pole Steel (1-65 Foot Mast Arm)	EACH	1	\$36,675.00	\$36,675.00
614-84100	Traffic Signal Pedestal Pole Aluminum	EACH	1	\$1,635.00	\$1,635.00
614-86105	Telemetry (Field)	EACH	2	\$4,045.00	\$8,090.00
614-86800	Uninterrupted Power Supply	EACH	2	\$7,485.00	\$14,970.00
614-87320	Closed Circuit Television	EACH	2	\$6,076.00	\$12,152.00
625-00000	Construction Surveying	LS	1	\$9,500.00	\$9,500.00
626-00000	Mobilization	LS	1	\$50,000.16	\$50,000.16
627-00008	Modified Epoxy Pavement Marking	GAL	12	\$326.00	\$3,912.00
627-00070	Preformed Thermoplastic Pavement Marking	SF	1923	\$13.00	\$24,999.00
627-01010	Preformed Plastic Pavement Marking (Type I) (Inlaid)	SF	37	\$45.00	\$1,665.00
629	Survey Monument	EACH	4	\$930.00	\$3,720.00
630-00000	Flagging	HOUR	240	\$26.00	\$6,240.00
630-00003	Uniformed Traffic Control	HOUR	80	\$115.00	\$9,200.00
630-00007	Traffic Control Inspection	DAY	24	\$155.00	\$3,720.00
630-00012	Traffic Control Management	DAY	60	\$970.00	\$58,200.00
630-80335	Barricade (Type 3 M-A) (Temporary)	EACH	4	\$194.00	\$776.00
630-80341	Construction Traffic Sign (Panel Size A)	EACH	8	\$65.00	\$520.00
630-80342	Construction Traffic Sign (Panel Size B)	EACH	28	\$78.00	\$2,184.00
630-80355	Portable Message Sign Panel	EACH	4	\$4,520.00	\$18,080.00
630-80356	Advance Warning Flashing or Sequencing Arrow Panel (A TY)	EACH	2	\$1,937.00	\$3,874.00
630-80363	Drum Channelizing Device (With Light) (Flashing)	EACH	50	\$65.00	\$3,250.00
630-80380	Traffic Cone	EACH	100	\$9.00	\$900.00
630-85041	Mobile Attenuator	DAY	5	\$300.00	\$1,500.00
700-70010	F/A Minor Contract Revisions	FA	1	\$15,000.00	\$15,000.00
700-70082	F/A Furnish & Install Electrical Service	FA	1	\$50,000.00	\$50,000.00
700-70310	F/A Landscaping	FA	1	\$5,000.00	\$5,000.00

700-70380	F/A Erosion Control	FA	1	\$5,000.00	\$5,000.00
700-70589	F/A Environmental Health & Safety Management	FA	1	\$2,500.00	\$2,500.00

						BID ITEMS		\$1,172,982.00
						TEXTURA		\$5,850.00
								\$1,178,832.00

Enter totals from QuestCDN Bid Worksheet below:

Bid Items Total Amount (Bid Items Total Amount (202-00155 through 700-70589, including Five [5] Force Accounts, (Ninety Three [93]) total bid items.)) \$ 1,172,982.00

Textura ® Fee from table on Page BF-3 (based on Bid Items Total Amount) \$ 5,850.00

Base Bid Items Total Amount plus Textura® Fee equals Total Bid Amount \$ 1,178,832.00

Base Bid + Textura Fee Total:

ONE MILLION, ONE HUNDRED SEVENY-EIGHT THOUSAND, EIGHT HUNDRED THIRTY-TWO AND NO CENTS. Dollars \$ 1,178,832.00)

If the Executive Director 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, 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 in the sum of the full amount of this bid, executed by a surety company acceptable to the Executive Director.

The ARGONAUT INSURANCE CO., a corporation of the State of ILLINIOS, is hereby offered as Surety on said bond. If such surety is not approved by the Executive Director, 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 5% OF THE BID TOTAL. 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 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: N/A Name: N/A

Address: Address:

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

CITY AND COUNTY OF DENVER
DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE

BID BOND

KNOW ALL MEN BY THESE PRESENTS:

THAT W.L. Contractors, Inc., as Principal, and Argonaut Insurance Company, a corporation organized and existing under and by virtue of the laws of the State of Illinois, 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 Obligee, in full and just sum of Five Percent (5%) of Amount Bid Dollars, (\$ 5%), 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 December 10th, 2020, for the construction of: **Federal Aid Project No. SHE - M320-125, City and County of Denver Contract No. 202056331 - CCD FY19 HSIP Pkg 1: Yosemite St @ I225 - Traffic Signals Upgrade**, as set forth in detail in the Contract Documents for the City and County of Denver, Colorado, and said Obligee 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 Obligee 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 therefor, on the prescribed form presented to him for signature, enter into a written contract with the Obligee 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 Obligee, 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 Obligee 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 10th day of December, 2020

ATTEST

12 g Mark
Secretary

W.L. Contractors, Inc.
Principal

By: [Signature]
Title: V.P. of operations

Argonaut Insurance Company
Surety

By: [Signature]
Susan J. Lattarulo, Attorney-in-Fact

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

[SEAL]

**Argonaut Insurance Company
Deliveries Only: 225 W. Washington, 24th Floor
Chicago, IL 60606**

United States Postal Service: P.O. Box 469011, San Antonio, TX 78246

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That the Argonaut Insurance Company, a Corporation duly organized and existing under the laws of the State of Illinois and having its principal office in the County of Cook, Illinois does hereby nominate, constitute and appoint:

Sheila J. Montoya, Angela R. Yanofsky, Shaleen R. Lovitt, John Browning, Justin Tomlin, Thomas McCoy Jr., Kelli E. Housworth, Susan J. Lattarulo

Their true and lawful agent(s) and attorney(s)-in-fact, each in their separate capacity if more than one is named above, to make, execute, seal and deliver for and on its behalf as surety, and as its act and deed any and all bonds, contracts, agreements of indemnity and other undertakings in suretyship provided, however, that the penal sum of any one such instrument executed hereunder shall not exceed the sum of:

\$85,000,000.00

This Power of Attorney is granted and is signed and sealed under and by the authority of the following Resolution adopted by the Board of Directors of Argonaut Insurance Company:

"RESOLVED, That the President, Senior Vice President, Vice President, Assistant Vice President, Secretary, Treasurer and each of them hereby is authorized to execute powers of attorney, and such authority can be executed by use of facsimile signature, which may be attested or acknowledged by any officer or attorney, of the Company, qualifying the attorney or attorneys named in the given power of attorney, to execute in behalf of, and acknowledge as the act and deed of the Argonaut Insurance Company, all bond undertakings and contracts of suretyship, and to affix the corporate seal thereto."

IN WITNESS WHEREOF, Argonaut Insurance Company has caused its official seal to be hereunto affixed and these presents to be signed by its duly authorized officer on the 8th day of May, 2017.



Argonaut Insurance Company

Joshua C. Betz

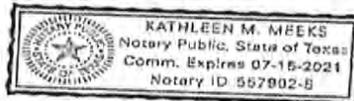
by:

Joshua C. Betz, Senior Vice President

STATE OF TEXAS
COUNTY OF HARRIS SS:

On this 8th day of May, 2017 A.D., before me, a Notary Public of the State of Texas, in and for the County of Harris, duly commissioned and qualified, came THE ABOVE OFFICER OF THE COMPANY, to me personally known to be the individual and officer described in, and who executed the preceding instrument, and he acknowledged the execution of same, and being by me duly sworn, deposed and said that he is the officer of the said Company aforesaid, and that the seal affixed to the preceding instrument is the Corporate Seal of said Company, and the said Corporate Seal and his signature as officer were duly affixed and subscribed to the said instrument by the authority and direction of the said corporation, and that Resolution adopted by the Board of Directors of said Company, referred to in the preceding instrument is now in force.

IN TESTIMONY WHEREOF, I have hereunto set my hand, and affixed my Official Seal at the County of Harris, the day and year first above written.



Kathleen M. MEEKS

(Notary Public)

I, the undersigned Officer of the Argonaut Insurance Company, Illinois Corporation, do hereby certify that the original POWER OF ATTORNEY of which the foregoing is a full, true and correct copy is still in full force and effect and has not been revoked.

IN WITNESS WHEREOF, I have hereunto set my hand, and affixed the Seal of said Company, on the 10th day of December, 2020.



James Bluzard

James Bluzard, Vice President-Surety



Office of Economic Development
 Division of Small Business Opportunity
 201 W Colfax Ave, Dept 907
 Denver, CO 80202
 P: 720.913.1714
 F: 720.913.1809
www.denvergov.org/oed

Diversity and Inclusiveness* in City Solicitations Information Request Form

Denver Executive Order No. 101 establishes strategies between the City and private industry to use diversity and inclusiveness to promote economic development in the City and County of Denver and to encourage more businesses to compete for City contracts and procurements. The Executive Order requires, among other things, the collection of certain information regarding the practices of the City's contractors and consultants toward diversity and inclusiveness and encourages/requires City agencies to include diversity and inclusiveness policies in selection criteria where legally permitted in solicitations for City services or goods.

Answer each question below. Missing or incomplete responses will be recorded as "no", "not applicable", or "none". **A proposal or response to a solicitation by a contractor/consultant that does not include this completed form shall be deemed non-responsive and rejected.**

Business Email Address * MBERNARDI@TEAMWL.COM

Enter Email Address of City and County of Denver contact person facilitating this solicitation * pw.procurement@denvergov.org

Project Name * CCD FY19 HSIP PACKAGE 1 - YOSEMITE AT I-225

Solicitation No. (Check Below if Not Applicable) * _____

Check Here if Solicitation No. is N/A

Name of Your Company * WL CONTRACTORS

What Industry is Your Business? *

- | | | |
|---|---|---|
| <input type="checkbox"/> Technology | <input type="checkbox"/> Financial | <input type="checkbox"/> Manufacturing |
| <input checked="" type="checkbox"/> Construction, Landscape, Maintenance Services | <input type="checkbox"/> Goods/Services | <input type="checkbox"/> Wholesale/Retail Trade |
| <input type="checkbox"/> Professional | <input type="checkbox"/> Transportation/Hauling | <input type="checkbox"/> Other |

Address * 5920 LAMAR STREET

City * ARVADA **State** COLORADO **Zip Code *** 80003

Business Phone Number * 303-422-7985

Business Facsimile Number 303-422-1634

1. How many employees does your company employ? *

- 1-10 51-100
 11-50 Over 100

1.1 How many of your employees are:

Number of Full Time: * ALL **Number of Part Time: *** 0

2. Do you have a Diversity and Inclusiveness Program? *

- Yes No

If **No**, and your company size is less than 10 employees continue to question 10. Complete and sign the form.

If **Yes**, does it address:

2.1. Employment and retention? *

- Yes No

2.2. Procurement and supply chain activities? *

- Yes No

2.3. Customer Service? *

- Yes No

3. Provide a detailed narrative of your company's diversity and inclusiveness principles and programs. This may include, for example, (i) diversity and inclusiveness employee training programs, equal opportunity policies, and the budget amount spent on an annual basis for workplace diversity; or (ii) diversity and inclusiveness training and information to improve customer service. (If Not Applicable, please type N/A below) *

N/A

4. Does your company regularly communicate its diversity and inclusiveness policies to employees? *

- Yes No

If you answered Yes to Question 4, how does your company regularly communicate its diversity and inclusiveness policies to employees? (Select all that apply) *

- Employee Training
 Pamphlets
 Public EEO Postings
 Other: NO

5. How often do you provide training and diversity and inclusiveness principles? *

- Monthly
- Quarterly
- Annually
- N/A
- Other:

5.1 What percentage of the total number of employees generally participate? *

- 0-25%
- 26-50%
- 51-75%
- 76-100%
- N/A

6. State how you achieve diversity and inclusiveness in supply and procurement activities. This may include, for example, narratives of training programs, equal opportunity policies, diversity or inclusiveness partnership programs, mentoring and outreach programs, and the amount and description of budget spent on an annual basis for procurement and supplier diversity and inclusiveness. (If Not Applicable, please type N/A below) *

N/A

7. Do you have a diversity and inclusiveness committee? *

- Yes
- No

7.1 If Yes, how often does it meet? *

- Monthly
- Quarterly
- Annually
- Other: NONE

7.2. If you responded that you do not have a diversity and inclusiveness committee, describe any plans your company may have to establish such a committee. (If Not Applicable, please type N/A below) *

NONE

8. Do you have a budget for diversity and inclusiveness efforts? *

Yes No

9. Does your company integrate diversity and inclusion competencies into executive/manager performance evaluation plans? *

Yes No

10. If you responded that you do not have a diversity and inclusiveness program, describe any plans your company may have to adopt such a program. *

N/A

11. Would you like information detailing how to implement a Diversity and Inclusiveness program? *

Yes No

If yes, please email XO101@denvergov.org.

I attest that the information represented herein is true, correct and complete, to the best of my knowledge. *

Matt Bernardi
Signature of Person Completing Form *

12/10/2020
Date

MATT BERNARDI
Printed Name of Person Completing Form

NOTE: Attach additional sheets or documentation as necessary for a complete response.

*"Diversity and Inclusiveness Program" means a program that invites values, perspectives and contributions of people from diverse backgrounds, and integrates diversity into its hiring and retention policies, training opportunities, and business development methods to provide an equal opportunity for each person to participate, contribute, and succeed within the organization's workplace. "Diversity" encompasses a wide variety of human differences, including differences such as race, age, gender, gender identity, sexual orientation, ethnicity, physical disabilities, appearance, historically underutilized and disadvantaged persons, as well as social identities such as religion, marital status, socio-economic status, lifestyle, education, parental status, geographic background, language ability, and veteran status."

COLORADO DEPARTMENT OF TRANSPORTATION COMMITMENT CONFIRMATION				
SECTION 1. This section must be completed by the Contractor.				
Project:	FY19 HSIP PKG 1 YOSEMITE/I-225	Project Code:	202056331	
Bidder/Contractor:	WL CONTRACTORS	Phone:	303-422-7985	
Contact:	MATT BERNARDI	Email:	mbernardi@teamwl.com	
DBE Firm Name:	CHATO'S CONCRETE, LLC	DBE Phone:	720-252-7959	
DBE Address:	8326 Quivas Way, Denver 80221	DBE Email:	marlene@chatosconcrete.com	
Commitment Details				
Category	Work to be Performed	DBE Work Code(s)	Commitment Amount	Eligible Participation
Construction	CONCRETE & ASPHALT	NAICS 237310	\$219,717.00	20.005%
Trucking				
Supplies				
Services				
			Total	\$219,717.00 20.05%
This section must be signed by an individual with the power to contractually bind the Bidder/Contractor. You declare under penalty of perjury in the second degree and any other applicable state or federal laws that the statements made in this document are complete, true and accurate to the best of your knowledge.				
WL CONTRACTORS	ESTIMATOR	<i>Matt Bernardi</i>	12/31/2020	
Bidder/Contractor Representative	Title	Signature	Date	
SECTION 2. This section must be completed by the DBE. (Attach additional pages if necessary).				
This document is not a contract with the Bidder/Contractor; it is an acknowledgement of the obligation that the Bidder/Contractor is making to CDOT. The amounts listed above may be less than the subcontractor or purchase order amount, but can never be more, and shall not reflect any mark up by the Bidder/Contractor. All questions must be answered.				
Are you contracting directly with the Bidder/Contractor or with one of its subcontractors? If with a subcontractor, provide the firm name.	Yes			
Will you be purchasing supplies or materials or leasing or renting equipment from the Bidder/Contractor or its subcontractors? If so, explain.	NO			
Do you intend to subcontract any portion of the work listed above? If yes, state to which firms, what work and the approximate amount. Include trucking subcontractors and owner-operators.	NO			
Will you be providing trucking services on this project? If so, state how many of your own trucks and employees you will have on this project.	Yes-for our own scope of work			
Who within your firm will be supervising and responsible for your firm's work on this project?	Chato Villalobos			
Will you be acting as a broker on this project? If so, state what you will be brokering and your approximate brokerage fee.	NO			
Will you be acting as a supplier on this project? If so, please state what you will be supplying and whether you will manufacture the items.	NO			

From:

12/14/2020 11:54

#019 P.003/003

This section must be signed by an individual with the power to contractually bind the DBE. You declare under penalty of perjury in the second degree and any other applicable state or federal laws that the statements made in this document are complete, true and to the best of your knowledge. You attest that you are eligible to participate as a DBE on this contract for the work listed above and have the capacity to perform the work as stated.

Marlene Andrade, owner/Partner	owner/Partner		12-11-2020
DBE Representative	Title	Signature	Date

See the DBE Standard Special provision for additional information on completing and submitting this form.

Pre-award CDOT projects: Submit this form to the CDOT Civil Rights and Business Resource Center via fax to (303)757-9019. All originals must be sent to: CDOT Civil Rights and Business Resource Center, 4201 E. Arkansas Ave. Room 150, Denver, CO 80222.

Pre-award local agency projects: Submit this form to the local agency. All originals must be sent to: CDOT Civil Rights and Business Resource Center, 4201 E. Arkansas Ave. Room 150, Denver, CO 80222.

COLORADO DEPARTMENT OF TRANSPORTATION – Form 605 CONTRACTORS PERFORMANCE CAPABILITY STATEMENT	Project # 202056331
--	------------------------

1. List names of partnerships or joint ventures none

List decreases in the contractors fiscal or workmanship qualifications compared to the last prequalification statement submitted to CDOT. (Attach additional sheets if necessary)

a. Key personnel changes none

b. Key equipment changes none

c. Fiscal capability changes (legal actions, etc.) none

d. Other changes that may affect the contractors ability to perform work none

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

Contractor's firm or company name <i>VV-L Contractors</i>	By <i>[Signature]</i>	Date <i>12-10-2020</i>
	Title <i>U.p of operations</i>	
2 nd Contractor's firm or company name (if joint venture) N/A	By Title	Date

Form 605

COLORADO DEPARTMENT OF TRANSPORTATION ANTI-COLLUSION AFFIDAVIT	Project No.: 202056331
	Location: REGION 1

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

I further attest that:

1. The price(s) and amount of this bid have been arrived at independently, without consultation, communication or agreement for the purpose or with the effect of restricting competition with any other firm or person who is a bidder or potential prime bidder.
- 2A. Neither the price(s) nor the amount of this bid have been disclosed to any other firm or person who is a bidder or potential prime bidder on this project, and will not be so disclosed prior to bid opening.
- 2B. Neither the prices nor the amount of the bid of any other firm or person who is a bidder or potential prime bidder on this project have been disclosed to me or my firm.
- 3A. No attempt has been made to solicit, cause or induce any firm or person who is a bidder or potential prime bidder to refrain from bidding on this project, or to submit a bid higher than the bid of this firm, or any intentionally high or non-competitive bid or other form of complementary bid.
- 3B. No agreement has been promised or solicited for any other firm or person who is a bidder or potential prime bidder on this project to submit an intentionally high, noncompetitive or other form of complementary bid on this project.
4. The bid of my firm is made in good faith and not pursuant to any consultation, communication, agreement or discussion with, or inducement or solicitation by or from any firm or person to submit any intentionally high, noncompetitive or other form of complimentary bid.
5. My firm has not offered or entered into a subcontract or agreement regarding the purchase or sale of materials or services from any firm or person, or offered, promised or paid cash or anything of value to any firm or person, whether in connection with this or any other project, in consideration for an agreement or promise by any firm or person to refrain from bidding or to submit any intentionally high, noncompetitive or other form of complementary bid or agreeing or promising to do so on this project.
6. My firm has not accepted or been promised any subcontract or agreement regarding the sale of materials or services to any firm or person, and has not been promised or paid cash or anything of value by any firm or person whether in connection with this or any other project, in consideration for my firm's submitting any intentionally high, noncompetitive or other form of complementary bid, or agreeing or promising to do so, on this project.
7. I have made a diligent inquiry of all members, officers, employees, and agents of my firm with responsibilities relating to the preparation, approval or submission of my firm's bid on this project and have been advised by each of them that he or she has not participated in any communication, consultation, discussion, agreement, collusion, or other conduct inconsistent with any of the statements and representations made in this affidavit.
8. I understand and my firm understands that any misstatement in this affidavit is and shall be treated as a fraudulent concealment from the Colorado Department of Transportation, of the true facts relating to the submission of bids for this contract.

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

Contractors firm or company name: <i>W. L. Contractors</i>	By: <i>[Signature]</i>	Date: <i>10-10-2020</i>
	Title: <i>V.P of operations</i>	
2 nd Contractors firm or company name: <i>N/A</i>	By:	Date:
	Title:	
Sworn to before me this <i>10th</i> day of <i>December</i> 20 <i>20</i>		
Notary Public <i>[Signature]</i>	<div style="border: 2px solid blue; padding: 5px; text-align: center;"> BARBARA WRIGHT NOTARY PUBLIC STATE OF COLORADO NOTARY ID 20004034696 MY COMMISSION EXPIRES JANUARY 8, 2025 </div>	
My commission expires: <i>01/08/2025</i>		
NOTE: THIS DOCUMENT MUST BE SIGNED IN INK.		

Form 606

COLORADO DEPARTMENT OF TRANSPORTATION
ASSIGNMENT OF ANTITRUST CLAIMS

 Project No.:
 202056331

Contractor and Colorado Department of Transportation (CDOT) recognize that in actual economic practice antitrust violations ultimately impact CDOT. Therefore, for good cause and as consideration for executing this contract and for receiving payments hereunder:

1. Contractor hereby irrevocably assigns to CDOT any and all claims it may now have or which may hereafter accrues to it under federal or state antitrust laws in connection with the particular project, goods or services purchased or acquired by CDOT pursuant to this contract.
2. Contractor hereby expressly agrees:
 - a. That, upon becoming aware that a third party has commenced a civil action asserting on Contractor's behalf an antitrust claim which has been assigned to CDOT hereunder, Contractor shall immediately advise in writing:
 - (1) Such third party that the antitrust claim has been assigned to CDOT, and
 - (2) CDOT that such civil action is pending and the date on which, in accordance with subparagraph a.(1) above, Contractor notified such third party that the antitrust claim had been assigned to CDOT.
 - b. To take no action which will in any way diminish the value of the claims or rights assigned or dedicated to CDOT hereunder; and
 - c. Promptly to pay over to CDOT its proper share of any payment under an antitrust claim brought on Contractor's behalf by any third party and which claim has been assigned to CDOT hereunder.
3. Further, Contractor agrees that in the event it hires one or more subcontractors to perform any of its duties under the contract, Contractor shall require that each such subcontractor:
 - a. Irrevocably assign to CDOT (as a third party beneficiary) any and all claims that such subcontractor may have or which may thereafter accrue to the subcontractor under federal or state antitrust laws in connection with any goods or services provided by the subcontractor in carrying out the subcontractor's obligations to Contractor;
 - b. Upon becoming aware that a third party has commenced a civil action on the subcontractor's behalf asserting an antitrust claim which has been assigned to CDOT hereunder, shall immediately advise in writing:
 - (1) Such third party that the antitrust claim has been assigned to CDOT, and
 - (2) Contractor and CDOT that such civil action is pending and the date on which, in accordance with subparagraph b.(1) above, the subcontractor notified such third party that the antitrust claim had been assigned to CDOT;
 - c. Take no action which will in any way diminish the value of the claims or rights assigned or dedicated to CDOT hereunder; and
 - d. Promptly pay over to CDOT its proper share of any payment under an antitrust claim brought on the subcontractor's behalf by any third party and which claim has been assigned or dedicated to CDOT pursuant hereto.

I, acting in my capacity as officer of a bidder (bidders if a joint venture) do agree to the above assignment of antitrust claims.

Contractors firm or company name: <i>W. L. Contractors</i>	By: <i>[Signature]</i>	Date: <i>12/10/2020</i>
	Title: <i>V.P. of operations</i>	
2 ND Contractors firm or company name: <i>N/A</i>	By:	Date:
	Title:	

Form 621

**CITY AND COUNTY OF DENVER
DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE**

CONTRACT NO: 202056331
PROJECT NAME: CCD FY19 HSIP Pkg 1:Yosemite St. @ I225 - Traffic Signals Upgrade

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:

TECHNICAL SPECIFICATIONS/DRAWINGS REVISIONS AND CHANGES:

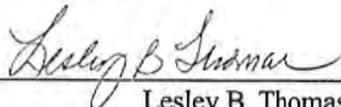
- **Details of the Fiber connection gator patch as required in the Telemetry specification. (See Attachment 1)**
- **Inclusion of Revision of Section 614 – Traffic Signal Backplates. (See Attachment 2)**

QUESTION AND ANSWERS:

Q1. Does the City require that traffic signal poles be furnished with the Valmont mitigator or are other manufactures without the mitigator acceptable? Also do the poles need to be powder coated or is paint acceptable?

A1. The mitigation device is required per latest Denver’s traffic standard and the poles need to be powder coated.

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



 Lesley B. Thomas
 City Engineer

November 24, 2020

 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

12-10-2020

 Date

CITY AND COUNTY OF DENVER
STATE OF COLORADO



DENVER
THE MILE HIGH CITY

DEPARTMENT OF TRANSPORTATION &
INFRASTRUCTURE

Bid Documents Package

Contract Number: 202056331

CCD FY19 HSIP Pkg 1: Yosemite St @ I225 -
Traffic Signals Upgrade

October 21, 2020

**CITY AND COUNTY OF DENVER
DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE**

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DENVER
THE MILE HIGH CITY

**CITY AND COUNTY OF DENVER
DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE**

STATEMENT OF QUANTITIES

Item No.	Description	Estimated	Quantity
202-00155	Removal of Wall	3	LF
202-00190	Removal of Concrete Median Cover Material	215	SY
202-00200	Removal of Sidewalk	216	SY
202-00203	Removal of Curb and Gutter	730	LF
202-00206	Removal of Concrete Curb Ramp	111	SY
202-00220	Removal of Asphalt Mat	922	SY
202-00453	Removal of Portions of Present Structure (Class 2)	26	SY
202-00810	Removal of Ground Sign	7	EACH
202-00828	Removal of Traffic Signal Equipment	1	LS
202-01130	Removal of Guardrail Type 3	45	LF
203	Potholing	60	EACH
207-00205	Topsoil	115	CY
208-00002	Erosion Log Type 1 (12 inch)	200	LF
208-00035	Aggregate Bag	200	LF
208-00046	Pre-fabricated Concrete Washout Structure (Type 1)	1	EACH
208-00051	Storm Drain Inlet Protection (Type I)	20	LF
208-00056	Storm Drain Inlet Protection (Type III)	2	EACH
208-00103	Removal and Disposal of Sediment (Labor)	120	HOUR
208-00105	Removal and Disposal of Sediment (Equipment)	120	HOUR



DENVER
THE MILE HIGH CITY

**CITY AND COUNTY OF DENVER
DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE**

STATEMENT OF QUANTITIES

Item No.	Description	Estimated	Quantity
208-00106	Sweeping (Sediment Removal)	20	HOUR
210-00810	Reset Ground Sign	6	EACH
210-00815	Reset Sign Panel	10	EACH
212-00006	Seeding (Native)	.2	ACRE
212-00032	Soil Conditioning	.2	ACRE
216-00201	Soil Retention Blanket (Straw/Coconut) (Biodegradable Class 1)	1,000	SY
304-06004	Aggregate Base Course (Class 6)	389	SY
403-00720	Hot Mix Asphalt (Patching) (Asphalt)	150	TON
503-00036	Drilled Shaft (36 Inch)	72	LF
503-00048	Drilled Shaft (48 Inch)	34	LF
601-03057	Concrete Class DR	5	CY
602-00000	Reinforcing Steel	50	LB
606-00301	Guardrail Type 3 (6-3 Post Spacing)	37	LF
607-11525	Fence (Plastic)	300	LF
608-00006	Concrete Sidewalk (6 Inch)	269	SY
608-00010	Concrete Curb Ramp	281	SY
609-21010	Curb and Gutter Type 2 (Section I-B)	18	LF
609-21020	Curb and Gutter Type 2 (Section II-B)	606	LF
610-00030	Median Cover Material (Concrete)	1,041	SF



DENVER
THE MILE HIGH CITY

**CITY AND COUNTY OF DENVER
DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE**

STATEMENT OF QUANTITIES

<u>Item No.</u>	<u>Description</u>	<u>Estimated</u>	<u>Quantity</u>
612-00039	Delineator (Flexible) (Surface Mounted)	7	EACH
613	Electric Meter Pedestal Cabinet and Base	2	EACH
613	Pull Box (Type C)	4	EACH
613	Luminaire (LED) (5,300 Lumens)	8	EACH
613-00207	2 Inch Electrical Conduit (Bridge)(Special)	672	LF
613-00306	3 Inch Electrical Conduit (Bored)	1,340	LF
613-01200	2 Inch Electrical Conduit (Plastic)	20	LF
613-01300	3 Inch Electrical Conduit (Plastic)	230	LF
613-10000	Wiring	1	LS
614	Reset Bluetoad Equipment	1	EACH
614	Ethernet Managed Field Switch	2	EACH
614-00011	Sign Panel (Class I)	136	SF
614-00012	Sign Panel (Class II)	25	SF
614-00035	Sign Panel (Special)	34	SF
614-01582	Steel Sign Support (2-1/2 in Round)(Post and Slipbase)	96	LF
614-70150	Pedestrian Signal Face (16) (Countdown)	12	EACH
614-70336	Traffic Signal Face (12-12-12)	24	EACH
614-70448	Traffic Signal Face (12-12-12-12)	4	EACH
614-72855	Traffic Signal Controller Cabinet	2	EACH



DENVER
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**CITY AND COUNTY OF DENVER
DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE**

STATEMENT OF QUANTITIES

<u>Item No.</u>	<u>Description</u>	<u>Estimated</u>	<u>Quantity</u>
614-72860	Pedestrian Push Button	12	EACH
614-72863	Pedestrian Push Button Post Assembly	3	EACH
614-72866	Fire Preemption Unit and Timer (System)	2	EACH
614-72886	Intersection Detection System (Camera)	6	EACH
614-81000	Traffic Signal-Light Pole Steel	2	EACH
614-81150	Traffic Signal-Light Pole Steel (1-50 Foot Mast Arm)	2	EACH
614-81155	Traffic Signal-Light Pole Steel (1-55 Foot Mast Arm)	2	EACH
614-81160	Traffic Signal-Light Pole Steel (1-60 Foot Mast Arm)	1	EACH
614-81165	Traffic Signal-Light Pole Steel (1-65 Foot Mast Arm)	1	EACH
614-84100	Traffic Signal Pedestal Pole Aluminum	1	EACH
614-86105	Telemetry (Field)	2	EACH
614-86800	Uninterrupted Power Supply	2	EACH
614-87320	Closed Circuit Television	2	EACH
625-00000	Construction Surveying	1	LS
626-00000	Mobilization	1	LS
627-00008	Modified Epoxy Pavement Marking	12	GAL
627-00070	Preformed Thermoplastic Pavement Marking	1,923	SF
627-01010	Preformed Plastic Pavement Marking (Type I) (Inlaid)	37	SF
629	Survey Monument	4	EACH



DENVER
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**CITY AND COUNTY OF DENVER
DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE**

STATEMENT OF QUANTITIES

Item No.	Description	Estimated	Quantity
630-00000	Flagging	240	HOUR
630-00003	Uniformed Traffic Control	80	HOUR
630-00007	Traffic Control Inspection	24	DAY
630-00012	Traffic Control Management	60	DAY
630-80335	Barricade (Type 3 M-A) (Temporary)	4	EACH
630-80341	Construction Traffic Sign (Panel Size A)	8	EACH
630-80342	Construction Traffic Sign (Panel Size B)	28	EACH
630-80355	Portable Message Sign Panel	4	EACH
630-80356	Advance Warning Flashing or Sequencing Arrow Panel (A TY)	2	EACH
630-80363	Drum Channelizing Device (With Light) (Flashing)	50	EACH
630-80380	Traffic Cone	100	EACH
630-85041	Mobile Attenuator	5	DAY
700-70010	F/A Minor Contract Revisions	1	FA
700-70082	F/A Furnish & Install Electrical Service	1	FA
700-70310	F/A Landscaping	1	FA
700-70380	F/A Erosion Control	1	FA
700-70589	F/A Environmental Health & Safety Management	1	FA

CITY AND COUNTY OF DENVER

**NOTICE OF INVITATION FOR BIDS
FEDERAL AID PROJECT NO.: SHE - M320-125
CITY OF DENVER CONTRACT NO.: 202056331**

CCD FY19 HSIP PKG 1: YOSEMITE ST @ I225 - TRAFFIC SIGNALS UPGRADE

**BID SCHEDULE:
11:00 a.m., Local Time
December 10, 2020**

Bids will be received and accepted via the online electronic bid service, www.QuestCDN.com. Bids must be submitted via QuestCDN no later than **December 10, 2020 at 11:00 a.m.** To access the electronic bid form, download the required documents from QuestCDN and click the online bidding button at the top of the advertisement. Prospective bidders must be on the plan holders list at QuestCDN for bids to be accepted. Bidders will be charged a fee of \$30.00 to submit a bid electronically. All properly uploaded bids will then be opened, witnessed and read aloud.

GENERAL STATEMENT OF WORK:

This project is to reconstruct two (2) existing traffic signals within the City and County of Denver. The two traffic signals are located at (1) Yosemite Street & I225 On/Off ramps (North Intersection); and (2) Yosemite Street & I225 On/Off ramps (South Intersection).

ESTIMATED CONSTRUCTION COST:

The estimated cost of construction for this project is between \$983,000.00 and \$1,201,000.00.

DOCUMENTS AND BID INFORMATION AVAILABLE:

Complete Contract Documents will be available on the first day of Bid publication at: www.QuestCDN.com. To download digital Contract Documents at a cost of \$15 per download, reference eBid Document Number #7355143. Contact QuestCDN at 952-233-1632 or info@questcdn.com for assistance.

PRE-BID MEETING:

A **virtual pre-bid meeting** will be held for this Project at 11:00 a.m., local time, on November 3, 2020. The teleconference call-in number and conference ID can be found on the project page at www.work4denver.com.

DEADLINE TO SUBMIT QUESTIONS: November 18, 2020 by 10:00 a.m. local time.

PREQUALIFICATION REQUIREMENTS:

Each bidder must be prequalified in category **1D(1) TRAFFIC SIGNALS, LIGHTING AND ITS** at or above 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 response due date. Applications must be submitted via email to pw.prequal@denvergov.org. To view the Rules and Regulations and to obtain a prequalification application, please visit our website at www.denvergov.org/prequalification.

DISADVANTAGED BUSINESS ENTERPRISE (DBE) PARTICIPATION:

Federally-funded construction, reconstruction, remodeling, and professional design services contracts made and entered into by the City and County of Denver are subject to Federal Statutes and Regulations regarding Disadvantaged Business Enterprise participation and all Disadvantaged Business Enterprises Utilization.

The U.S. Department of Transportation (DOT) is authorized to establish project goals for expenditures on construction, reconstruction and remodeling and professional design services work funded by FHWA and let by the City and County of Denver. The specific goal for this project is:

12% Disadvantaged Business Enterprise (DBE)

The project goal must be met with certified participants as set forth in 49 CFR Part 26. For compliance with good faith effort requirements, refer to 49 CFR 26.53.

MISCELLANEOUS:

Contracts for construction, reconstruction, and remodeling are subject to the United States Department of Labor Wage determinations requirements.

City contracts are subject to payment of City Minimum Wage established pursuant to Section 20-82 through 20-84 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.

Publication Dates: October 21, 22, 23, 2020
Published In: The Daily Journal

CITY AND COUNTY OF DENVER 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 a 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, via QuestCDN's electronic bidding platform 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.

Bid guarantee will be accepted electronically as part of the Bid packet submitted via QuestCDN. The bid guarantee must be received by the City within seven calendar days following the bid opening date to:

Department of Transportation and Infrastructure
Attention: Contract Administration
201 W. Colfax Ave. Dept. 614
Denver, CO 80202

IB-3 CONTRACT DOCUMENTS AS PUBLISHED BY CITY

Each bidder is responsible for, and shall be deemed to have received, all 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 typing 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 fully and properly completed. If a submitted bid has words and figures as written on the Bid Form by the bidder that do not agree, the written words will govern.

On Bid Forms requiring unit price bids, the bidder shall write in the provided Bid Form spaces 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 the other persons have agency to bind the bidder.

IB-5 UNACCEPTABLE BIDS

The City will not accept bids from bidders not prequalified with the City (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, interlineation, 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 so unbalanced 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 that have not acknowledged all addenda to the Contract Documents issued for this bid may also be rejected.

The City reserves the right 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 1) a certified or cashier's check made payable without condition to the order of the City and County of Denver or 2) a bid bond in a form acceptable to the City and signed by an approved corporate surety in favor of the City and County of Denver. Upon acceptance of the bid and notification by the Executive Director the bidder is considered to be the Apparent Low Bidder, bidder must execute a contract in the form prescribed, furnish a performance and payment bond with a legally responsible and approved surety, furnish the required evidence of insurance, and otherwise satisfy all conditions precedent to contract execution within five (5) days after such notice is made by the City. Should a bidder fail to complete these requirements within the time allotted, 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 properly executed bid guarantee on the form provided herein may, in the City's sole discretion, 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. The bid guarantee of the Apparent Low Bidder shall be returned after the following conditions have been met: the Apparent Low Bidder delivers to the City satisfactory performance and payment bonds and required insurance

documentation, the Apparent Low Bidder has satisfied all conditions precedent to contract execution by the City, the Apparent Low Bidder fully and faithfully executes the Contract, and, if required, the Council of the City approves the Contract. 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 based on interpretation by the design professionals from 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 Executive Director or his/her representatives.

Since the bid information cannot be guaranteed, the bidder 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 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 the Department of Transportation and Infrastructure and sending or delivering it to the office 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 www.QuestCDN.com. 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 the Department of Transportation and Infrastructure. After such time, no bid may be withdrawn or modified.

Withdrawal requests must be signed by the persons authorized to bind the bidder as defined in IB-4, COMPLETING AND SIGNING BID FORMS.

IB-12 WEBSITE

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 www.QuestCDN.com website.

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 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 VIRTUAL BID OPENING

Unless otherwise suspended, delayed or canceled by posted notice from the Manager, bid opening will occur via teleconference at the time designated in the Notice of Invitation for Bid.

IB-16 EVALUATION OF BIDS AND BASIS OF BID SELECTION

Bids will be evaluated after reading in the open meeting at the place designated for such bid opening. All low bidders' bids will be reviewed for responsiveness per the requirements of the Contract Documents as well as whether the bids contain irregularities that could give any bidder an unfair advantage.

Selection will be made based on the lowest, total, responsible, responsive, qualified bid that includes 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. Only corrected totals will be considered as the basis of selection.

Upon concluding the bid is, in fact, the lowest, total, responsive bid to the bidding conditions and is 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 re-bid the Project.

IB-17 NOTICE TO APPARENT LOW BIDDER

The Notice to Apparent Low Bidder, a form 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 the Executive Director 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 non-responsive and may constitute cause for rejection.

Issuance of such Notice shall not 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 the documents submitted by the Apparent Low Bidder into one or more executable copies. Upon notification that contract 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 will be examined by the City to determine whether or not the Apparent Low Bidder has correctly executed the Contract and has correctly provided and satisfactorily and properly completed the required supplemental documents. Once confirmed, 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 Executive Director 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, attestation by the Clerk, and countersignature and registration by the Auditor. 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 Apparent Low Bidder. Any work performed, or materials purchased, prior to the issuance of the Notice to Proceed is at the Apparent Low Bidder'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 a form similar to the one attached) to the City.

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 bidder and all subcontractors performing Work on the Project, unless such requirements are specifically accepted in writing by the City's Risk Management Office. The bidder 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 bidder shall ensure that each subcontractor complies with all 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 bidder must comply with, and should carefully consider, all requirements and conditions of the United States Department of Labor's Payment of Prevailing Wages.

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, prior to the date of the bid publication, it is determined 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. 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** prevailing wage rates to be paid by all contractors or subcontractors for the life of the contract.

IB-23 PAYMENT OF CITY MINIMUM WAGE

Contractor shall comply with, and agrees to be bound by, all requirements, conditions, and City determinations regarding the City's Minimum Wage Ordinance, Sections 20-82 through 20-84 D.R.M.C, including, but not limited to, the requirement that every covered worker shall be paid no less than the City Minimum Wage in accordance with the foregoing D.R.M.C. Sections.

Instances in which a worker is covered by both Prevailing Wage rate requirements and City Minimum Wage rate requirements, Contractor shall pay every covered worker the greater of the two.

The services being requested in this solicitation may involve services that are covered pursuant to Division 3.75 of Article IV of Chapter 20 of the Denver Revised Municipal Code ("D.R.M.C."), which is designed to address the issue of wage equity and cost of living affordability in the City & County of Denver. Contractor agrees that any contract with the City shall include a requirement that Contractor will comply

with the provisions of D.R.M.C. §§20-82 through 20-84, including, but not limited to, paying all covered workers no less than the City Minimum Wage for all covered services rendered in connection with the Contract. Additionally, Contractor agrees that the contract shall require compliance with all current and future federal and state laws and City ordinances.

IB-24 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. The City of Denver imposes consumer use tax on all construction and building materials used on any construction project located in Denver. Denver does not exempt governmental or charitable projects.

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 include Denver sales/use tax, Occupational Privilege taxes, and 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 \$500 or more 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-25 DIVERSITY AND INCLUSIVENESS IN CITY SOLICITATIONS

Each bidder shall, as a condition of responsiveness to this solicitation, complete and return the “Diversity and Inclusiveness in City Solicitations Information Request Form” with their Bid.

Using the “Diversity and Inclusiveness in City Solicitations Information Request Form” provided, please state whether you have a diversity and inclusiveness program for employment and retention, procurement and supply chain activities, or customer service. Provide any additional information requested on the form. The information supplied on the “Diversity and Inclusiveness in City Solicitations Information Request Form” will provide an opportunity for City contractors to describe their own diversity and inclusiveness practices. Bidders are not expected to conduct intrusive examinations of its employees, managers, or business partners to describe diversity and inclusiveness measures. Rather, the City simply seeks a description of the bidder’s current practices, if any.

Diversity and Inclusiveness information provided by City bidders in response to City solicitations for services or goods will be collated, analyzed, and made available in reports consistent with City Executive Order No. 101. However, no personally identifiable information provided by or obtained from bidders will be in such reports.

IB-26 DISADVANTAGED BUSINESS ENTERPRISE (DBE) REQUIREMENTS

The Disadvantaged Business Enterprise (DBE) Program is a federally-mandated program that seeks to ensure non-discrimination in the award of U.S. Department of Transportation (DOT) assisted contracts and to create a level playing field on which DBEs can compete fairly for DOT assisted contracts. **Local Public Agencies (LPAs) that are subrecipients of FHWA funding from the Colorado Department of**

Transportation (CDOT) must comply with CDOT's FHWA-approved DBE Program. To such end, CDOT sets a contract goal for DBE participation for each DOT assisted LPA Contract.

In order to be awarded the Contract, the Apparent Low Bidder shall show it has committed to DBE participation sufficient to meet the goal or has otherwise made good faith efforts to do so. CDOT will amend the goal prior to award if the Apparent Low Bidder demonstrates good faith efforts were made, but sufficient commitments to meet the goal could not be obtained.

CDOT and the LPA will monitor the progress of the Awarded Contractor (Contractor) throughout the project to ensure that the Contractor's DBE commitments are being fulfilled. Modifications to the commitments must be approved by the CDOT Regional Civil Rights Office (RCRO). The LPA may withhold payment or seek other contractual remedies if the Contractor is not complying with the requirements of this special provision. Upon completion of the Contract, CDOT may require the LPA to reduce the final payment to the Contractor if the Contractor has failed to fulfill the commitments or made good faith efforts to meet the contract goal.

The contractor, sub recipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate, which may include, but is not limited to:

(1) Withholding monthly progress payments; (2) Assessing sanctions; (3) Liquidated damages; and/or (4) Disqualifying the contractor from future bidding as non-responsible.

For general assistance regarding the DBE program and compliance, contact CDOT's Civil Rights and Business Resource Center (CRBRC) at (303)757-9234. For project specific issues, contact the LPA Engineer or RCRO.

All forms referenced herein can be found on the CDOT website in the forms library. Remainder of the Disadvantaged Business enterprise (DBE) Requirements (Local Agency) may be found attached herein.

IB-27 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 and costs and damages the City may incur directly or may be ordered to pay by such court.

IB-28 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 may also visit www.work4denver.com for information, both general and project specific. The Contract Administrator assigned to this project is **Isabelle Oldani** who may be reached via email at pw.procurement@denvergov.org.

IB-29 FEDERAL REQUIREMENTS

This project is funded, in whole or in part, by federal funding made available through the Federal Highway Administration (“FHWA”) and administered by the Colorado Department of Transportation (“CDOT”). As such, each bidder must review and comply with certain bid requirements (the “Federal Forms”) in formulating and submitting its bid for the Project, and, if awarded a contract pursuant to this bid, must comply with certain “Federal Requirements.” The required Federal Forms are included in the Bid Package at pages BF-13 through BF-21. The Federal Requirements are attached to the Bid Document Package, pages at BDP-63 through BDP-88. The bidder shall be presumed to have considered and completed all Federal Requirements and Forms as part of its bid and shall be presumed to have carefully considered and accounted for all costs of complying with the Federal Requirements in formulating and submitting a bid hereunder.

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IB-30 PAYMENT PROCEDURE REQUIREMENTS

Bidder recognizes and agrees that it shall be required to use the Textura® Construction Payment Management System (“Textura”) for this Project to request payment from the City and to pay all first tier subcontractors and suppliers and further record payment to all certified subcontractors or suppliers that are listed for participation towards any assigned program goal. All fees associated with Textura are to be paid by the bidder for billings for work performed. Bidders are required, when preparing a bid, to enter the price of Textura on the line provided for the service. The fee is all inclusive of all subcontractor, project and subscription fees associated with Textura. The bidder will calculate the fee based on their total bid (not including any alternates, if applicable) and the table below, and then include it on the line item provided in the bid form labeled **“Textura® Construction Payment Management System Fee”**. This expense becomes part of the contract and billable to the City. All costs including, but not limited to, costs associated with training, entering data, and/or utilizing Textura other than the Textura Construction Payment Management System Fee are overhead and shall not be reimbursed by the City. Bidder will be responsible for any tax on the Textura fee. As with other taxes, the City will not reimburse bidder for this cost and therefore this cost should be included in bidder’s bid. Textura will invoice the awarded bidder directly.

Project Value	Project Fee (GC + Sub Usage)
\$100,000 – 249,999.99	\$780
\$250,000 - \$499,999.99	\$1,625
\$500,000 - \$999,999.99	\$3,250
\$1,000,000 - \$2,999,999.99	\$5,850
\$3,000,000 - \$4,999,999.99	\$9,100
\$5,000,000 - \$9,999,999.99	\$12,220
\$10,000,000 - \$19,999,999.99	\$20,345
\$20,000,000 - \$49,999,999.99	\$32,500
\$50,000,000 - \$99,999,999.99	\$48,750
\$100,000,000 - \$199,999,999.99	\$69,095
\$200,000,000 - \$299,999,999.99	\$85,345
\$300,000,000 - \$399,999,999.99	\$109,720
\$400,000,000 - \$499,999,999.99	\$142,220
\$500,000,000 - \$999,999,999.99	\$162,500
\$1,000,000,000 - \$1,999,999,999.99	\$345,345
\$2,000,000,000 - \$4,999,999,999.99	\$650,000
\$5,000,000,000 - \$9,999,999,999.99	\$1,015,625
\$10,000,000,000 or greater	\$1,503,125

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**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 subjected 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 Mayor's Office of Contract Compliance.
- 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. "Mayor's Office of Contract Compliance" means the City agency established pursuant to Article III, Division 1 of Chapter 28 of the Denver Revised Municipal Code.

Revised: 10/19/93

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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 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 Mayor's Office of Contract Compliance 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 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.

Revised: 10/19/93

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REGULATION NO. 3. DIRECTOR OF CONTRACT COMPLIANCE: The Director of the Mayor's Office of Contract Compliance shall perform the duties assigned to such official by Article III, Division 2 of Chapter 28 of the Revised Municipal Code and by the Manager. (1) The Director of the Mayor's Office of Contract Compliance 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 Mayor's Office of Contract Compliance; 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 Mayor's Office of Contract Compliance 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 Mayor's Office of Contract Compliance 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 Notice to Proceed a sign-off will be required of the Director of the Mayor's Office of Contract Compliance 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.

Revised: 10/19/93

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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 & 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 Revised Municipal Code, he may issue a notice requiring the contractor to show cause, within fifteen 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.

Revised: 04/12/91

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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, Chapter 28 of the Revised Municipal Code, and the rules, regulations, and relevant orders of the Manager and Director.
5. The contractor will furnish all information and reports required by Article III, Division 2, 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 cancelled, 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.

Revised: 09/28/90

EEO-A1

7. The contractor will include Regulation 12 Paragraph 2 and the provisions of paragraphs (1) through (6) in every subcontract or 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 upon each subcontractor or suppliers. 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, 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.

Revised: 10/02/90

EEO-A2

APPENDIX F
BID CONDITIONS
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.

MICHAEL D. MUSGRAVE
Manager of Public Works
City and County of Denver

Revised: 10/19/93

EEO-F1

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 Office of Contract Compliance. 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:

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

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).

¹"Minority" is defined as including, Blacks, Spanish Surname Americans, Asian-Americans, and American Indians, and includes both men and Minority women.

Revised: 10/02/90

EEO-F2

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.

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:

Revised: 11/12/82

EEO-F3

- 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 Mayor's Office of Contract Compliance 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.

Revised: 10/19/93

EEO-F4

- 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

Revised: 10/19/93

EEO-F5

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 Mayor's Office of Contract Compliance 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.

Revised: 10/19/93

EEO-F6

A. **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, 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, 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, Chapter 28 of the Revised Municipal Code, and is therefore a "responsible prospective contractor".

Revised: 09/26/90

EEO-F7

3. The Mayor's Office of Contract Compliance shall review the contractor's employment practices during the performance of the contract. If the Mayor's Office of Contract Compliance determines that the contractor's Affirmative Action Plan is no longer an acceptable program, the Director shall notify the Manager.

B. **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, 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.

Revised: 10/19/93

EEO-F8

C. **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.

Revised: 04/12/91

EEO-F9

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, City and County Building, Room 379, Denver, Colorado 80202, and shall be forwarded through and with the endorsement of the Director.

Revised: 04/12/91

EEO-F10

CITY AND COUNTY OF DENVER

**FEDERAL AID PROJECT NO.: SHE - M320-125
CITY OF DENVER CONTRACT NO.: 202056331**

CCD FY19 HSIP Pkg 1: Yosemite St @ I225 - Traffic Signals Upgrade

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 contractor listed below, hereinafter referred to as the "Contractor," party of the second part,

**Lumin8 Transportation Technologies, LLC dba W.L. Contractors, LLC
5820 Lamar Street
Arvada CO, 80003**

WITNESSETH, commencing on **October 21, 2020**, 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:

<p>FEDERAL AID PROJECT NO.: SHE - M320-125 CITY OF DENVER CONTRACT NO.: 202056331</p>
--

WHEREAS, bids pursuant to said advertisement have been received by the Executive Director of the Department of Transportation and Infrastructure, 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*
- Bid Bond*
- Addenda (as applicable)*
- DBE Documents*
- Equal Employment Opportunity Provisions (Appendices A, B, E and F)*
- Bid Form*
- Commitment to DBE Participation*
- 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 **360 (Three Hundred and Sixty)** 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 **bid item numbers (202-00155 through 700-70589 including Five [5] Force Accounts, (Ninety Three [93]) total bid items.)**, the total estimated cost thereof being **One Million One Hundred Seventy-Eight Thousand Eight Hundred Thirty-Two Dollars and No Cents (\$1,178,832.00)**. 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 work under this contract, the Contractor may not refuse to hire, discharge, promote or demote, or discriminate in matters of compensation against any person otherwise qualified, solely because of race, color, religion, national origin, gender, age, military status, sexual orientation, gender identity or gender expression, marital status, or physical or mental disability. The Contractor shall insert the foregoing provision in all subcontracts.

6. DBE AND EQUAL OPPORTUNITY REQUIREMENTS

The Contractor agrees to comply with all requirements of the City's Equal Employment Opportunity program and the Federal Disadvantaged Business Enterprise Participation program as set out in Article III, Division 2, Chapter 28 of the Denver Revised Municipal Code, and any rules, regulations and guidelines set forth thereunder for such programs. This compliance shall include the obligation to maintain throughout

the term of the contract that level of DBE participation upon which the Contract was initially awarded, unless otherwise authorized by the law or any rules, regulations or guidelines.

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 as well as the **City's Minimum Wage Protections** Sections 20-82 through 20-84 D.R.M.C, in addition to the U.S Department of Labor rates, and the contractor shall pay whichever is greatest of the three rates.

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. [RESERVED]

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 City 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. 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.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

Contract Control Number: DOTI-202056331-00
Contractor Name: Lumin8 Transportation Technologies, LLC dba W.L. Contractors, LLC

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:

Attorney for the City and County of Denver

By:

By:

By:

Contract Control Number:
Contractor Name:
Contractors, LLC

DOTI-202056331-00
Lumin8 Transportation Technologies, LLC dba W.L.

DocuSigned by:
Doug Freyta
By: 03265AB219EE49B...

Name: Doug Freyta
(please print)
Title: Senior vp of operations
(please print)

ATTEST: [if required]

By: _____

Name: _____
(please print)

Title: _____
(please print)

**STANDARD SPECIFICATIONS FOR CONSTRUCTION
GENERAL CONTRACT CONDITIONS**

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CITY AND COUNTY OF DENVER
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 Capital Projects Management

<https://www.denvergov.org/content/denvergov/en/wastewater-management/capital-projects-management.html>

Colorado Department of Transportation:

Standard Specifications for Road and Bridge Construction
(Sections 200 through 700 of the 2019 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 2018 Series, City and County of Denver Amendments 2019)

<https://www.denvergov.org/content/denvergov/en/denver-development-services/help-me-find/building-codes-and-policies.html>

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, (5th floor), Denver, CO 80202. The *Standard Specifications for Construction, GENERAL CONTRACT CONDITIONS* is available at: <https://www.denvergov.org/content/denvergov/en/contract-administration/contractor-resources.html> *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, The FHWA website also contains purchasing information.

SC-2 DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE (REPLACES GENERAL CONTRACT CONDITION 203)

As of January 1, 2020, the functions of Public Works are housed in the new Department of Transportation and Infrastructure. For purposes of this Contract all references (including, but not limited to, references appearing in the body of the contract, General Conditions, Special Conditions, Exhibits, Contract Documents or Policies and Procedures) to the Department of Public Works will have the same meaning as the Department of Transportation and Infrastructure.

Vested exclusively in the Department of Transportation and Infrastructure is the management and control of the design and construction of general and local public improvements undertaken by the City and County of Denver, except for: (i) work which is under the management and control of the Department of Aviation; (ii) that work performed by the Denver Board of Water Commissioners; (iii) any such work that the Mayor has specifically assigned to another department or agency; and (iv) work under the authority of the Department of Transportation and Infrastructure that is performed with the permission of the Manager of Transportation and Infrastructure by private entities at their own expense.

SC-3 MANAGER OF DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE (REPLACES GENERAL CONTRACT CONDITION 204)

General Condition 204 "Manager of Public Works" is hereby deleted in its entirety and replaced with the following:

As of January 1, 2020, the functions of Public Works are housed in the new Department of Transportation and Infrastructure. The Manager of Public Works / Executive Director of Public Works will become the Executive Director of Transportation and Infrastructure. Manager of Public Works, Executive Director of Public Works, Executive Director of Transportation and Infrastructure and Manager of Transportation and Infrastructure will have the same meaning for purposes of this Agreement.

SC-4 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-5 PROJECT DELIVER ADMINISTRATION / CITY ENGINEER

Project Delivery Administration is a division is a unit of the Department of Transportation and Infrastructure and is supervised by the City Engineer, who is subordinate to the Manager of Transportation and Infrastructure. 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 are deleted and replaced with references to the Engineering Division and the City Engineer, respectively.

SC-6 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 (the "Director") 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 Director 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:

Department of Transportation and Infrastructure:

<u>Project Manager</u>	<u>Telephone</u>
Alex Kouprivitch - Design	720.913.0803
Mat Flores - Construction	720.865.3158

<u>Consultant</u>	<u>Name</u>	<u>Telephone</u>
Apex Design Build Inc.	Tony Hurd	303.945.2356

SC-7 LIQUIDATED DAMAGES; MILESTONES; ACTUAL DAMAGES

.1 Time is of the essence in performing the Contract. In the event the Contractor fails to achieve the milestones described below or fails to meet any other time requirement or the time limit set forth in the Contract (See Milestone Schedule SC 8.5 below), after due allowance for any extension or extensions of time made in accordance with the provisions herein set forth, the Contractor shall be liable to the City for liquidated damages, and not as a penalty, in the amount stipulated therefore in the Contract Form or in the Special Conditions. Such liquidated damages shall be assessed for each and every Day that the Contractor shall be in default, as established by said time limit or limits. The City shall have the right to deduct said liquidated damages from any amount due or that may become due the Contractor, or to collect such liquidated damages from the Contractor or its surety.

.2 Liquidated damages in the amount stipulated do not include any sums of money to reimburse the City for actual damages which may be incurred between Substantial Completion and Final Completion because of the Contractor's failure to achieve Final Completion within the Contract Time. For such delay in Final Completion, the Contractor shall reimburse the City, as a mitigation of City damages and not as a penalty, those administrative costs incurred by the City as a result of such failure. Representative hourly rates for such administrative costs are set out in the Special Conditions. The Project Manager shall calculate the City's administrative costs based on such Special Conditions, as the same may be revised from time to time.

Representative hourly rates for the City administrative costs 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

.3 Liquidated damages in the amounts stipulated do not include any sums of money to reimburse the City for extra costs which the City may become obligated to pay on other contracts which were delayed or extended because of the Contractor's failure to complete the Work within the Contract Time. Should the City incur additional costs because of delays or extensions to other contracts resulting from the Contractor's failure of timely performance, the City will assess these extra costs against the Contractor, and these assessments will be in addition to the stipulated liquidated damages.

.4 The City reserves all of its rights to actual damages from the Contractor for injury or loss suffered by the City from actions or omissions of the Contractor, including but not limited to any other breach or default of the Contract, outside of the scope of the above sections of GC 602.

.5 The Parties recognize and agree that time is of the essence on this Contract. Due to the time sensitivities, the Contract establishes multiple milestones based on the date the Notice to Proceed is issued by the City. Milestone completion shall be achieved per the Milestone Schedule listed herein. If Substantial Completion is not reached by the last day of the individual milestone work window, liquidated damages will be assessed by the City to the contractor in the amount of \$1,500.00 per calendar day. Completion for the purposes of this section 602.5 shall include all work completed per the Contract and any executed change orders and any executed amendments.

Milestone Schedule:

Milestone	Requirement	Location	Milestone Work Window
1	Pothing and underground conduit installation	I-225/Yosemite	NTP to June 30, 2021
2	Substantial Completion	I-225/Yosemite	NTP plus 360 days

SC-8 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-9 PREVAILING WAGE RATES

General Contract Condition 1001 Wages is replaced in its entirety with the United States Department of Labor wages and requirements and compliance therewith.

SC-10 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 (“Textura”) for this Project to request payment from the City and to pay all first tier subcontractors and suppliers and further record payment to all certified subcontractors or suppliers that are listed for participation towards any assigned DBE program goal. Contractor further agrees that, to the fullest extent possible within Textura, 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 Textura, including, but not limited to, information related to Contractor and subcontractor billings. To that end, Contractor agrees it will activate any available settings within Textura 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>
Department of Transportation and Infrastructure	Mat Flores	720.865.3158

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, and its subcontractors of all tiers who have performed work, shall also submit to the Auditor and other appropriate officials of the City prior to submitting the payment application, information required by General Contract Condition 1004, REPORTING WAGES PAID.
4. Starting with the second payment application, the payment applications shall be accompanied by a completed Contractors' Certification of Payment Form (CCP), listing all first tier subcontractors and suppliers and all certified subcontractors or suppliers that are listed for participation towards any assigned DBE program goal. The final payment application must be accompanied by an executed Final Claim Release Form and Certificate of Contract Release Form from the Contractor.

The forms, Final Release and Certificate of Payment (Subcontractor/Supplier) and the Contractor's Certification of Payment (CCP), both of which must be used are attached below. If subcontractor or supplier payments are disbursed via Textura® CPM, those systems generated Release and CCP forms are acceptable.

Title 20, 2003 Final Settlement, section .2, item F is modified to read as follows:

F. At time of request for final payment, Contractor shall submit a complete and final, unconditional waiver or release of any and all lien and claim rights for all labor, equipment, and material used or furnished to complete the Work in the form and format generated within the Textura CPM system. Contractor shall also return an executed Certificate of Contract Release (below), upon request from the City.

SC-11 CONSTRUCTION INSPECTION BY THE CITY

General Condition 1701, AUTHORITY OF INSPECTORS, is modified as follows:

1701.1 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 TERMINOLOGY

Terminology used in Colorado Department of Transportation (CDOT) Standards and Specifications and City and County of Denver (CCD) Standards and Specifications may differ but shall be considered interchangeable where appropriate. Examples are Department of Public Works (CCD) and Department (CDOT), Project Manager (CCD) and Engineer (CDOT), Traffic Maintenance Plan (CCD) and Traffic Control Plan (CDOT).

SC-15 TECHNICAL SPECIFICATIONS

Section 106 of the CDOT Standard Specifications is hereby incorporated into this contract except where conflicts exist between Section 106 and the General Contract Conditions or Special Contract Conditions. Where conflicts exist, the General Contract Conditions or Special Contract Conditions shall govern.

SC-16 MODIFICATION TO GENERAL CONTRACT CONDITION 405

General Contract Condition 405 is hereby revised for this project as follows:

G.C. 405.2 shall include the following:

Shop Drawings shall be submitted in accordance with Section 105.02 of the CDOT Standard Specifications. Any work performed by the Contractor prior to receipt of approved shop drawings is at the sole risk of the Contractor.

SC-17 MODIFICATION TO GENERAL CONTRACT CONDITION 809

General Contract Condition 809 is hereby revised for this project as follows:

Add G.C. 809.3 as follows:

.3 Fossils may be uncovered during excavation for the project. The Colorado Department of Transportation will furnish a paleontologist to monitor project excavations. The Contractor shall notify the Engineer at least five working days prior to the start of excavation operations to allow for scheduling of the monitor. The paleontologist, Mr. Steve Wallace, can be contacted at (303) 757-9632.

If fossils are encountered, they will be evaluated and, if deemed important, removed prior to further excavation. When directed, the Contractor shall excavate the site in such manner as to preserve the fossils uncovered and shall remove them as directed by the Engineer.

SC-18 FEDERAL REQUIREMENTS

This Project is funded, in whole or in part, by federal funding made available through the Federal Highway Administration (“FHWA”) and administered by the Colorado Department of Transportation (“CDOT”). As such, performance under this contract is subject to certain “Federal Requirements” contained or referenced in Attachment A to this contract, attached hereto and incorporated herein by this reference. The Contractor shall thoroughly review and shall strictly comply with all Federal Requirements in performing its Work under this contract.

SC-19 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-20 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-21 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, Auto Liability and Contractors Pollution 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-22 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.

<https://www.denvergov.org/content/denvergov/en/contract-administration/contractor-resources.html>

SC-23 [RESERVED]**SC-24 DEFENSE AND INDEMNIFICATION**

Title 1602 is hereby deleted in its entirety and replaced with the following:

- (a) To the fullest extent permitted by law, the Contractor hereby agrees to defend, indemnify, reimburse and hold harmless City, its appointed and elected officials, agents and employees for, from and against all liabilities, claims, judgments, suits or demands for damages to persons or property arising out of, resulting from, or related to the work performed under this Agreement that are due to the negligence or fault of the Contractor or the Contractor's agents, representatives, subcontractors, or suppliers ("Claims"). This indemnity shall be interpreted in the broadest possible manner consistent with the applicable law to indemnify the City.
- (b) Contractor's duty to defend and indemnify City shall arise at the time written notice of the Claim is first provided to City regardless of whether suit has been filed and even if Contractor is not named as a Defendant.

- (c) Contractor will defend any and all Claims which may be brought or threatened against City and will pay on behalf of City any expenses incurred by reason of such Claims including, but not limited to, court costs and attorney fees incurred in defending and investigating such Claims or seeking to enforce this indemnity obligation. Such payments on behalf of City shall be in addition to any other legal remedies available to City and shall not be considered City's exclusive remedy.
- (d) Insurance coverage requirements specified in this Agreement shall in no way lessen or limit the liability of the Contractor under the terms of this indemnification obligation. The Contractor shall obtain, at its own expense, any additional insurance that it deems necessary for the City's protection.
- (e) This defense and indemnification obligation shall survive the expiration or termination of this Agreement.

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**CITY AND COUNTY OF DENVER
DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE**

Bond No. SUR0065021

PERFORMANCE AND PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned Lumin8 Transportation Technologies, LLC dba W.L. Contractors, LLC, 5820 Lamar Street, Arvada CO, 80003, a corporation organized and existing under and by virtue of the laws of the State of Colorado, hereafter referred to as the "Contractor", and Argonaut Insurance Company, a corporation organized and existing under and by virtue of the laws of the State of Illinois, 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 One Hundred Seventy-Eight Thousand Eight Hundred Thirty-Two Dollars and No Cents (\$1,178,832.00), 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 **Federal Aid Project No. SHE - M320-125, City and County of Denver Contract No. 202056331 - CCD FY19 HSIP Pkg 1: Yosemite St @ I225 - Traffic Signals Upgrade**, 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 _____ day of _____, 20__.

Attest:

Secretary

Lumin8 Transportation Technologies, LLC DBA W.L. Contractors
Contractor

By: _____
President

Argonaut Insurance Company

Surety

By: _____
Attorney-In-Fact Susan J. Lattarulo

(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

Signature by the CAO will be provided later
By: and fully incorporated herein.
Assistant City Attorney

APPROVED FOR THE CITY AND COUNTY
OF DENVER

Signature by the Mayor will be provided later
By: and fully incorporated herein.
MAYOR
Signature by the ED will be provided later
By: and fully incorporated herein.
EXECUTIVE DIRECTOR OF THE DEPARTMENT
OF TRANSPORTATION AND INFRASTRUCTURE

Argonaut Insurance Company
Deliveries Only: 225 W. Washington, 24th Floor
Chicago, IL 60606

United States Postal Service: P.O. Box 469011, San Antonio, TX 78246

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That the Argonaut Insurance Company, a Corporation duly organized and existing under the laws of the State of Illinois and having its principal office in the County of Cook, Illinois does hereby nominate, constitute and appoint:

Sheila J. Montoya, Angela R. Yanofsky, Shaleen R. Lovitt, John Browning, Justin Tomlin, Thomas McCoy Jr., Kelli E. Housworth, Susan J. Lattarulo

Their true and lawful agent(s) and attorney(s)-in-fact, each in their separate capacity if more than one is named above, to make, execute, seal and deliver for and on its behalf as surety, and as its act and deed any and all bonds, contracts, agreements of indemnity and other undertakings in suretyship provided, however, that the penal sum of any one such instrument executed hereunder shall not exceed the sum of:

\$85,000,000.00

This Power of Attorney is granted and is signed and sealed under and by the authority of the following Resolution adopted by the Board of Directors of Argonaut Insurance Company:

"RESOLVED, That the President, Senior Vice President, Vice President, Assistant Vice President, Secretary, Treasurer and each of them hereby is authorized to execute powers of attorney, and such authority can be executed by use of facsimile signature, which may be attested or acknowledged by any officer or attorney, of the Company, qualifying the attorney or attorneys named in the given power of attorney, to execute in behalf of, and acknowledge as the act and deed of the Argonaut Insurance Company, all bond undertakings and contracts of suretyship, and to affix the corporate seal thereto."

IN WITNESS WHEREOF, Argonaut Insurance Company has caused its official seal to be hereunto affixed and these presents to be signed by its duly authorized officer on the 8th day of May, 2017.



Argonaut Insurance Company

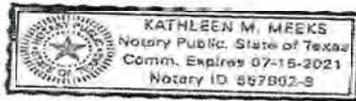
by: *Joshua C. Betz*

Joshua C. Betz, Senior Vice President

STATE OF TEXAS
COUNTY OF HARRIS SS:

On this 8th day of May, 2017 A.D., before me, a Notary Public of the State of Texas, in and for the County of Harris, duly commissioned and qualified, came THE ABOVE OFFICER OF THE COMPANY, to me personally known to be the individual and officer described in, and who executed the preceding instrument, and he acknowledged the execution of same, and being by me duly sworn, deposed and said that he is the officer of the said Company aforesaid, and that the seal affixed to the preceding instrument is the Corporate Seal of said Company, and the said Corporate Seal and his signature as officer were duly affixed and subscribed to the said instrument by the authority and direction of the said corporation, and that Resolution adopted by the Board of Directors of said Company, referred to in the preceding instrument is now in force.

IN TESTIMONY WHEREOF, I have hereunto set my hand, and affixed my Official Seal at the County of Harris, the day and year first above written.



Kathleen M. Meeks

(Notary Public)

I, the undersigned Officer of the Argonaut Insurance Company, Illinois Corporation, do hereby certify that the original POWER OF ATTORNEY of which the foregoing is a full, true and correct copy is still in full force and effect and has not been revoked.

IN WITNESS WHEREOF, I have hereunto set my hand, and affixed the Seal of said Company, on the _____ day of _____, _____.



James Bluzard

James Bluzard, Vice President-Surety

THIS DOCUMENT IS NOT VALID UNLESS THE WORDS ARGO POWER OF ATTORNEY ARE IN BLUE. IF YOU HAVE QUESTIONS ON AUTHENTICITY OF THIS DOCUMENT CALL (210) 331 - 8400.

January 15, 2021

Lumin8 Transportation Technologies, LLC
5920 Lamar Street
Denver, CO 80001

Re: Bond No. SUR0065021
City and County of Denver – Yosemite St. @ I225 – Traffic Signals Upgrade

Enclosed please find the Performance and Payment bonds for the referenced project. Because the agreement date is not known, the bonds and the power of attorney have not been dated.

Please be sure to date the bonds and the power of attorney the same date as the contract.

Thank you.

Best Regards,

LOCKTON COMPANIES OF COLORADO, INC.

A handwritten signature in blue ink, appearing to read "Susan J. Laffarulo".

Susan J. Laffarulo
Senior Account Manager, Surety



CERTIFICATE OF LIABILITY INSURANCE

12/1/2021 DATE (MM/DD/YYYY)
1/15/2021

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 have ADDITIONAL INSURED provisions or 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 Lockton Companies 8110 E Union Avenue Suite 700 Denver CO 80237 (303) 414-6000	CONTACT NAME: PHONE (A/C, No, Ext): FAX (A/C, No): E-MAIL ADDRESS: <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 80%;">INSURER(S) AFFORDING COVERAGE</th> <th style="width: 20%;">NAIC #</th> </tr> <tr> <td>INSURER A: Federal Insurance Company</td> <td>20281</td> </tr> <tr> <td>INSURER B: Executive Risk Indemnity Inc.</td> <td>35181</td> </tr> <tr> <td>INSURER C: The Princeton Excess & Surplus Lines Ins Co</td> <td>10786</td> </tr> <tr> <td>INSURER D: Allied World Assurance Company (U.S.) Inc.</td> <td>19489</td> </tr> <tr> <td>INSURER E:</td> <td></td> </tr> <tr> <td>INSURER F:</td> <td></td> </tr> </table>	INSURER(S) AFFORDING COVERAGE	NAIC #	INSURER A: Federal Insurance Company	20281	INSURER B: Executive Risk Indemnity Inc.	35181	INSURER C: The Princeton Excess & Surplus Lines Ins Co	10786	INSURER D: Allied World Assurance Company (U.S.) Inc.	19489	INSURER E:		INSURER F:	
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INSURER F:															
INSURED W.L. Contractors, Inc. 1486517 dba Lumin8 Transportation Technologies 5920 N Lamar Street Arvada, CO 80003															

COVERAGES **CERTIFICATE NUMBER: 17309505** **REVISION NUMBER: XXXXXXXX**

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 INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
B	COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: <input checked="" type="checkbox"/> POLICY <input type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC OTHER:	Y	N	54326176	12/1/2020	12/1/2021	EACH OCCURRENCE \$ 1,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 100,000 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 <input type="checkbox"/> OWNED AUTOS ONLY <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> HIRED AUTOS ONLY <input type="checkbox"/> NON-OWNED AUTOS ONLY	Y	N	54326175	12/1/2020	12/1/2021	COMBINED SINGLE LIMIT (Ea accident) \$ 1,000,000 BODILY INJURY (Per person) \$ XXXXXXXX BODILY INJURY (Per accident) \$ XXXXXXXX PROPERTY DAMAGE (Per accident) \$ XXXXXXXX \$ XXXXXXXX
C D	<input checked="" type="checkbox"/> UMBRELLA LIAB <input checked="" type="checkbox"/> OCCUR <input checked="" type="checkbox"/> EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE DED RETENTION \$	Y	N	8E-A3-XL-0000160-00 0312-6203	12/1/2020 12/1/2020	12/1/2021 12/1/2021	EACH OCCURRENCE \$ 6,000,000 AGGREGATE \$ 6,000,000 \$ XXXXXXXX
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	Y/N N	N/A	54326177	12/1/2020	12/1/2021	<input checked="" type="checkbox"/> PER STATUTE <input type="checkbox"/> OTH-ER E.L. EACH ACCIDENT \$ 1,000,000 E.L. DISEASE - EA EMPLOYEE \$ 1,000,000 E.L. DISEASE - POLICY LIMIT \$ 1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
 RE: WL Project #2963 - CONTRACT - 202056331 / CCD FY19 HSIP Pkg 1: Yosemite St. @ I225 - Traffic Signals Upgrade. As required by written contract The City and County of Denver, its Elected and Appointed Officials, Employees and Volunteers are included as Additional Insured with respects General Liability, Auto Liability, Excess Liability.

CERTIFICATE HOLDER 17309505 City and County of Denver Department of Transportation & Infrastructure Office of Executive Director 201 West Colfax Avenue, Dept 608 Denver CO 80202	CANCELLATION See Attachments 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
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NOTICE TO APPARENT LOW BIDDER

Name
Address
City, State Zip

The EXECUTIVE DIRECTOR OF THE DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE has considered the Bids submitted on December 10, 2020 for work to be done and materials to be furnished in and for:

Federal Aid Project No. SHE - M320-125, City and County of Denver Contract No. 202056331 - CCD FY19 HSIP Pkg 1: Yosemite St @ I225 - Traffic Signals Upgrade

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 total bid items: (#) bid items (# through #) the total estimated cost thereof being: **(Contract Written Amount) (\$_____)**.

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

- a. One original, plus four copies, of the Power of Attorney relative to Performance and/or Payment Bond; and,
- b. ACORD Insurance Certificates: General Liability and Automotive Liability, Workers' Compensation, Employer Liability; or any other coverage required by contract.

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 the Department of Transportation and Infrastructure, 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 TO APPARENT LOW BIDDER
CONTRACT NO. 202056331 - SHE - M320-125
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 _____
Executive Director of the Department of Transportation and Infrastructure

SAMPLE

City and County of Denver Department of Transportation & Infrastructure
201 West Colfax Avenue, Dept 608 | Denver, CO 80202
www.denvergov.org/dpw

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**NOTICE TO PROCEED
(SAMPLE)**

Current Date

Name
Company
Street
City/State/Zip

**FEDERAL AID PROJECT NO. SHE - M320-125
CONTRACT NO. 202056331 - CCD FY19 HSIP Pkg 1: Yosemite St @ I225 - Traffic Signals Upgrade**

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 **Federal Aid Project Nos. SHE - M320-125, City and County of Denver Contract No. 202056331 - CCD FY19 HSIP Pkg 1: Yosemite St @ I225 - Traffic Signals Upgrade**, with the work of constructing contract number, as set forth in detail in the contract documents for the City and County of Denver.

With a contract time of 360 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.

Very truly yours,

By: _____
Lesley B. Thomas
City Engineer
cc:

City and County of Denver Department of Transportation & Infrastructure
201 West Colfax Avenue, Dept 608 | Denver, CO 80202
www.denvergov.org/dpw

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DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE
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: \$ _____.

Last Progress Payment: \$ _____.

Date: _____.

Check Applicable Box:
 MBE WBE

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 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 this _____
day of _____, 20__.

By: _____

Notary Public/Commissioner of Oaths
My Commission Expires: _____

Title: _____



Certificate of Contract Release

202056331 - CCD FY19 HSIP Pkg 1: Yosemite St @ I225 - Traffic Signals Upgrade

Current Date
Name
Street Address
City, State, Zip

Upon receipt of the below stated amount from 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 work, 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.

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. The undersigned further 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.

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 as described herein is the last or final payment.

Contractor's Signature

Date Signed

If there are any questions, please contact me by telephone at (###) ###-####. Please return this document to me via email at pw.procurement@denvergov.org.

Sincerely,

Contract Administration

City and County of Denver Department of Transportation & Infrastructure
201 West Colfax Avenue, Dept 608 | Denver, CO 80202
www.denvergov.org/dpw

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**REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS**

- I. General
- II. Nondiscrimination
- III. Nonsegregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Compliance with Governmentwide Suspension and Debarment Requirements
- XI. Certification Regarding Use of Contract Funds for Lobbying

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in bid proposal or request for proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. Equal Employment Opportunity: Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under

this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: 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, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are

applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar

with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurance Required by 49 CFR 26.13(b):

a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on [Form FHWA-1391](#). The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor

will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions

of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b.(1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or

will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and basic records

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-

Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g. , the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees

a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly

rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

5. **Compliance with Copeland Act requirements.** The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

6. **Subcontracts.** The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. **Contract termination: debarment.** A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. **Compliance with Davis-Bacon and Related Act requirements.** All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. **Disputes concerning labor standards.** Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. **Certification of eligibility.**

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. **Overtime requirements.** No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. **Violation; liability for unpaid wages; liquidated damages.** In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.

3. **Withholding for unpaid wages and liquidated damages.** The FHWA or the contacting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.

4. **Subcontracts.** The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term "perform work with its own organization" refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

(1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;

(2) the prime contractor remains responsible for the quality of the work of the leased employees;

(3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and

(4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is

evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.

2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200.

1. Instructions for Certification – First Tier Participants:

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this

covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. Instructions for Certification - Lower Tier Participants:

(Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which

this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the

department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion—Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000 (49 CFR 20).

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

ATTACHMENT A - EMPLOYMENT AND MATERIALS PREFERENCE FOR APPALACHIAN DEVELOPMENT HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS ROAD CONTRACTS

This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph (1c) shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph (4) below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which the participant estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, the participant shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within one week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph (1c) above.

5. The provisions of 23 CFR 633.207(e) allow the contracting agency to provide a contractual preference for the use of mineral resource materials native to the Appalachian region.

6. The contractor shall include the provisions of Sections 1 through 4 of this Attachment A in every subcontract for work which is, or reasonably may be, done as on-site work.

ON THE JOB TRAINING

October 1, 2019

This On-the-Job Training (OJT) special provision is an implementation of 23 U.S.C, 140(a), a federal requirement to provide equal opportunity and training on federal-aid construction projects. The Contractor shall meet the requirements of the FHWA 1273 for all apprentices and trainees. For additional guidance, please look at the OJT Contractor Manual.

1. Goal Setting

CDOT will set OJT goals for every federally-assisted project. Goals for the projects will be set based on the criteria that is outlined in the 23 CFR Part 230, Appendix B to Subpart (A):

- A. Availability of minorities, women, and disadvantaged persons for training;
- B. The potential for effective training;
- C. Duration of the contract;
- D. Dollar value of the contract;
- E. Total normal workforce that the average bidder could be expected to use;
- F. Geographic location;
- G. Type of work;
- H. The need for journey-level workers in the area;
- I. Recognition of the state's goal;
- J. A satisfactory ratio of trainees to journeymen expected to be on the workforce.

The number of required training hours will be identified in the Contract. The following chart provides guidelines based on contract value, but the required number of hours will be determined by CDOT after consideration of the aforementioned variables.

Contract dollar value	Training hours to be provided on the project
Up to 1 million	0
>1 - 2 million	320
>2 - 4 million	640
>4 - 6 million	1280
>6 - 8 million	1600
>8 - 12 million	1920
>12 - 16 million	2240
>16 - 20 million	2560
For each increment of \$5 million, over \$20 million	1280

2. Training Plan Options

CDOT accepts the following training programs:

- A. CDOT's pre-approved classifications utilization program (PAC-UP);
- B. A registered U.S. Department of Labor training program or apprenticeship program;
- C. Approved programs through workforce centers and through specific groups like Colorado Contractors Association (CCA) and Western Colorado Contractors Association (WCCA);
- D. A Contractor specific plan approved by CDOT and the Federal Highway Administration (FHWA).

The minimum length and type of training for each skilled craft shall be as established in the training program selected by the Contractor.

When one or more approved plans are chosen, the Contractor shall submit the OJT Contractor Commitment to Meet OJT Requirements, CDOT Form 1337 to the Engineer. Additional pre-approved training programs and/or additional apprentices/trainees may be utilized at any point throughout the project. The plan option(s) that the Contractor chooses will be effective for the duration of the project.

3. Journey-Level Worker to Apprentice/Trainee Ratio

The OJT goal requirement shall be met through approved trainee(s)/apprentice(s) working on the CDOT project under the supervision of a journey-level worker. For the CDOT Pre-Approved Classification Training Programs (PAC-UP), the apprentice/trainee ratio to journey-level worker shall not exceed a one to one ratio for all classifications, and the Contractor shall not exceed 25 percent of the workforce as trainees/apprentices at any time. Furthermore, it is at CDOT's discretion that a stricter ratio guideline may be imposed as outlined in the specific training classification. For all other approved programs, the apprentice/trainee ratio shall be as outlined in the specific program. When apprentices/trainees are on the job without proper supervision as outlined above, they shall be paid full Davis-Bacon wages.

4. Trainee Selection

Two components must be considered when choosing a trainee:

- A. The intent of this program is for Contractors to recruit and train entry-level individuals or individuals who will be working within new classifications and guide them toward journey-level status in that specific classification. A trainee will not be approved in any classification for which they have already obtained journey-level status.
- B. Another intent of the OJT program is the primary consideration for the Contractor to use minorities, women, and disadvantaged persons to fulfill the trainee roles, and as such, the Contractor shall make every effort to enroll such individuals in the program by using "systematic and direct recruitment through public and private sources."

The consideration to include women and minorities is based on the regulation; however, it will not be used to systematically deny any one person or group from the opportunity to be a part of the OJT program. CDOT may reject non-minority male trainees for entry into the program if it is determined that a Contractor failed to make sufficient good faith efforts (GFE) to hire minorities or female trainees and/or the Contractor failed to document or submit evidence of its GFE to do so. CDOT will consider a Contractor's documentation of all GFE on a case-by-case basis and will take into account the items listed in the goal setting section of this specification. For more information, please see Section 11 of this specification.

5. OJT Apprentice/Trainee Approval

As a condition of the OJT program, the Contractor will:

- A. Notify all employees at the start of employment and at a minimum of at least once per year regarding the available training programs, positions, and eligibility requirements. The Contractor shall document that this information was conveyed to and received by employees.
- B. Provide each trainee with a copy of his or her enrollment form (if applicable) and the training program within a month of starting the chosen plan.

The OJT submittals (CDOT Form 1337, Contractor Commitment to Meet OJT Requirements; CDOT Form 832, Trainee Status and Evaluation; CDOT Form 838, OJT apprentice/trainee Record) shall be filled out completely and

approved or rejected by CDOT. If the apprentice/trainee is working within the proposed classification before approval is granted, full Davis-Bacon prevailing wages shall be paid to the individual. The Regional Civil Rights Office must approve the CDOT Form 838 prior to any of the hours counting toward the OJT goal. If there is a CDOT delay that is completely outside of the Contractor's responsibility for approval of the apprentices/trainees, and if approval is ultimately granted, the date that will be utilized will be ten business days after the date that the CDOT Form 838 was submitted.

The Contractor shall retain full responsibility for meeting the training requirements imposed by this special provision.

6. Eligible Work Activities that Count Toward the Training Goal

The work hours that are completed on the site of work and per the training documents for approved apprentices/trainees in approved classifications and programs will apply toward the project goal. Hours for work performed outside the individual's approved training classification will not count toward the project OJT goal and the individual shall be paid full applicable prevailing wage.

Job shadowing can apply toward the project goal if it is written into the specific training plan. If the Contractor is using CDOT's PAC-UP training program, job shadowing can apply toward the project goal when the approved employee is performing within the "Observation" component of the plan (hours vary by classification). Non-CDOT project hours will not be accepted toward the project goal.

Although US DOL apprenticeship programs can use the reduced wages for any CDOT job (with or without an OJT goal) with approval, none of these "additional" hours may be banked or included for use as part of the required special provisions on any project other than that for which it was approved.

The Contractor may count OJT hours accomplished by a subcontractor with an approved plan. The subcontractor's trainee or apprentice, who is enrolled in any of the approved OJT programs and is contributing toward meeting a project's OJT goal hours, can count toward the project's OJT goal to satisfy the requirement of this specification. A subcontractor who chooses to participate in meeting the OJT goal shall follow the same process as the Contractor in terms of approving apprentices/trainees, submitting forms, etc. The Contractor retains the full responsibility for meeting the training requirements imposed by this special provision.

7. Contractor Training and Trainee Monitoring

The Contractor's representative (supervisor, manager, or other designee) will evaluate progress for the apprentice/trainee monthly and will provide a copy to the apprentice/trainee of the submitted CDOT Form 832 within 30 calendar days. This evaluation will include documentation of the apprentice/trainee's performance including what was done well and what needs to be improved. The Contractor training and monitoring will be evaluated through CDOT's use of the CDOT Form 200 Interview.

8. Wages

The Contractor may pay apprentice/trainee wages at a reduced rate for those that are in an approved program according to the following guidelines:

US DOL Apprenticeship Programs

Rates (at minimum) will be paid according to the scaled adjustments for a registered US DOL Apprentice. Fringe benefits (either in cash and/or bona fide benefits in lieu of cash) will be paid in full and as outlined by the bargained agreement. If fringe benefits are not mentioned as part of a bargained agreement or if there is no collectively bargained agreement, full fringe benefits will be paid as outlined through the US DOL wage decision. Approved US DOL apprenticeship programs can use the reduced wages for any CDOT project.

If the project does not have a training goal and the Contractor is seeking to pay apprenticeship rates as part of a registered US DOL Apprenticeship Program, the following documentation is required to ensure wages are being paid correctly: apprenticeship program registration, OA (formerly BAT) certificates, and collective bargaining agreement including the wage sheet.

Other Approved Programs

For all other OJT wage reductions, reduced percentages are allowed for the project if there is a goal greater than zero as outlined in the 23 CFR Appendix B to Subpart A of Part 230 (as described in this section), in the collectively bargained agreement, or as outlined in the specific plans. If the Contractor chooses to pay the trainee rates, the reduced percentage shall be based only on the base rate of pay. Fringe benefits shall be paid at 100 percent of the journey-level wage. If the apprentice/trainee is working within the proposed classification before approval is granted, full Davis-Bacon prevailing wages shall be paid to the apprentice/trainee.

The minimum trainee wage (base and fringe) shall be no less than \$13.00 per hour. Trainees shall be paid at minimum:

- First half of the training period -- at least 60 percent of the appropriate minimum journey-level rate
- Third quarter of the training period – at least 75 percent of the appropriate minimum journey-level rate
- Last quarter of the training period -- at least 90 percent of the appropriate minimum journey-level rate

9. Contractor Reporting

The Contractor shall keep all data associated with the trainees and the project for a period of at least three years from the closing date of the Contract.

10. Reimbursement to Contractors

For the purposes of reimbursement, the Contractor will have satisfied its responsibilities under this specification if CDOT has determined that it has fulfilled the acceptable number of training hours. Contractors will be reimbursed at a rate of \$10.00 per hour per (approved) trainee for all OJT hours worked in approved classifications up to the project goal.

The Contractor will be reimbursed for no more than the amount outlined in the OJT Force Account budget.

11. OJT Good Faith Efforts (GFE)

CDOT recognizes two explanations of good faith efforts: (1) The Contractor will be required to prove an effort has been made to achieve a diversified workforce, but it has not yet been accomplished, or (2) The attempt has been made to meet the number of required OJT hours by using approved trainees or apprentices in approved classification(s) utilizing approved plans, but the Contractor cannot meet the required number of hours. In either case, a GFE will be required, and the Region Civil Rights Office will make the determination.

- A. If the Contractor does not meet its OJT project goal with the inclusion of some female and/or minority trainees, the Contractor may be requested to produce documentation of adequate good faith efforts taken to fill that position with a minority or female applicant. Good faith efforts are designed to achieve equal opportunity through positive, assertive, and continuous result-oriented measures. Good faith efforts should be taken as hiring opportunities arise.
- B. If the Contractor does not meet its OJT project goal, the Contractor may submit a CDOT Form 1336, Waiver Request for Contract's OJT Hours. On the form, the Contractor shall outline and submit all good faith efforts made when it is believed that the required number of training hours will not be met. If GFE is not demonstrated and approved, The Contractor will be subject to payment reductions outlined in the Disincentive Section.

If a good faith effort has been denied by CDOT, the Contractor may ask for reconsideration by the Region Civil Rights Manager and the Resident Engineer for the region where work is being performed. Additionally, if requested by the Contractor, the Region Civil Rights Office and the Project Engineer will meet with the Contractor to discuss the Contractor's initial Good Faith Effort determination.

12. Disincentive

A failure to provide the required training without the demonstration and approval of GFE to meet the project OJT goal may result in the Region Civil Rights Office assigning the following disincentive: A sum representing the total number of hours not met in the contract shall be multiplied by the journey worker hourly wages plus fringe benefits [(hours not met) x (dollar per hour + fringe benefits) = disincentive amount].

In order to obtain the disincentive amount, the journey worker wages will be figured using the prevailing wages for the classifications outlined on the CDOT Form 1337. If a single classification is noted on the submitted CDOT Form 1337, then that one wage will be used to figure the monetary amount owed. If multiple classifications are used, then the journey worker wages of all classifications will be used to determine an average wage rate. If the Contractor does not submit any documentation toward the OJT goal, the disincentive rate will be calculated at \$30.00 per hour. CDOT will provide the Contractor a written notice at the final acceptance stage of the project informing them of the noncompliance with this specification which will include a calculation of the disincentive(s) to be assessed.

January 20, 2017

DISADVANTAGED BUSINESS ENTERPRISE (DBE) REQUIREMENTS
(LOCAL AGENCY)

NOTICE

This is a standard special provision that revises or modifies CDOT's *Standard Specifications for Road and Bridge Construction*. It has gone through a formal review and approval process and has been issued by CDOT's Project Development Branch with formal instructions for its use on CDOT Local Public Agency construction projects. It is to be used as written without change. Do not use modified versions of this special provision on CDOT Local Public Agency construction projects, and do not use this special provision on projects in a manner other than that specified in the instructions unless such use is first approved by the Standards and Specifications Unit of the Project Development Branch. The instructions for use on CDOT Local Public Agency construction projects appear below.

Instructions for use on Local Public Agency construction projects:

Use this Standard Special Provision on Local Agency administered Federal-Aid Design-Bid-Build Projects. For purposes of this Standard Special Provision, Federal Aid Design Bid Build Projects only include those projects for which the construction portion is funded in whole or in part with federal funds.

Use in conjunction with the Project Special Provision Worksheet, Disadvantaged Business Enterprise (DBE) Contract Goal.

The Local Public Agency should consult with the Regional Civil Rights Office (RCRO) to determine the use of this standard special and to obtain the contract goal. A contract goal of zero still requires the use of this standard special and the worksheet. Local Public Agencies shall not set their own contract goal.

This standard special provision should not be used for CM/GC services, design-build or other innovative projects. For DBE provisions for these projects, contact the Civil Rights and Business Resource Center (CRBRC) at (303)757-9234.

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DISADVANTAGED BUSINESS ENTERPRISE (DBE)
REQUIREMENTS (LOCAL AGENCY)

1. Overview

The Disadvantaged Business Enterprise (DBE) Program is a federally-mandated program that seeks to ensure non-discrimination in the award of U.S. Department of Transportation (DOT)-assisted contracts and to create a level playing field on which DBEs can compete fairly for DOT-assisted contracts. Local Public Agencies (LPAs) that receive federal funds, must comply with CDOT's DBE program. To such end, CDOT sets a contract goal for DBE participation for each DOT-assisted LPA Contract.

In order to be awarded the Contract, the bidder shall show that it has committed to DBE participation sufficient to meet the goal or has otherwise made good faith efforts to do so. CDOT will amend the goal prior to award if the lowest apparent bidder demonstrates that good faith efforts were made but sufficient commitments to meet the goal could not be obtained.

CDOT and the LPA will monitor the progress of the Contractor throughout the project to ensure that the Contractor's DBE commitments are being fulfilled. Modifications to the commitments must be approved by the CDOT Regional Civil Rights Office (RCRO). CDOT may withhold payment or seek other contractual remedies if the Contractor is not complying with the requirements of this special provision. Upon completion of the Contract, CDOT may require the LPA to reduce the final payment to the Contractor if the Contractor has failed to fulfill the commitments or made good faith efforts to meet the contract goal.

For general assistance regarding the DBE program and compliance, contact CDOT's Civil Rights and Business Resource Center (CRBRC) at (303)757-9234. For project specific issues, contact the LPA Engineer or RCRO.

All forms referenced herein can be found on the CDOT website in the forms library.

2. Contract Assurance

By submitting a proposal for this Contract, the bidder agrees to the following assurance and shall include it verbatim in all (including non-DBE) subcontracts:

The contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate, which may include, but is not limited to: (1) Withholding monthly progress payments; (2) Assessing sanctions; (3) Liquidated damages; and/or (4) Disqualifying the contractor from future bidding as non-responsible.

3. Definitions

Terms not defined herein shall have the meaning provided in the CDOT Standard Specifications for Road and Bridge Construction.

- A. *Commitment.* A commitment is a portion of the Contract, identified by dollar amount and work area, designated by the bidder or Contractor for participation by a particular DBE. Commitments are submitted to CDOT via Form 1414, Anticipated DBE Participation Plan, or via Form 1420, DBE Plan Modification Request. Once approved, commitments are enforceable obligations of the Contract.
- B. *Commercially Useful Function (CUF).* Responsibility for the execution of the work and carrying out such responsibilities by actually performing, managing and supervising the work as further described in Section 8 below.
- C. *Contract Goal.* The percentage of the contract designated by CDOT for DBE participation. The contract goal for this contract is provided in the Project Special Provision Disadvantaged Business Enterprise Contract Goal.

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DISADVANTAGED BUSINESS ENTERPRISE (DBE)
REQUIREMENTS (LOCAL AGENCY)

- (1) The bidder/Contractor shall make good faith efforts to fulfill the contract goal with eligible DBE participation. For determining whether the contract goal was met prior to award, the contract goal shall be based upon the proposal amount excluding force account items. For determining whether the contract goal was met during and upon completion of the project, the contract goal shall be based upon the total earnings amount.
- (2) If the lowest apparent bidder demonstrates that it was unable to meet the contract goal but made good faith efforts to do so, the contract goal will be amended and the revised contract goal will be provided on Form 1417, Approved DBE Participation Plan.
- D. *Disadvantaged Business Enterprise (DBE)*. A Colorado-certified Disadvantaged Business Enterprise listed on the Colorado Unified Certification Program (UCP) DBE Directory at www.coloradodbe.org.
- E. *DBE Program Manual*. The manual maintained by the CRBRC which details CDOT's policies and procedures for administering the DBE program. A copy of the DBE Program Manual is available on the CRBRC webpage.
- F. *Eligible Participation*. Work by a DBE that counts toward fulfillment of the contract goal as described in Section 4 below.
- G. *Good Faith Efforts*. All necessary and reasonable steps to achieve the contract goal which, by their scope, intensity, and appropriateness to the objective, could reasonably be expected to obtain sufficient DBE participation, even if not fully successful. Good faith efforts are evaluated prior to award and throughout performance of the Contract. For guidance on good faith efforts, see 49 CFR Part 26, Appendix A.
- H. *Joint Check*. A check issued by the Contractor or one of its subcontractors to a DBE firm and a material supplier or other third party for materials or services to be incorporated into the work.
- I. *Reduction*. A reduction occurs when the Contractor reduces a commitment to a DBE. A reduction constitutes a partial termination.
- J. *Subcontractor*. An individual, firm, corporation or other legal entity to whom the Contractor sublets part of the Contract. For purposes of this special provision, the term subcontractor includes suppliers.
- K. *Substitution*. Substitution occurs when a Contractor seeks to find another DBE to perform work on the contract as a result of a reduction or termination.
- L. *Termination*. A termination occurs when a Contractor no longer intends to use a DBE for fulfillment of a commitment.
- M. *Total Earnings Amount*: Amount of the Contract earned by the Contractor, including approved changes and approved force account work performed, but not including any deductions for liquidated damages, price reduced material, work time violations, overweight loads or liens. The amount of the Contract earned does not include plan force account items (i.e. OJT, pavement incentives, etc).
- N. *Work Code*. A code to identify the work that a DBE is certified to perform. A work code includes a six digit North American Industry Classifications System code plus a descriptor. Work codes are listed on a firm's profile on the UCP DBE Directory. The Contractor may contact the CRBRC to receive guidance on whether a work code covers the work to be performed.

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DISADVANTAGED BUSINESS ENTERPRISE (DBE)
REQUIREMENTS (LOCAL AGENCY)**4. Eligible Participation**

The following rules will be used to determine whether work performed by a DBE qualifies as eligible participation on the Contract:

- A. *Work Must be Identified in Commitment.* The work performed by the DBE must be reasonably construed to be included in the work area and work code identified by the Contractor in the approved commitment.
- (1) If the Contractor intends to use a DBE for work that was not listed in the commitment, the Contractor shall submit Form 1420, DBE Participation Plan Modification for approval of the modification. Unapproved work will not count toward the contract goal.
 - (2) A DBE commitment cannot be modified to include work for which the DBE was not certified at the time of the approval of the original commitment.
- B. *DBE Must be Certified to Perform the Work.* The DBE must be certified to perform the work upon submission of the commitment and upon execution of the DBE's subcontract.
- (1) When a commitment has been made, but upon review of Form 205, Sublet Permit, CDOT determines that the DBE is no longer certified in the work code which covers the work to be performed, the Contractor may not use the DBE's participation toward the contract goal. The Contractor shall terminate the DBE commitment and seek substitute DBE participation in accordance with Section 9 below.
 - (2) A DBE's work will continue to count as eligible participation if the DBE was certified upon approval of Form 205, Sublet Permit and the certification status changes during the performance of the work.
 - (3) Suppliers must be certified upon execution of the purchase order.
- C. *DBE Performs the Work.* Eligible participation will only include work actually performed by the DBE with its own forces.
- (1) Work performed by the DBE includes the cost of supplies and materials obtained by the DBE for its work on the Contract, including any equipment leased by the DBE, provided that such supplies or equipment are not purchased or leased from the Contractor or a subcontractor that is subletting to the DBE.
 - (2) The term "work actually performed by the DBE with its own forces" includes work by temporary employees, provided such employees are under the control of the DBE.
 - (3) If CDOT or the LPA determines that a DBE has not performed a CUF on the project, no participation by such DBE shall count toward the contract goal.
- D. *DBE Subcontracts to Another Firm.* When a DBE subcontracts part of the work, the value of the subcontracted work may only be counted toward the goal if the subcontractor is a DBE. Performance by non-DBE subcontractors, including non-DBE trucking firms and owner-operators, shall be deducted from the DBE's participation.
- E. *DBE Received Payment for the Work.* Eligible participation only includes work for which the DBE has received payment, including the release of its retainage.
- F. *Special Calculations for Suppliers.* When a DBE supplies goods on a project, the DBE may be classified as a manufacturer, dealer or broker. The DBE's status as a manufacturer, dealer or broker is determined

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DISADVANTAGED BUSINESS ENTERPRISE (DBE)
REQUIREMENTS (LOCAL AGENCY)

on a contract-by-contract basis and is based upon the actual work performed.

- (1) When a DBE is deemed to be acting as a manufacturer, one hundred percent of the commitment will count as eligible participation.
 - (2) When a DBE is deemed to be acting as a regular dealer (i.e. non-manufacturer supplier), only sixty percent of the commitment will count as eligible participation.
 - (3) When a DBE is deemed to be acting as a broker, only the reasonable brokerage fee will count as eligible participation.
- G. *Reasonable Fee for Contract-Specific Services.* Services shall count toward the contract goal only if they are specifically required for the performance of the Contract. Non-contract specific expenses may not be counted toward the contract goal. Fees for services must be reasonable. Services include but are not limited to professional services, public involvement, etc. In the case of temporary employment placement agencies, only the placement fee for an individual to be specifically and exclusively used for work on the contract shall count as eligible participation.
- H. *Pre-Approval for Joint Venture Participation.* When a DBE is a participant in a joint venture, the DBE must apply to CDOT to determine how much of the work performed by the joint venture will count toward the contract goal. The DBE shall complete Form 893, Information for Determining DBE Participation when a Joint Venture Includes a DBE. Form 893 shall be submitted to CDOT CRBRC no less than ten days before the submission of the Proposal or to the RCRO no less than ten days before submission of the Form 205 to ensure sufficient time for review.

5. Proposal Requirements

In order to be eligible for award, the following shall be submitted with the proposal to the LPA:

- A. *Form 1413, Bidders List.* The bidder shall list each subcontractor (including both DBE and non-DBE subcontractors) that submitted a quote for participation on the project. Failure to submit a signed Form 1413 will result in rejection of the proposal.
- B. *Form 1414, Anticipated DBE Participation Plan.* If the Contract Goal is greater than zero, the bidder shall submit Form 1414 to document anticipated DBE participation.
 - (1) If the Bidder has not obtained any DBE commitments, it shall still submit Form 1414 documenting zero anticipated participation. If the Contract Goal is greater than zero, failure to submit a signed Form 1414 shall result in rejection of the proposal.
 - (2) The bidder shall list the DBE, work area(s), commitment amount and estimated eligible participation for each commitment. Once Form 1414 is submitted, a commitment may only be terminated or reduced in accordance with Section 9 below. The bidder is responsible for ensuring that commitments, and the estimated eligible participation resulting therefrom, have been properly calculated prior to submitting its proposal.
 - (3) If the bidder is a DBE, the bidder must include itself in Form 1414 and list the work area(s) and amount that it intends to self-perform and count as eligible participation on the contract.
 - (4) Commitments may be made to second tier or lower DBE subcontractors; however, the Contractor is ultimately responsible for the fulfillment of the commitment and shall sign the Form 1415, Commitment Confirmation.

6. Additional Forms Due Prior to Award.

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DISADVANTAGED BUSINESS ENTERPRISE (DBE)
REQUIREMENTS (LOCAL AGENCY)

If the contract goal is greater than zero, or if the bidder has voluntarily made commitments, the Bidder shall submit the following forms to the LPA within five calendar days of selection as the lowest apparent bidder. These forms must be submitted to the CDOT CRBRC concurrent with the request for concurrence to award.

- A. *Form 1415, Commitment Confirmation.* A Form 1415, Commitment Confirmation shall be obtained from each DBE listed on Form 1414. The bidder shall complete Section 1 and the DBE shall complete Section 2 of Form 1415. Form 1415s shall be consistent with the commitments listed on Form 1414. The bidder shall not modify commitments listed on Form 1414 without good cause and approval from CDOT. The bidder shall contact CDOT if any issues arise which may require the bidder to alter or terminate a commitment.
- B. *Form 1416, Good Faith Effort Report.* If the total eligible participation listed on Form 1414 does not meet the contract goal, the lowest apparent bidder shall also submit Form 1416, Good Faith Effort Report and any supporting documentation that the bidder would like considered by CDOT as evidence of good faith efforts.

7. Commitment and Good Faith Effort Review

- A. *Commitment Review.* CDOT will evaluate the Form 1414 and each Form 1415 to ensure that it the commitment is valid and has been properly calculated. CDOT may investigate or request additional information in order to confirm the accuracy of a commitment. If CDOT determines that the total estimated eligible participation of the commitments does not meet the contract goal, within two business days of notice from CDOT, the bidder shall submit Form 1416 to CDOT.
- B. *Good Faith Effort Review.* If the total eligible participation of Form 1414 and all supporting Form 1415s does not meet the contract goal, CDOT will review Form 1416 and all supporting documentation submitted by the bidder in order to determine whether the bidder has demonstrated good faith efforts to obtain DBE participation. CDOT will use 49 CFR Part 26, Appendix A as a guide for determining whether the bidder made good faith efforts to meet the contract goal. A bidder will be deemed to not have made good faith efforts if the bidder lists a DBE for a work area for which the DBE is not certified and the bidder cannot establish a reasonable basis for its determination. CDOT may consider and approve commitments made after submission of the bid if the Bidder demonstrates that (1) good faith efforts were made prior to submission of the bid and (2) there is a reasonable justification for not obtaining the commitments prior to submission of the bid.
- C. *Administrative Reconsideration.* If CDOT determines that the bidder did not demonstrate good faith efforts to meet the contract goal, it will provide the bidder and LPA with written notice of its determination. The bidder will be provided an opportunity to request administrative reconsideration of the decision. The process for reconsideration is set forth in the *Good Faith Effort Appeal Process*, which is an Appendix I to the DBE Program Manual. A copy of the *Good Faith Effort Appeal Process* will be included in the written notice from CDOT.
- D. *Form 1417, Approved DBE Participation Plan.* If CDOT determines that the bidder has met the contract goal or made good faith efforts to do so, CDOT will issue to the bidder, with a copy to the LPA, Form 1417, Approved DBE Participation Plan, documenting the approved commitments. If CDOT determines that the bidder did not meet the contract goal but made good faith efforts to do so, via the Form 1417 CDOT will amend the contract goal in accordance with the commitments that were obtained and attach an explanation of its determination.

January 20, 2017

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DISADVANTAGED BUSINESS ENTERPRISE (DBE)
REQUIREMENTS (LOCAL AGENCY)**8. Ongoing Oversight of DBE Participation**

- A. *Consistency Review.* CDOT will review Form 205, Sublet Permit Application to determine whether the work being sublet is consistent with the DBE commitments. CDOT may withhold approval of the sublet or direct the LPA to stop performance of the work if the Contractor has reduced, terminated, or otherwise modified the type or amount of work to be performed by a DBE without seeking prior approval.
- B. *Business to Government, (B2G).* The Contractor shall track project and participation towards the Goal via the LPA's B2G system. Contractors and subcontractors must continuously update and certify payments and participation within the system. The LPA may withhold progress payments if B2G is not updated and certification is not obtained at least quarterly. The LPA will not provide final payment on the Contract until all B2G information has been reviewed and approved by the CDOT RCRO.
- C. *Joint Checks.* All joint checks must be approved by the CDOT RCRO before they are used in payment to a DBE. Joint checks used in payments to DBEs will be monitored closely to ensure (1) the DBE is performing a CUF and (2) the joint checks are not being used in a discriminatory manner. The Contractor shall request approval for the use of a joint check in a written letter signed by the DBE and the Contractor, stating the reason for the joint checks and the approximate number of checks that will be needed.
- D. *Commercially Useful Function.* CDOT will monitor performance during the Contract to ensure each DBE is performing a CUF. If CDOT or the LPA determines that a DBE is not performing a CUF, no work performed by such DBE shall count as eligible participation. The DBE, Contractor, and any other involved third parties may also be subject to additional enforcement actions.
- (1) When determining whether a DBE is performing a CUF, CDOT and the LPA will consider the amount of work subcontracted, industry practices, the amount the firm is to be paid compared to the work performed and eligible participation claimed, and any other relevant factors.
 - (2) With respect to material and supplies used on the Contract, in order to perform a CUF the DBE must be responsible for negotiating price, determining quality and quantity, ordering the material, installing the material, if applicable, and paying for the material itself.
 - (3) With respect to trucking, in order to perform a CUF, the DBE trucking firm must own and operate at least one fully licensed, insured and operational truck used on the Contract. Additionally, the DBE trucking firm must be responsible for the management and supervision of the entire trucking operation for which it is responsible on the Contract.
 - (4) A DBE does not perform a CUF when its role is limited to that of an extra participant in a transaction, contract or project through which funds are passed in order to obtain the appearance of DBE participation. CDOT will evaluate similar transactions involving non-DBEs in order to determine whether a DBE is an extra participant.
 - (5) If a DBE does not perform or exercise responsibility for at least 30 percent of the total cost of its contract with its own work force, or the DBE subcontracts a greater portion of the work than would be expected on the basis of normal industry practice for the type of work involved, CDOT and the LPA will presume that the DBE is not performing a CUF. The DBE may present evidence to rebut this presumption.

January 20, 2017

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DISADVANTAGED BUSINESS ENTERPRISE (DBE)
REQUIREMENTS (LOCAL AGENCY)

9. DBE Participation Plan Modifications

- A. *Contractor must Use DBEs Listed in Approved Plan.* The Contractor shall utilize the specific DBEs listed to perform the work and supply the materials for which it is listed unless the Contractor obtains the CDOT RCRO's written consent to terminate, reduce or modify the commitment. Unless CDOT grants such consent, the Contractor will not be entitled to payment for the work or materials. Failure to carry out the requirements of this section is a material breach of the Contract and may result in the termination of the Contract or other remedies established by CDOT or the LPA.
- B. *Form 1420, DBE Participation Plan Modification Request.* During the performance of the Contract, the Contractor shall use Form 1420, DBE Participation Plan Modification Request to communicate all requests for termination, reduction, substitution, and waivers to the CDOT RCRO. One Form 1420 may include multiple requests and must be submitted at the time of the occurrence or, if that is not possible, within a reasonable time of the occurrence requiring termination, reduction, substitution or waiver.
- C. *Commitment Terminations and Reductions.* No commitment shall be terminated or reduced without CDOT's approval. Terminations and reductions include, but are not limited to, instances in which a Contractor seeks to perform work originally designated for a DBE subcontractor with its own forces, those of an affiliate, a non-DBE firm or with another DBE firm. In order to receive approval, the Contractor shall:
- (1) Have good cause for termination or reduction. Good cause may include:
 - (i) the DBE fails or refuses to execute a written contract;
 - (ii) the DBE fails or refuses to perform the work of its subcontract consistent with normal industry standards, provided that such failure is not the result of bad faith or discriminatory actions of the Contractor or one of its subcontractors;
 - (iii) the DBE fails to meet reasonable, nondiscriminatory bond requirements;
 - (iv) the DBE becomes bankrupt, insolvent, or exhibits credit unworthiness;
 - (v) the DBE is ineligible to work because of suspension or debarment proceedings or other state law;
 - (vi) the DBE is not a responsible contractor;
 - (vii) the DBE voluntarily withdraws from the project and provides written notice to CDOT;
 - (viii) the DBE is ineligible to receive DBE credit for the work required;
 - (ix) the DBE owner dies or becomes disabled and is unable to complete the work;
 - (x) the DBE ceases business operations or otherwise dissolves;
 - (xi) or other documented good cause that compels termination. Good cause does not exist if the Contractor seeks to terminate a DBE it relied upon to obtain the contract so that the Contractor can self-perform the work for which the DBE was engaged or so that the Contractor can substitute another DBE or non-DBE contractor after contract award.
 - (2) Provide the DBE notice of the Contractor's intent to terminate or reduce the commitment and the reason for such termination or reduction, with a copy to the CDOT RCRO and LPA;

January 20, 2017

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DISADVANTAGED BUSINESS ENTERPRISE (DBE)
REQUIREMENTS (LOCAL AGENCY)

- (3) In the notice of intent, provide the DBE at least five calendar days to respond to the notice and inform CDOT and the Contractor of the reasons, if any, why it objects to the proposed termination or reduction and any reasons that it shall not be approved. The Contractor is not required to provide the five calendar days written notice in cases where the DBE in question has provided written notice that it is withdrawing from the subcontract or purchase order. The notice period may be reduced by the CDOT RCRO if required by public necessity.
- (4) Following the notice period, if the Contractor decides to proceed, submit Form 1420 requesting approval of the termination or reduction.
- (5) When a commitment is terminated or reduced (including when a DBE withdraws), make good faith efforts to find another DBE to substitute. These good faith efforts shall be directed at finding another DBE to perform at least the same amount of work under the contract as the participation that was terminated or reduced up to the contract goal.

D. *Contract Changes*: In the event of a contract change:

- (1) If the LPA eliminates or reduces work committed to a DBE, such change shall be considered good cause for termination or reduction in accordance with Section 9.B above. The Contractor shall follow the processes outlined in Section 9.B.
- (2) If the LPA issues a change which increases or adds new work items, the Contractor shall ensure that it has obtained sufficient DBE participation to meet the Contract Goal, or has made good faith efforts to do so.

E. *Process for Substitution or Increase in Participation to Meet the Contract Goal*: When the Contractor must obtain additional DBE participation to meet the Contract Goal, whether resulting from an approved termination or reduction or a change to the Contract, the Contractor shall:

- (1) Increase the participation of a DBE for any work items previously identified in an approved commitment without seeking CDOT approval; provided, however, that at its discretion, the CDOT RCRO may request a Form 1420 documenting such additional participation; or
- (2) If the Contractor needs to add new work to a commitment or obtain additional participation from a DBE that is not already participating on the contract pursuant to an approved commitment, submit a Form 1420 and Form 1415 to the RCRO requesting approval of the additional participation; or
- (3) If the Contractor determines that additional DBE participation cannot be obtained, submit a Form 1420 to the RCRO requesting waiver of the participation. The Contractor shall include its justification for not obtaining additional participation and, at its discretion, CDOT may require additional information regarding the efforts of the Contractor. If the Contractor has not obtained substitute participation, the RCRO may require the Contractor to submit evidence of good faith efforts to substitute. The contractor shall have seven days to submit such information. This period may be extended at the discretion of the RCRO.

January 20, 2017

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DISADVANTAGED BUSINESS ENTERPRISE (DBE)
REQUIREMENTS (LOCAL AGENCY)

10. Payment Reduction

The Contractor's retainage will not be released until the CDOT RCRO has determined whether the Contractor will be subject to a payment reduction. Payment reductions will be calculated as follows:

- A. *Failure to Fulfill Commitments.* If the Contractor terminated or reduced a commitment, the Contractor will be subject to a payment reduction for any termination or reduction which was not approved via a Form 1420.
- B. *Failure to Meet Contract Goal.* If the Contractor failed to meet the contract goal, the Contractor will be subject to a payment reduction for the portion of the contract goal that was not met and was not waived via an approved Form 1420.
- C. *Duplication.* The contractor will not be subject to duplicate reduction for the same offense.
- D. *Adjustments.* CDOT may adjust the payment reduction wherein the Contractor demonstrates that its failure to obtain DBE participation was due to circumstances outside of its control.

11. Other Enforcement

- A. *Investigations.* As it determines necessary, CDOT or the LPA may conduct reviews or investigations of participants. All participants, including, but not limited to, DBE firms and applicants for DBE certification, complainants, and contractors using DBE firms to meet contract goals, are required to cooperate fully and promptly with compliance reviews, certification reviews, investigations, and other requests for information.
- B. *Intimidation and retaliation.* Participants shall not intimidate, threaten, coerce, or discriminate against any individual or firm for the purpose of interfering with any right or privilege secured by the DBE program or because the individual or firm has made a complaint, testified, assisted, or participated in any manner in an investigation, proceeding, or hearing under the DBE program.
- C. *Consequences of Non-Compliance.* Failure to comply with subsections 11 A. or 11 B. shall be a ground for appropriate action against the party involved (e.g., with respect to recipients, a finding of noncompliance; with respect to DBE firms, denial of certification or removal of eligibility and/or suspension and debarment; with respect to a complainant or appellant, dismissal of the complaint or appeal, with respect to a contractor which uses DBE firms to meet goals, findings of non-responsibility for future contracts and/or suspension and debarment).
- D. *Fraud and Misrepresentation.* If CDOT or the LPA determines that a Contractor or subcontractor was a knowing and willing participant in any intended or actual subcontracting arrangement contrived to artificially inflate DBE participation or any other business arrangement determined by CDOT or the LPA to be unallowable, or if the Contractor engages in repeated violations, falsification or misrepresentation, CDOT may:
 - (1) refuse to count any fraudulent or misrepresented DBE participation;
 - (2) withhold progress payments to the Contractor commensurate with the violation;
 - (3) suspend or reduce the Contractor's prequalification status;
 - (4) refer the matter to the Office of Inspector General of the US Department of Transportation for investigation; or
 - (5) seek any other available contractual remedy.

CITY AND COUNTY OF DENVER
STATE OF COLORADO



DENVER
THE MILE HIGH CITY

DEPARTMENT OF TRANSPORTATION &
INFRASTRUCTURE

Prevailing Wage Rates

Contract Number: 202056331

CCD FY19 HSIP Pkg 1: Yosemite St @ I225 -
Traffic Signals Upgrade

October 21, 2020

TRAFFIC SIGNALIZATION:

Traffic Signal Installation

Zone 1.....	\$ 26.42	4.75%+8.68
Zone 2.....	\$ 29.42	4.75%+8.68

TRAFFIC SIGNAL INSTALLER ZONE DEFINITIONS

Zone 1 shall be a 35 mile radius, measured from the following addresses in each of the following cities:

- Colorado Springs - Nevada & Bijou
- Denver - Ellsworth Avenue & Broadway
- Ft. Collins - Prospect & College
- Grand Junction - 12th & North Avenue
- Pueblo - I-25 & Highway 50

All work outside of these areas shall be paid Zone 2 rates.

 ENGI0009-008 05/01/2018

	Rates	Fringes
POWER EQUIPMENT OPERATOR:		
(3)-Hydraulic Backhoe (Wheel Mounted, under 3/4 yds), Hydraulic Backhoe (Backhoe/Loader combination), Drill Rig Caisson (smaller than Watson 2500 and similar), Loader (up to and including 6 cu. yd.).....	\$ 28.25	10.70
(3)-Loader (under 6 cu. yd.) Denver County.....	\$ 28.25	10.70
(3)-Motor Grader (blade- rough) Douglas County.....	\$ 28.25	10.70
(4)-Crane (50 tons and under), Scraper (single bowl, under 40 cu. yd).....	\$ 28.40	10.70
(4)-Loader (over 6 cu. yd) Denver County.....	\$ 28.40	10.70
(5)-Drill Rig Caisson (Watson 2500 similar or larger), Crane (51-90 tons), Scraper (40 cu.yd and over),.....	\$ 28.57	10.70
(5)-Motor Grader (blade- finish) Douglas County.....	\$ 28.57	10.70
(6)-Crane (91-140 tons).....	\$ 29.55	10.70

 SUCO2011-004 09/15/2011

	Rates	Fringes
CARPENTER (Excludes Form Work)...	\$ 19.27	5.08
CEMENT MASON/CONCRETE FINISHER		
Denver.....	\$ 20.18	5.75
Douglas.....	\$ 18.75	3.00
ELECTRICIAN (Excludes Traffic Signal Installation).....	\$ 35.13	6.83
FENCE ERECTOR (Excludes Link/Cyclone Fence Erection).....	\$ 13.02	3.20
GUARDRAIL INSTALLER.....	\$ 12.89	3.20
HIGHWAY/PARKING LOT STRIPING:Painter		
Denver.....	\$ 12.62	3.21
Douglas.....	\$ 13.89	3.21
IRONWORKER, REINFORCING (Excludes Guardrail Installation).....	\$ 16.69	5.45
IRONWORKER, STRUCTURAL (Includes Link/Cyclone Fence Erection, Excludes Guardrail Installation).....	\$ 18.22	6.01
LABORER		
Asphalt Raker.....	\$ 16.29	4.25
Asphalt Shoveler.....	\$ 21.21	4.25
Asphalt Spreader.....	\$ 18.58	4.65
Common or General		
Denver.....	\$ 16.76	6.77
Douglas.....	\$ 16.29	4.25
Concrete Saw (Hand Held)....	\$ 16.29	6.14
Landscape and Irrigation....	\$ 12.26	3.16
Mason Tender- Cement/Concrete		
Denver.....	\$ 16.96	4.04
Douglas.....	\$ 16.29	4.25
Pipelayer		
Denver.....	\$ 13.55	2.41
Douglas.....	\$ 16.30	2.18
Traffic Control (Flagger)...	\$ 9.55	3.05
Traffic Control (Sets Up/Moves Barrels, Cones,		

Install Signs, Arrow Boards and Place Stationary Flags)(Excludes Flaggers).....	\$ 12.43	3.22
PAINTER (Spray Only).....	\$ 16.99	2.87
POWER EQUIPMENT OPERATOR:		
Asphalt Laydown		
Denver.....	\$ 22.67	8.72
Douglas.....	\$ 23.67	8.47
Asphalt Paver		
Denver.....	\$ 24.97	6.13
Douglas.....	\$ 25.44	3.50
Asphalt Roller		
Denver.....	\$ 23.13	7.55
Douglas.....	\$ 23.63	6.43
Asphalt Spreader.....	\$ 22.67	8.72
Backhoe/Trackhoe		
Douglas.....	\$ 23.82	6.00
Bobcat/Skid Loader.....	\$ 15.37	4.28
Boom.....	\$ 22.67	8.72
Broom/Sweeper		
Denver.....	\$ 22.47	8.72
Douglas.....	\$ 22.96	8.22
Bulldozer.....	\$ 26.90	5.59
Concrete Pump.....	\$ 21.60	5.21
Drill		
Denver.....	\$ 20.48	4.71
Douglas.....	\$ 20.71	2.66
Forklift.....	\$ 15.91	4.68
Grader/Blade		
Denver.....	\$ 22.67	8.72
Guardrail/Post Driver.....	\$ 16.07	4.41
Loader (Front End)		
Douglas.....	\$ 21.67	8.22
Mechanic		
Denver.....	\$ 22.89	8.72
Douglas.....	\$ 23.88	8.22
Oiler		
Denver.....	\$ 23.73	8.41
Douglas.....	\$ 24.90	7.67
Roller/Compactor (Dirt and Grade Compaction)		
Denver.....	\$ 20.30	5.51
Douglas.....	\$ 22.78	4.86
Rotomill.....	\$ 16.22	4.41
Screed		
Denver.....	\$ 22.67	8.38
Douglas.....	\$ 29.99	1.40
Tractor.....	\$ 13.13	2.95

TRAFFIC SIGNALIZATION:

Groundsman

Denver.....	\$ 17.90	3.41
Douglas.....	\$ 18.67	7.17

TRUCK DRIVER

Distributor

Denver.....	\$ 17.81	5.82
Douglas.....	\$ 16.98	5.27

Dump Truck

Denver.....	\$ 15.27	5.27
Douglas.....	\$ 16.39	5.27

Lowboy Truck.....	\$ 17.25	5.27
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Mechanic.....	\$ 26.48	3.50
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Multi-Purpose Specialty &

Hoisting Truck

Denver.....	\$ 17.49	3.17
Douglas.....	\$ 20.05	2.88

Pickup and Pilot Car

Denver.....	\$ 14.24	3.77
Douglas.....	\$ 16.43	3.68

Semi/Trailer Truck.....	\$ 18.39	4.13
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Truck Mounted Attenuator....	\$ 12.43	3.22
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Water Truck

Denver.....	\$ 26.27	5.27
Douglas.....	\$ 19.46	2.58

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

CITY AND COUNTY OF DENVER
STATE OF COLORADO



DENVER
THE MILE HIGH CITY

DEPARTMENT OF TRANSPORTATION &
INFRASTRUCTURE

Addenda

Contract Number: 202056331

CCD FY19 HSIP Pkg 1: Yosemite St @ I225 -
Traffic Signals Upgrade

October 21, 2020

**CITY AND COUNTY OF DENVER
DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE**

CONTRACT NO: 202056331

PROJECT NAME: CCD FY19 HSIP Pkg 1:Yosemite St. @ I225 - Traffic Signals Upgrade

ADDENDUM NO. 1

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:

TECHNICAL SPECIFICATIONS/DRAWINGS REVISIONS AND CHANGES:

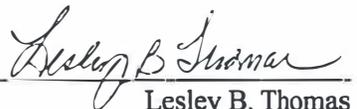
- **Details of the Fiber connection gator patch as required in the Telemetry specification. (See Attachment 1)**
- **Inclusion of Revision of Section 614 – Traffic Signal Backplates. (See Attachment 2)**

QUESTION AND ANSWERS:

Q1. Does the City require that traffic signal poles be furnished with the Valmont mitigator or are other manufactures without the mitigator acceptable? Also do the poles need to be powder coated or is paint acceptable?

A1. The mitigation device is required per latest Denver’s traffic standard and the poles need to be powder coated.

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



Lesley B. Thomas
City Engineer

November 24, 2020

Date

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



Contractor

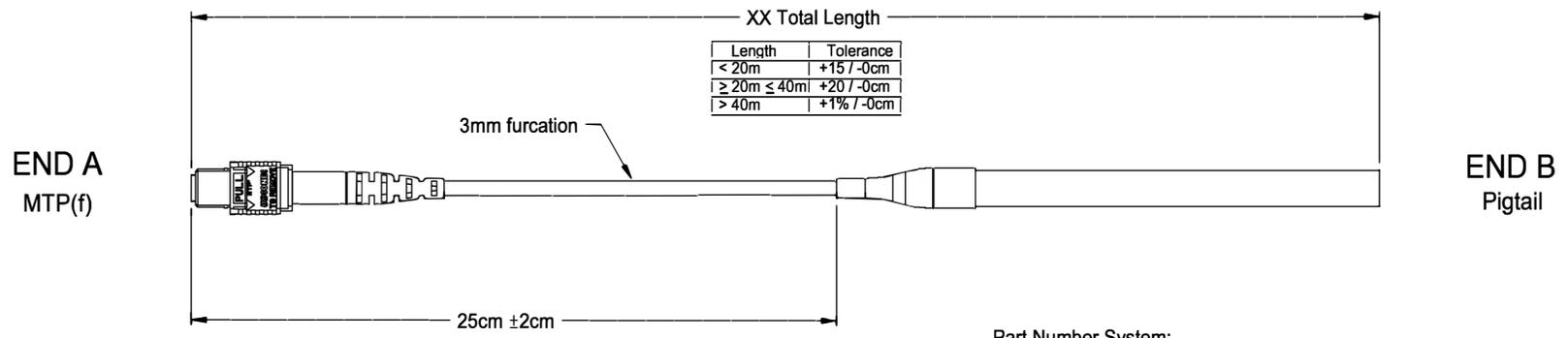
ADDENDUM NO. 1

12-10-2020

Date

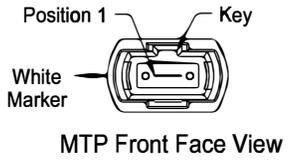
Attachment 1

REVISIONS			
REV	DESCRIPTION	DATE	APPR.



Part Number System:
FCP 14278 - X - XX

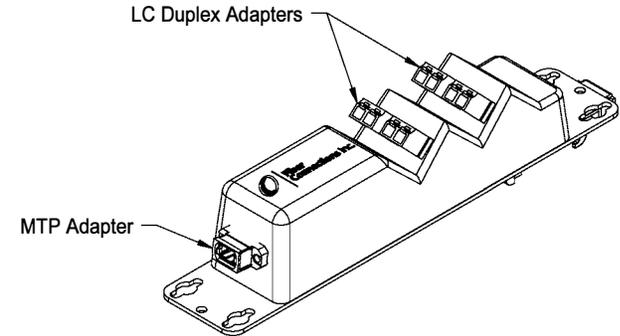
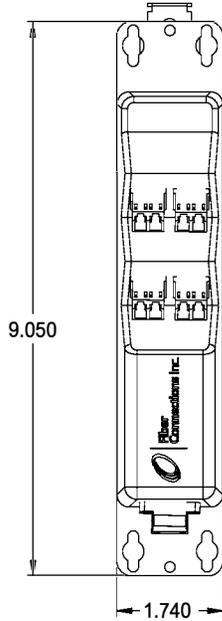
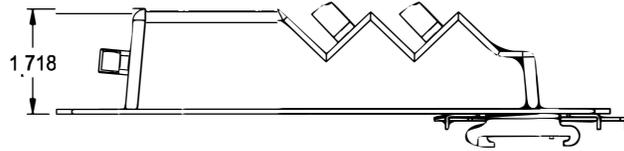
- | | |
|----------------------------------|---------------|
| Fiber Type: | Fiber Count: |
| 1 = OM1 | 04 = 4 Fiber |
| 2 = OS2 | 06 = 6 Fiber |
| 9 = OM3 | 08 = 8 Fiber |
| H = Hybrid | 12 = 12 Fiber |
| - Half OM1/ Half OS2 | |
| G = Hybrid | |
| - Half OM3/ Half OS2 | |
| F = Hybrid | |
| - Configuration to be determined | |



- NOTES:
1. Cable is loose tube riser rated with variable fiber type.
 2. Connector is MTP female IL <.5dB per connector.
 3. Transition is an epoxy filled tube covered with adhesive heat shrink.
 4. Include individual test results.
 7. XX in part number denotes total cable length in meters.
 8. Y in part number denotes pull kit: 0 = none, 1 = End B.

		FIBER CONNECTIONS INC.	
		Multi-Fiber and Fiber Type MTP(f) to Pigtail Cable	
<small>This information is confidential and disclosed to you on the condition that no further disclosure is made by you, to other than FIBER CONNECTIONS INC. personal without prior written authorization from FIBER CONNECTIONS INC.</small>			
DRN. SM	PART NO. FCP 14278-XX-Y	DWG NO. C 14278-1	REV 0
APPD. -	ORIGIN -	SIZE B	SCALE NTS SHEET 1 of 1
DATE 07 Feb 20	REF. NO. -		

REVISIONS			
REV	DESCRIPTION	DATE	APPR.



Part Number System:
FCP 14277 - X - XX

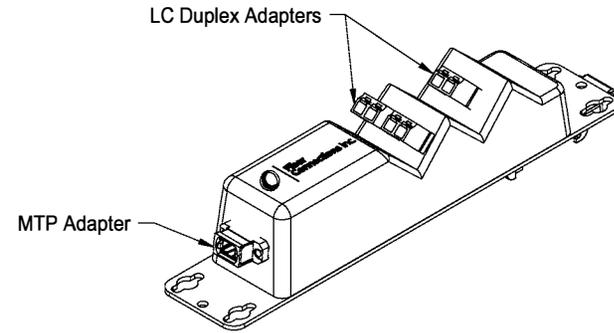
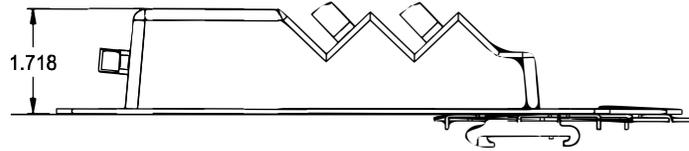
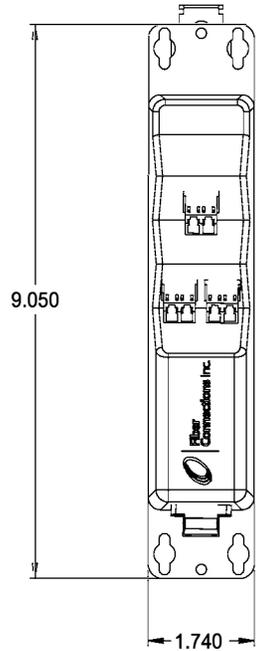
Fiber Type: Fiber Count:
 1 = OM1 08 = 8 Fiber
 2 = OS2
 9 = OM3
 H = Hybrid
 - Half OM1/ Half OS2
 G = Hybrid
 - Half OM3/ Half OS2
 F = Hybrid
 - Configuration to be determined

NOTES:

1. Body is 3 Step Narrow Body GatorPatch.
2. Breakout is 8 Fiber with Fiber Type outlined in part number.
3. For all configuration, LC Duplex IL <0.4dB, RL > 55dB
RL only applies to SM configurations.
4. For all configurations, MTP IL< 0.5dB, RL > 50dB
RL only applies to SM configurations.
5. For Hybrid configurations H and G, add 1.25" x 2" silver metallic label on shell:
 "Port 1-4 SM,
 Port 5-8 MM"
 Adjust accordingly for Hybrid configuration F.

 Fiber Connections Inc.	FIBER CONNECTIONS INC.		
	8 Fiber MTP Adapter to LC Adapter GatorPatch		
<small>This information is confidential and is disclosed to you on the condition that no further disclosure is made by you, to other than FIBER CONNECTIONS INC. personnel without prior written authorization from FIBER CONNECTIONS INC.</small>			
DRN. SM	PART NO. FCP 14277-X-08	DWG NO. C 14277-2	REV 0
APPD. -	ORIGIN -	SIZE B	SCALE NTS
DATE 06 Feb 20	REF. NO. -	SHEET 1 of 1	

REVISIONS			
REV	DESCRIPTION	DATE	APPR.



Part Number System:
FCP 14277 - X - XX

Fiber Type:
 1 = OM1
 2 = OS2
 9 = OM3
 H = Hybrid
 - Half OM1/ Half OS2
 G = Hybrid
 - Half OM3/ Half OS2
 F = Hybrid
 - Configuration to be determined

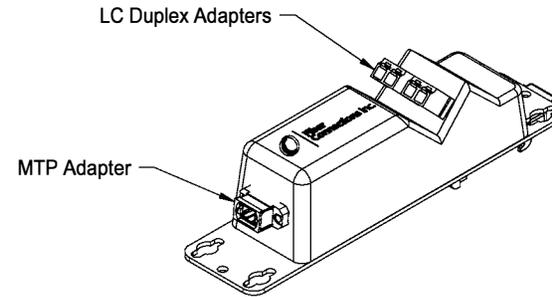
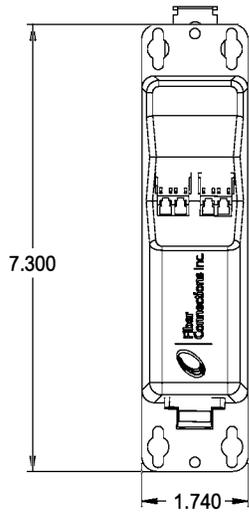
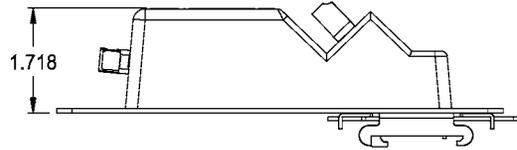
Fiber Count:
 06 = 6 Fiber

NOTES:

1. Body is 3 Step Narrow Body GatorPatch.
2. Breakout is 6 Fiber with Fiber Type outlined in part number.
3. For all configuration, LC Duplex IL <0.4dB, RL > 55dB
 RL only applies to SM configurations.
4. For all configurations, MTP IL < 0.5dB, RL > 50dB
 RL only applies to SM configurations.
5. For all Hybrid configurations, add 1.25" x 2" silver metallic label on shell:
 "Port # - #SM,
 Port # - #MM"
 Adjust label according to customer requirements.

 Fiber Connections Inc.	FIBER CONNECTIONS INC.		
	6 Fiber MTP Adapter to LC Adapter GatorPatch		
<small>This information is confidential and is disclosed to you on the condition that no further disclosure is made by you, to other than FIBER CONNECTIONS INC. personnel without prior written authorization from FIBER CONNECTIONS INC.</small>			
DRN. SM	PART NO. FCP 14277-X-06	DWG NO. C 14277-3	REV 0
APPD. -	ORIGIN -		
DATE 06 Feb 20	REF. NO. -	SIZE B SCALE NTS	SHEET 1 of 1

REVISIONS			
REV	DESCRIPTION	DATE	APPR.



Part Number System:
FCP 14277 - X - XX

NOTES:

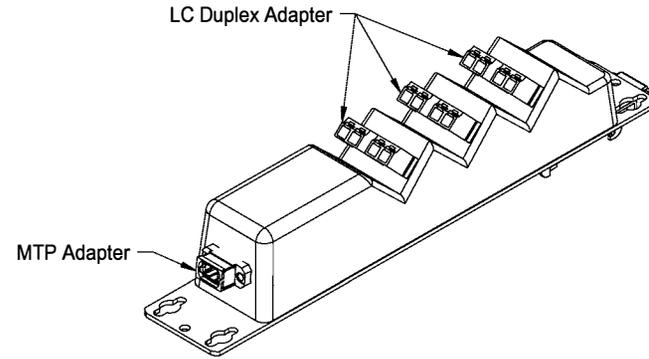
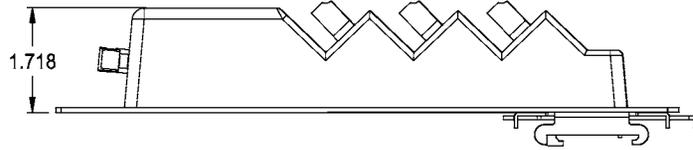
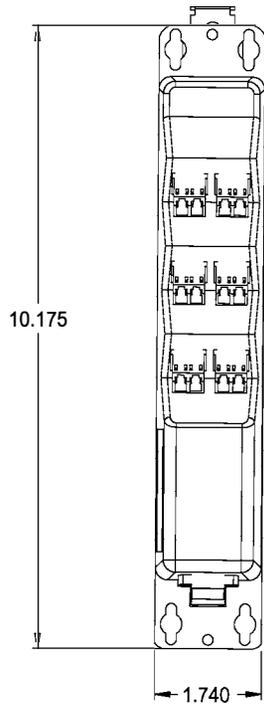
1. Body is 2 Step Narrow Body GatorPatch.
2. Breakout is 4 Fiber with Fiber Type outlined in part number.
3. For all configuration, LC Duplex IL < 0.4dB, RL > 55dB
 RL only applies to SM configurations.
4. For all configurations, MTP IL < 0.5dB, RL > 50dB
 RL only applies to SM configurations.
5. For Hybrid configurations H and G, add 1.25" x 2" silver metallic label on shell:
 "Port 1-2 SM,
 Port 3-4 MM"
 Adjust accordingly for Hybrid configuration F.

Fiber Type:
 1 = OM1
 2 = OS2
 9 = OM3
 H = Hybrid
 - Half OM1/ Half OS2
 G = Hybrid
 - Half OM3/ Half OS2
 F = Hybrid
 - Configuration to be determined

Fiber Count:
 04 = 4 Fiber

 Fiber Connections Inc.	FIBER CONNECTIONS INC.		
	4 Fiber MTP Adapter to LC Adapter GatorPatch		
<small>This information is confidential and is disclosed to you on the condition that no further disclosure is made by you, to other than FIBER CONNECTIONS INC. personal without prior written authorization from FIBER CONNECTIONS INC.</small>			
DRN. SM	PART NO. FCP 14277-X-04	DWG NO. C 14277-4	REV 0
APPD. -	ORIGIN -	SIZE B	SCALE NTS
DATE 06 Feb 20	REF. NO. -	SHEET 1 of 1	

REVISIONS			
REV	DESCRIPTION	DATE	APPR.



Part Number System:
FCP 14277 - X - XX

Fiber Type:
 1 = OM1
 2 = OS2
 9 = OM3
 H = Hybrid
 - Half OM1/ Half OS2
 G = Hybrid
 - Half OM3/ Half OS2
 F = Hybrid
 - Configuration
 to be determined

Fiber Count:
 12 = 12 Fiber

NOTES:

1. Body is 4 Step Narrow Body GatorPatch.
2. Breakout is 12 Fiber with Fiber Type outlined in part number.
3. For all configuration, LC Duplex IL <0.4dB, RL > 55dB
 RL only applies to SM configurations.
4. For all configurations, MTP IL <0.5dB, RL > 50dB
 RL only applies to SM configurations.
5. For Hybrid configurations H and G, add 1.25" x 2" silver metallic label on shell:
 "Port 1-6 SM,
 Port 7-12 MM"
 Adjust accordingly for Hybrid configuration F.

 Fiber Connections Inc.	FIBER CONNECTIONS INC.		
	12 Fiber MTP Adapter to LC Adapter GatorPatch		
<small>This information is confidential and is disclosed to you on the condition that no further disclosure is made by you, to other than FIBER CONNECTIONS INC. personnel without prior written authorization from FIBER CONNECTIONS INC.</small>	DRN. SM	PART NO. FCP 14277-X-12	DWG NO. C 14277-1
	APPD. -	ORIGIN -	REV 0
	DATE 06 Feb 20	REF. NO. -	SIZE B SCALE NTS SHEET 1 of 1

Attachment 2

REVISION OF SECTION 614 TRAFFIC SIGNAL BACKPLATE

Section 614 of the Standard Specification is hereby revised as follows:

Subsection 614.08 (j) shall include the following:

Traffic signals that are mounted on the mast arm shall include a non-louvered type "Traffic signal backplate." The backplate shall include a fluorescent yellow border tape that meets ASTM D4956 Type XI reflective sheeting or approved equal, and shall be of the following:

- 1.5 Inch wide
- Diamond grade DG3 Reflective sheeting
- Florescent Yellow 4081

Subsection 614.13 shall include the following:

Traffic signal backplates will not be measured and pay for separately but shall be included in the cost of the item for Traffic Signal Face.

CITY AND COUNTY OF DENVER
STATE OF COLORADO



DENVER
THE MILE HIGH CITY

DEPARTMENT OF TRANSPORTATION &
INFRASTRUCTURE

Technical Specifications

Contract Number: 202056331

CCD FY19 HSIP Pkg 1: Yosemite St @ I225 -
Traffic Signals Upgrade

October 21, 2020

**CITY AND COUNTY OF DENVER
DEPARTMENT OF TRANSPORTATION & INFRASTRUCTURE
TRANSPORTATION DESIGN
FY2019 HSIP PACKAGE 1: I-225 AT YOSEMITE ST
CITY AND COUNTY OF DENVER PROJECT NO. 2020-PROJMSTR-000088
CDOT PROJECT NO. SHE M320-125 (22935)**

General Contract Conditions shall be the City and County of Denver “Standard Specifications for Construction General Contract Conditions”, 2011 Edition and hereinafter modified shall be used for this project.

STANDARD CONSTRUCTION SPECIFICATIONS

The Standard Specifications for Construction for this Project shall consist of the applicable sections and subsections of the 2019 “Colorado Department of Transportation Standard Specifications for Road and Bridge Construction” and as hereinafter modified.

The Colorado Department of Transportation General Provisions consists of Sections 100 through 109 of the above-mentioned specifications. With the exception of General Provision Sections 101, 105, 106, 107 and 108, all other General Provisions are not applicable to this Project and are hereby deleted. In place of the deleted sections, the City and County of Denver “Standard Specifications for Construction General Contract Conditions,” 2011 Edition, shall apply to this contract.

The following Project Special Provisions take precedence over Specifications or Plans and supplement or amend the referenced “Standard Specifications for Road and Bridge Construction” adopted in 2019 by the Colorado Department of Transportation.

DETAILED CONSTRUCTION SPECIFICATIONS

The Detailed Specifications for this project are defined in the City of Denver Contract Requirements and Contract Documents.

STANDARD CONSTRUCTION DETAILS

It is the intent of the City to use applicable details from the Colorado Department of Transportation M&S Standards, the City of Denver’s Wastewater Management Division Standard Details, and the Denver Water Department’s Standard Drawings, most recent editions. Drainage related appurtenances shall follow the City and County of Denver (CCD), Department of Transportation & Infrastructure document titled “Storm Drainage and Sanitary Sewer Construction Detail and Technical Specifications”. This document can be found at the following web address: www.denvergov.org

The Colorado Department of Transportation (CDOT) Special Provisions, Standard Special Provisions are to be used for the project. Use CDOT Project Special Provisions that revise the above described documents, and prevail over above described documents.



This seal applies to all specifications EXCEPT:
202 Removal of Portions of Present Structure (Class 2)
202 Sandblasting Reinforcing Steel
601 Concrete Class DR

**CITY AND COUNTY OF DENVER
DEPARTMENT OF TRANSPORTATION & INFRASTRUCTURE
TRANSPORTATION DESIGN
FY2019 HSIP PACKAGE 1: I-225 AT YOSEMITE ST
CITY AND COUNTY OF DENVER PROJECT NO. 2020-PROJMSTR-0000088
CDOT PROJECT NO. SHE M320-125 (22935)**

The 2019 Colorado Department of Transportation’s “Standard Specifications for Road and Bridge Construction”, controls construction of this project. The following Special Provisions supplement or modify the Standard Specifications and take precedence over the Standard Specifications and Plans.

PROJECT SPECIAL PROVISIONS

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This seal applies to the following Specifications. Revision of Section
- 202 Removal of PPS (Class 2)
- 202 Sandblasting Reinforcing Steel
- 601 Concrete Class DR 2

CITY AND COUNTY OF DENVER
DEPARTMENT OF TRANSPORTATION & INFRASTRUCTURE
TRANSPORTATION DESIGN
FY2019 HSIP PACKAGE 1: I-225 AT YOSEMITE ST
CITY AND COUNTY OF DENVER PROJECT NO. 2020-PROJMSTR-0000088
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**CITY AND COUNTY OF DENVER
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CDOT STANDARD SPECIAL PROVISIONS

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Revision of Section 109 – Prompt Payment (Local Agency)	(October 1, 2019)	2
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NOTICE TO BIDDERS

It is recommended that bidders on this project review the work site and plan details with an authorized City representative. Prospective bidders shall contact one of the following listed authorized City representatives at least 24 hours in advance of the time they wish to review the project.

Project Engineer/Manager: Mr. Alex Kouprivitch
City & County of Denver
Department of Transportation and Infrastructure
Transportation Design
201 West Colfax Avenue, Dept. 508
Denver, CO 80202
Office Phone: 720-913-0803
Alex.Kouprivitch@denvergov.org

The above referenced individual(s) are the only representative(s) of the City with authority to provide any information, clarification, or interpretation regarding the plans, specifications, and any other contract documents or requirements.

A mandatory pre-bid conference will be held for this project in accordance with City and County of Denver contracting process at the City and County of Denver Offices located at 201 West Colfax Avenue, Denver Colorado 80202.

COMMENCEMENT AND COMPLETION OF WORK

Section 108 of the Standard Specifications is hereby revised as follows:

Subsection 108.03 shall include the following:

The Contractor's progress schedule may be a Bar Chart Schedule.

Salient features to be shown on the Contractor's Progress Schedule are:

1. Notice to Proceed
2. Mobilization(s)
3. Erosion Control
4. Removals
5. Traffic Signals
6. Curb and Gutter, Median Cover Material, Curb Ramps
7. Sidewalk
8. Hot Mix Asphalt
9. Signing and Striping
10. Construction Traffic Control
11. Landscape Restoration

DISADVANTAGED BUSINESS ENTERPRISE (DBE) CONTRACT GOAL

This is a federally-assisted construction project. As described in the CDOT DBE Standard Special Provision, the Bidder shall make good faith efforts to meet the following contract goal:

12 Percent DBE participation.

ON THE JOB TRAINING CONTRACT GOAL

The Department has determined that On the Job Training shall be provided to trainees with the goal of developing full journey workers in the types of trade or classification involved. The contract goal for On the Job Trainees working in an approved training plan in this Contract has been established as follows:

Minimum number of total On the Job Training required: Zero (0) hours.

**REVISION OF SECTION 101
DEFINITION AND TERMS**

Section 101 of the Standard Specifications is hereby revised to include the following:

Technical Specifications related to construction materials and methods for the Work under this Contract shall consist of the *State Department of Highways, Division of Highways, State of Colorado, Standard Specifications for Road and Bridge Construction* dated 2019.

Certain terms utilized in the Specifications referred to in the paragraph above shall be interpreted to have different meaning within the scope of this Contract. A summary of redefinitions follows:

- Subsection 101.28** **“Department”** shall mean the City and County of Denver, Colorado.
- Subsection 101.29** **“Engineer”** shall mean the Director of Denver Department of Transportation & Infrastructure, or designated representative.
- Subsection 101.39** **“Laboratory”** shall mean City and County of Denver, Colorado or their designated representative.
- Subsection 101.51** **“Project Engineer”** shall mean the Director of Denver Department of Transportation & Infrastructure, or designated representative.
- Subsection 101.76** **“State”** shall mean City and County of Denver, Colorado (where applicable).

**REVISION OF SECTION 105
COOPERATION OF THE CONTRACTOR**

Section 105 of the Standard Specifications is hereby revised as follows:

Subsection 105.10 shall include the following:

Other construction agencies may be working in the vicinity of the project. The Contractor shall conduct the work so as not to interfere with or hinder the progress or completion of the work being performed by other agencies or contractors. All traffic control conflicts that arise between the needs of the various construction contractors and other agencies shall be brought to the attention of the Engineer. The Engineer will decide the method of resolution.

**REVISION OF SECTION 106
CONFORMITY TO THE CONTRACT OF HOT MIX ASPHALT**

Section 106 of the Standard Specifications is hereby revised as follows:

Subsection 106.05 shall include the following:

For this project, Contractor process control testing of hot mix asphalt is mandatory.

**REVISION OF SECTION 107
PERFORMANCE OF SAFETY CRITICAL WORK**

Section 107 of the Standard Specifications is hereby revised as follows:

Add subsection 107.061 immediately following subsection 107.06 as follows:

107.61 Performance of Safety Critical Work. The following work elements are considered safety critical work for this project:

- (1) Work requiring the use of cranes or other lifting equipment

The Contractor shall submit, for record purposes only, an initial detailed construction plan that addresses safe construction of each of the safety critical elements. An erection plan, it shall be included as a part of this plan. The detailed construction plan shall be submitted two weeks prior to the safety critical element conference described below. The construction plan shall be stamped "Approved for Construction" and signed by the Contractor. The construction plan will not be approved by the Engineer.

The Construction Plan shall include the following:

- (1) Safety Critical Element for which the plan is being prepared and submitted.
- (2) Contractor or subcontractor responsible for the plan preparation and the work.
- (3) Schedule, procedures, equipment, and sequence of operations, that comply with the working hour limitations
- (4) Temporary works required: falsework, bracing, shoring, etc.
- (5) Additional actions that will be taken to ensure that the work will be performed safely.
- (6) Names and qualifications of workers who will be in responsible charge of the work:
 - A. Years of experience performing similar work
 - B. Training taken in performing similar work
 - C. Certifications earned in performing similar work
- (7) Names and qualifications of workers operating cranes or other lifting equipment
 - A. Years of experience performing similar work
 - B. Training taken in performing similar work
 - C. Certifications earned in performing similar work
- (8) The construction plan shall address how the Contractor will handle contingencies such as:
 - D. Unplanned events (storms, traffic accidents, etc.)
 - E. Structural elements that don't fit or line up
 - F. Work that cannot be completed in time for the roadway to be reopened to traffic
 - G. Replacement of workers who don't perform the work safely
 - H. Equipment failure
 - I. Other potential difficulties inherent in the type of work being performed
- (9) Name and qualifications of Contractor's person designated to determine and notify the Engineer in writing when it is safe to open a route to traffic after it has been closed for safety critical work.

-2-

**REVISION OF SECTION 107
PERFORMANCE OF SAFETY CRITICAL WORK**

A safety critical element conference shall be held two weeks prior to beginning construction on each safety critical element. The Engineer, the Contractor, the safety critical element subcontractors, and the Contractor's Engineer shall attend the conference. Required pre-erection conferences may be included as a part of this conference.

After the safety critical element conference, and prior to beginning work on the safety critical element, the Contractor shall submit a final construction plan to the Engineer for record purposes only. The Contractor's Engineer shall sign and seal temporary works related to construction plans for the safety critical elements, and Temporary Works. The final construction plan shall be stamped "Approved for Construction" and signed by the Contractor.

The Contractor shall perform safety critical work only when the Engineer is on the project site. The Contractor's Engineer shall be on site to inspect and provide written approval of safety critical work for which he provided stamped construction details. Unless otherwise directed or approved, the Contractor's Engineer need not be on site during the actual performance of safety critical work, but shall be present to conduct inspection for written approval of the safety critical work.

When ordered by the Engineer, the Contractor shall immediately stop safety critical work that is being performed in an unsafe manner or will result in an unsafe situation for the traveling public. Prior to stopping work, the Contractor shall make the situation safe for work stoppage. The Contractor shall submit an acceptable plan to correct the unsafe process before the Engineer will authorize resumption of the work.

When ordered by the Engineer, the Contractor shall remove workers from the project that are performing the safety critical work in a manner that creates an unsafe situation for the public in accordance with subsection 108.06.

Should an unplanned event occur, or the safety critical operation deviate from the submitted plan, the Contractor shall immediately cease operations on the safety critical element, except for performing any work necessary to ensure worksite safety, and provide proper protection of the work and the traveling public. If the Contractor intends to modify the submitted plan, he shall submit a revised plan to the Engineer prior to resuming operations.

All costs associated with the preparation and implementation of each safety critical element construction plan will not be measured and paid for separately, but shall be included in the work.

Nothing in the section shall be construed to relieve the Contractor from ultimate liability for unsafe or negligent acts or to be a waiver of the Colorado Governmental Immunity Act on behalf of the City and County of Denver

**REVISION OF SECTION 107
WORKER SAFETY**

Section 107 of the Standard Specifications is hereby revised as follows:

Subsection 107.06 shall include the following:

If nighttime construction activities are required, the contractor shall comply with the local agency requirements.

P.M. Construction Noise Note for Denver Jurisdiction:

Contractors shall comply with the CCD Noise Control Ordinance for all construction activities scheduled to occur between the hours of 9:00 p.m. to 7:00 a.m. Monday – Friday and 5:00 p.m. and 8:00 a.m. Saturday through Sunday if noise levels are expected to exceed 50 dBA in residential areas or 60 dBA in commercial areas. Nighttime construction activities exceeding noise levels during these restricted hours may not be initiated without first obtaining this permit variance from CCD.

Under any circumstances where nighttime construction activities will take place between the restrictive hours listed above where noise levels will exceed the noise impact thresholds, the contractor is required to apply for a construction noise variance no less than one month before the startup date for construction. Note: the CCD board only meets the 2nd Thursday of every month.

Applications shall be submitted through the Denver Department of Public Health and Environmental (DDPHE) at a cost of \$25.00 for application processing.

The contractor is responsible for fulfilling the requirements set forth by the CCD and is responsible for obtaining the permit variance prior to the construction startup date. All exemption requests and permitting requirements will not be paid for separately, but will be included in the work. Copies of the final application approval shall be provided to CDOT R1 Noise Specialist (Curt Frischkorn)) for recording and documentation purposes demonstrating compliance with the local agencies regulations.

If the Contractor is ordered to cease operations due to violations of a noise ordinance as a result of equipment back up alarms, the Contractor shall take whatever actions are necessary to comply with the ordinance and continue work on the project. This includes the option of using an observer in lieu of using the equipment's back up alarms as allowed by 29 CFR 1926.601(b) (4) (II) of the OSHA Safety and Health Standards. Should the Contractor fail to mitigate the noise ordinance violation, the Contractor shall be deemed to have waived any right to a claim as a result of work suspension or being required to perform the work at times not specified in the Contract.

If the Contractor uses an observer in lieu of back up alarms, the Contractor shall follow all of the OSHA requirements regarding the use of observers.

All costs incidental to the foregoing requirements shall be included in the original contract prices for the project.

**REVISION OF SECTION 107
PROTECTION OF EXISTING VEGETATION**

Section 107 of the Standard Specifications is hereby revised as follows:

Subsection 107.12 shall include the following:

The Contractor shall save all existing vegetation (including trees, shrubs, ground covers, grasses, wetlands & riparian) in this area, except for that vegetation, which must be removed to accommodate construction of the project, per the plans. Specific areas of vegetation to be protected shall be as directed by the Engineer and shall be protected by using orange construction fencing, wire fencing with metal posts or silt fence. Fencing for trees shall be installed at the drip line of the tree or as approved by the Engineer. Equipment shall not be installed or stockpile material within 15 feet of existing trees to remain.

The Contractor shall perform all the work in such a manner that the least environmental damage will result. All questionable areas or items shall be brought to the attention of the Engineer for approval prior to removal or any damaging activity.

The Contractor shall promptly report any vegetation damaged or scarred during construction to the Engineer for assessment of damages. Damaged or destroyed fenced vegetation, shall be replaced at the expense of the Contractor. Vegetation of replaceable size shall be replaced at the Contractor's expense. When trees, shrubs beyond replaceable size or wetlands have been damaged or destroyed, the Contractor shall be liable for the appraised value based upon the official current publications. For trees and shrubs use the International Society of Arboriculture, Guide for Plant Appraisals. The Contractor shall pay any fines or jail time should a wetland be damaged, at no cost to the project. The value of disturbed vegetation shall be calculated according to the following formula:

$$\frac{(\text{Vegetation size}) \times (\text{Species}) \times (\text{Location}) \times (\text{Condition}) \times (\text{Arborist or Wetland Specialist})}{\text{Vegetation value}} =$$

A consulting Arborist retained by the Department will determine the value of the trees and shrubs. A consulting Wetland Specialist shall determine the value of the wetland or wetland species. This value will be deducted from any money due to the Contractor.

The determination as to whether a plant is of replacement size or beyond will be made by the City's Landscape Architect or Wetland Specialist. Contact Jim Myers at CCD Forestry Department.

If the fence is knocked down or destroyed by the Contractor, the Engineer will suspend the work, wholly or in part, until the fence is repaired to the Engineer's satisfaction at the Contractor's expense. Time lost due to such suspension will not be considered a basis for adjustment of time charges, but will be charged as contract time.

**REVISION OF SECTION 108
PROSECUTION AND PROGRESS**

Section 108 of the Standard Specifications is hereby revised as follows:

Subsection 108.03 shall include the following:

The Contractor shall establish daily working hours for the project and submit them to the Engineer for approval along with the Progress Schedule. All work performed by the Contractor or any of the Contractor's agents during a working day shall be accomplished within these pre-established working hours. Daily working hours shall not exceed 10 consecutive hours for each 24 hour working day. Neither the Contractor nor any of the Contractor's agents shall work at times outside of the daily working hours without prior approval by the Engineer. Requests for changes in working hours shall be submitted to the Engineer in writing at least 48 hours before the proposed change in working hours would take effect.

**REVISION OF SECTION 201
CLEARING AND GRUBBING**

Section 201 of the Standard Specifications is hereby revised as follows:

Subsection 201.02, paragraph 2 shall be deleted and replaced with the following:

Removals shall be completed to the proposed subgrade elevation for the work, or as designated by the Engineer.

Removal of trees with less than a 4 inch diameter, when measured 24 inches or less above the existing grade, will not be measured and paid for separately. These tree removals will be included in the clearing and grubbing work.

Subsection 201.02, paragraph 8 shall be deleted and replaced with the following:

All tree trimming will be performed by the City and County of Denver through the City Forester's Office. Contact Jim Myers two (2) days prior.

Subsection 201.02 is hereby revised to include:

All trees designated to remain shall be protected in accordance with Denver's Standard Detail for Tree Protection Area as shown in the plans.

Subsection 201.03 is hereby revised to include:

Clearing and grubbing will not be measured and paid for separately but shall be included in the cost of the work.

**REVISION OF SECTION 202
REMOVAL OF STRUCTURES AND OBSTRUCTIONS**

Section 202 of the Standard Specifications is hereby revised as follows:

Subsection 202.02, paragraph 7 shall be deleted and replaced with the following:

The existing asphalt mat, which varies in thickness, shall be removed in a manner that minimizes contamination of the removed mat with underlying material. The removed mat shall become the property of the Contractor and be disposed of by any one or more of the following described methods:

1. Use in embankment construction in accordance with subsection 203.06.
2. Place material in bottom of fills as approved by the Engineer.
3. Place material in subgrade soft spots outside of the roadway prism as directed by the Engineer.
4. Recycled into the Hot Mix Asphalt.

Subsection 202.02 shall be revised to include the following:

The Engineer will mark the limits of removals in the field. Removals in the vicinity of trees to remain shall conform to applicable provisions of the Denver Forestry's Tree Protection specification.

Subsection 202.03 is hereby replaced as follows:

All salvable material shown on the plans shall be removed, without unnecessary damage, in sections or pieces that may be readily transported, and delivered by the Contractor to the location noted on the plans, or as directed by the Engineer. The Contractor shall be held responsible for the safekeeping of all salvable materials during the period of the Contract until they are delivered to the City. The Contractor shall make good or replace at his own expense any such materials damaged, stolen or otherwise lost prior to receipt by the City. All salvable materials, as designated on the plans, shall remain the property of the City.

Subsection 202.07 is hereby replaced as follows:

All concrete pavement, sidewalks, structures, curbs, gutters, asphalt pavement, etc., designated for removal, shall be broken into pieces and disposed of outside the limits of the project, unless otherwise designated on the plans, or as directed by the Engineer.

Old concrete construction which abuts new construction, edges of pavement, sidewalks, curbs, etc., to be left in place shall be saw cut to true line with a vertical face.

Where old asphalt construction abuts new construction, edges of asphalt pavement, patching, etc., asphalt to be left in place shall be wheel cut or sawcut to a neat vertical face with minimal jagged edges to the satisfaction of the Engineer. The Engineer, at his discretion, may require asphalt to be sawcut.

Removal of stone curb shall include the complete removal of the curb head and concrete foundation. No payment will be made for sprinkler relocation, utility relocation, etc., beyond the limits of construction as shown on the plans. Stone curb designated for salvage shall be carefully removed to prevent damage and delivered to the location indicated in the plans or specifications, or as directed by the Engineer.

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**REVISION OF SECTION 202
REMOVAL OF STRUCTURES AND OBSTRUCTIONS**

Subsection 202.11 shall be revised to include the following:

The removal of the existing asphalt mat will be measured by the area, in square yards, completed to the required depth and accepted.

Removal of asphalt mat from concrete gutter and other concrete designated to remain shall be measured by the square yard. Removal of asphalt mat from gutter shall include sandblasting and compressed air cleaning as part of that pay item.

Subsection 202.12 is hereby deleted and replaced as follows:

The accepted quantities will be paid for at the contract unit price for each of the pay items listed below that appear in the bid schedule. Payment shall be full compensation for sawcutting, scraping, sandblasting, removing, hauling and disposal of such items, excavation and subsequent backfill (with moisture/density control per the Revision of Subsection 203.07) to proposed subgrade elevation. The price shall also include salvageable materials removed, their custody, preservation, storage, haul and disposal as provided herein.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Removal of Concrete Median Cover Material	Square Yard
Removal of Sidewalk	Square Yard
Removal of Curb and Gutter	Linear Foot
Removal of Concrete Curb Ramp	Square Yard
Removal of Asphalt Mat	Square Yard
Removal of Guardrail Type 3	Linear Foot
Removal of Ground Sign	Each

When the Contract does not include pay items for Removal of Structures and Obstructions, the removal will not be paid for separately but shall be included in the work.

**REVISION OF SECTION 202
REMOVAL OF PAVEMENT MARKING**

Section 202 of the Standard Specifications is hereby revised as follows:

In subsection 202.11, delete the second paragraph and add the following:

Removal of pavement marking will not be measured but shall be included in the work. Sandblasting of pavement that is to be covered with pavement marking material will not be measured and paid for separately but shall be included in the cost of the work.

**REVISION OF SECTION 202
REMOVAL OF TRAFFIC SIGNAL EQUIPMENT**

Section 202 of the Standard Specifications is hereby revised as follows:

Subsection 202.03 shall include the following:

The Contractor shall safeguard any salvageable materials designated by Denver Department of Transportation & Infrastructure – Transportation Operations (Denver Traffic) and shall be responsible for the expense of repairing or replacing damaged or missing material until it is delivered to the City and County of Denver Traffic Maintenance Yard at 5440 Roslyn Street.

Designation of salvageable equipment and times for delivery of such items shall be coordinated with Denver Traffic (720-865-4002).

Signal operations shall be maintained at each of the project intersections throughout construction.

Subsection 202.04 shall include the following:

Removal of the traffic signal equipment shall include signal poles (without luminaire), pedestal poles, footings, span wire cable, traffic signal controller cabinet, pedestrian push button, cabinet footings, all attachment hardware, and all incidental equipment, except as noted on the plans. All existing foundations and pull boxes shall be removed and back-filled. All wiring shall be removed from existing conduit and the conduit shall be abandoned in place.

Xcel Energy shall remove all signal poles with luminaire attached. Xcel Energy will remove only the signal pole and luminaire, and the Contractor shall remove the remainder of the traffic signal equipment, as noted in the plans. The Contractor shall coordinate with Xcel Energy for these removals.

All “Light Emitting Diode” (LED) signal lenses in existing signal faces shall be removed prior to the removal of the signal face. These LED lenses shall be protected from damage and delivered to 5440 Roslyn Street, Denver. This work shall be included in the cost of Removal of Traffic Signal Equipment and will not be paid for separately.

Times for delivery to the maintenance yard shall be coordinated with Denver Traffic at (720) 865-4000.

Subsection 202.12 shall include the following:

Pay Item

Removal of Traffic Signal Equipment

Pay Unit

Lump Sum

Payment includes all labor, equipment, and materials necessary to complete the work.

**REVISION OF SECTION 202
REMOVAL OF PORTIONS OF PRESENT STRUCTURE (CLASS 2)**

Section 202 of the Standard Specifications is hereby revised to include the following:

DESCRIPTION

This work consists of saw cutting, removal and disposal of portion of existing sidewalk over a bridge deck. Removal operations shall be conducted so that the traveling public is protected, and so that interference with the traveling public using the structure is minimized.

The applicable classes of removal shall be performed as defined in the plans. The locations and limits of removal will be as determined by the Engineer.

CONSTRUCTION REQUIREMENTS

a) General:

At least 10 working days before beginning removal, the Contractor shall submit a Method Statement to the Engineer with details of the removal operations including the means, methods, sequence of removal, tools, and equipment to be used.

The Contractor's Method Statement shall also include proposed methods used to:

- (1) Determine the locations and limits of removal
- (2) Prevent debris from falling to the ground or waterways below the structure
- (3) Protect the traveling public using the structure, and adjacent to the structure, from airborne debris generated by the removal operations.

All removal operations, methods, and equipment must be approved by the Engineer before the work begins.

The Contractor shall control dust and run-off in accordance with applicable governmental agencies. The Contractor is responsible for the proper disposal of all material removed, including but not limited to, material collected by vacuuming the deck and sidewalk surface.

The existing concrete shall be removed as shown on the plans or as directed by the Engineer. The Contractor shall saw cut along the removal limits prior to removal. Removal operations shall not occur prior to approval of the Engineer. The sawing of concrete shall be done to a true line, with a vertical face, unless otherwise specified. Feathered edges will not be acceptable. The depth of the saw cut shall be approximately $\frac{3}{4}$ -inch.

The Contractor shall take all steps necessary to prevent cutting or otherwise damaging reinforcing steel, including any vertical stirrups, and/or structural steel including welded shear connectors projecting into the bridge deck. All bars or shear connectors damaged by the Contractor's operations shall be repaired or replaced at the Contractor's expense using means and methods approved by the Engineer with no allowance for contract time extension.

Following the removal of the concrete, all exposed non-epoxy reinforcing steel to remain in place shall be straightened as required and thoroughly cleaned to sound metal by sandblasting per Revision of Section 202 Sandblasting. Epoxy coated reinforcing steel, if present, shall not be sandblasted but shall be cleaned with hand tools. Epoxy coating on reinforcing steel, if damaged, shall be repainted with epoxy paint prior to placement of the concrete.

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**REVISION OF SECTION 202
REMOVAL OF PORTIONS OF PRESENT STRUCTURE (CLASS 2)**

Following sandblasting, the condition of all exposed reinforcing bars will be inspected by the Engineer. If, in the opinion of the Engineer, the loss of original cross-sectional area of the bar due to deterioration is 25 percent or more, the Contractor shall add additional bars to replace the section area loss due to deterioration, as approved by the Engineer. New added bars shall be lap spliced as shown in the plans. If the required lap splice length cannot be utilized, a mechanical splice shall be used. The mechanical splice shall develop at least 125 percent of the specified yield strength of the bar. The Mechanical splice shall be selected from CDOT's Approved Products List. All minimum clearances shall be maintained as defined in the plans. As an alternative, the Contractor may remove additional sound concrete to achieve the required lap length. Payment for additional removals and repairs will be based on the unit price for the appropriate class of removal and repair method.

All reinforcing steel shall be secured to adjacent bars as provided in subsection 602.

All areas of the prepared surface contaminated by oil or other materials detrimental to bonding shall be thoroughly cleaned by a method approved by the Engineer.

b) Surface Preparation Equipment

Pneumatic hammers heavier than nominal 15-pound class will not be permitted. Pneumatic hammers and chipping tools shall not be operated at an angle exceeding 60° relative to the surface of the slab. Such tools may be started in the vertical position but must be immediately tilted to 60° operating angle.

Hand tools such as hammers and chisels shall be provided for removal of final particles of loose, unbonded concrete. Only short, one-handed hammers with a maximum head weight of 5 pounds will be allowed unless Class 3 removal is designated. Hydraulic demolition may be utilized with approval of Engineer.

Sandblasting equipment shall meet the requirements of Revision of Section 202 Sandblasting Reinforcing Steel.

c) Class 2 Removal

Removal of Portions of Present Structure (Class 2) shall consist of removing existing bridge sidewalk concrete within the limits shown on the plans, or as designated by the Engineer. Class 2 removal shall begin at the surface of the existing bridge sidewalk and extend to the depth shown on plans or sound concrete whichever is deeper.

Wherever solid bond between existing concrete and reinforcing steel is lacking, or where more than half of the diameter of the reinforcing bars is exposed by removal of concrete, the concrete adjacent to the bar shall be removed to a minimum clearance of one inch below and around the bar in all directions to permit new concrete to bond to the entire periphery of the bar. Care shall be taken so as not to fracture sound concrete in the bottom half of the sidewalk.

Removal may be performed by power chipping or hand tools in accordance with these specifications or as otherwise approved by the Engineer.

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**REVISION OF SECTION 202
REMOVAL OF PORTIONS OF PRESENT STRUCTURE (CLASS 2)**

METHOD OF MEASUREMENT

Removal of Portions of Present Structure will be measured by the actual quantity completed and accepted to the required depth.

Removal and repairs beyond the minimum required lap length of reinforcing steel will not be measured or paid for, but will be at the contractors expense.

Cleaning of prepared surfaces contaminated by oil or other materials detrimental to bonding will not be measured and paid for separately but shall be included in the work.

BASIS OF PAYMENT

Planned removal quantities are approximate. The actual accepted quantities of Removal of Portions of Present Structure will be paid for at the contract unit price.

Payment will be made under:

Pay Item

Removal of Portions of Present Structure (Class 2)

Pay Unit

Square Yard

Payment for Removal of Portions of Present Structure will be full compensation for all labor, materials, tools, equipment and incidentals required to complete the item including saw cutting removal of concrete to the required depth, sandblasting or hand cleaning reinforcing steel including epoxy repair, and disposal of removed materials and debris.

Methods to prevent debris from falling from the structure, and methods to protect the traveling public using the structure, or adjacent to the structure, from airborne debris will not be paid for separately, but shall be included in the work.

Cleaning, straightening, and repairing epoxy coating of existing reinforcing steel will not be paid for separately, but shall be included in the work.

Payment for the new reinforcement steel will be made in accordance with Section 602. Payment for the Mechanical splice will be as the weight of reinforcing steel for the designated lap splice for that bar size.

**REVISION OF SECTION 202
SANDBLASTING REINFORCING STEEL**

Section 202 of the Standard Specifications is hereby revised to include the following:

DESCRIPTION

Sandblasting shall consist of cleaning exposed non-epoxy reinforcing steel designated to remain in place and roughening the surface and removing all fractured particles from the entire existing concrete surface against which new concrete is to be placed.

CONSTRUCTION REQUIREMENTS

Sandblasting equipment shall be capable of removing rust scale and concrete fragments or laitance from reinforcing steel, roughening existing surface, and removing all fractured particles from the existing concrete surface.

Following the removal of adjacent concrete, all exposed non-epoxy reinforcing steel designated to remain in place shall be cleaned to sound steel by sandblasting. Sound steel is defined as free of oil, dirt, concrete fragments, or laitance, loose rust scale, and other coatings of any character that would limit or inhibit the bond with the new concrete. Epoxy-coated steel shall not be sandblasted.

Rust that may form on the reinforcing steel within seven calendar days following the accepted sandblasting, will not be cause for rejection of the steel.

When acceptable reinforcing steel is exposed to the elements for more than seven calendar days prior to encasement in concrete, adequate measures shall be taken by the Contractor, as approved by the Engineer, to protect the steel from contamination or corrosion. Reinforcing steel contaminated or corroded, shall be re-sandblasted at the Contractor's expense. No adjustment in Contract time will be made for re-sandblasting.

BASIS OF PAYMENT

Sandblasting, including labor, materials, tools, equipment and incidentals, will not be measured and paid for separately but shall be included in the work.

**REVISION OF SECTION 203
POTHOLING**

Section 203 of the Standard Specifications is hereby revised as follows:

Subsection 203.05(f) Excavation shall include the following:

The Contractor shall complete all conduit installation and potholing prior to June 2021. An overlay project by Denver Maintenance is anticipated to begin in June 2021 and will resurface the asphalt pavement along Yosemite Street between Hampden Avenue and Belleview Avenue. The Contractor shall cooperate and coordinate all work with the overlay work by Denver Maintenance.

All surface material disturbed by potholing shall be restored in kind in accordance with the provisions of the most recent release of the *Standards and Details for the City and County of Denver*.

- All potholes must be core drilled.
- All potholes must be backfilled using only one of the following methods:
 - Wet Sand
 - Flowfill
 - Flashfill
 - The Contractor may submit a written request to use a material not specified above (squeegee, pea gravel, and native material will not be allowed)
- Potholes in an asphalt street must be patched back using hot bituminous asphalt, minimum 9-inch in depth.
- Potholes in a concrete street must be patched back with fast curing high strength concrete no less than 8000 psi in 28 days and a 3000 psi in 60 minutes.
- Full concrete panel replacement is required when a third pothole is core drilled in the same panel. The contractor that cut the last pothole (i.e. 3rd) will be required to replace the panel.
- Any pothole in a sidewalk will require a full panel replacement.
- Any pothole in the curb and gutter or any drainage way will require at a minimum, a half panel replacement.

Delete Subsection 203.11(e) and replace with the following:

(e) Potholing. Potholing will be measured by each. The work shall include One Pothole per utility crossing per conduit or as approved by the Engineer. All other related work, including removal of existing pavement, backfilling, shoring and labor will not be measured and paid for separately, but shall be included in the work.

Subsection 203.12 of the Standard Specifications shall be modified as follows:

Payment will be made under:

Pay Item
Potholing

Pay Unit
Each

**REVISION OF SECTION 203
SWEEPING**

Section 203 of the Standard Specifications is hereby revised as follows:

Subsection 203.01 shall include the following:

This work is for sweeping paved surfaces during construction as part of the project Best Management Practices (BMP).

Subsection 203.04 shall include the following:

Paved surfaces adjacent to the construction site shall be swept by the close of business day and during the day as needed when sediment and other materials are tracked or discharged onto them. Sweeping shall be completed with a pickup broom or equipment capable of collecting sediment. Sweeping with a kick broom will not be allowed. Street sweepers using water while sweeping is preferred in order to minimize dust. Flushing off paved surfaces with water is prohibited.

Subsection 203.11 shall include the following:

Sweeping, when used as a BMP as shown in the Contract, will be measured by the number of hours that a pickup broom or equipment capable of collecting sediment, authorized by the Engineer, is used to remove sediment from the roadway or other paved surfaces. Each week the Contractor shall submit to the Engineer a statement detailing the type of sweeping equipment used and the number of hours it was used to pick up sediment. Operator will not be measured and paid for separately, but shall be included in the work.

Subsection 203.12 of the Standard Specifications shall be modified as follows:

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Sweeping (Sediment Removal)	Hour

Payment for Sweeping (Sediment Removal) shall be full compensation for all work necessary to complete this item.

**REVISION OF SECTION 207
TOPSOIL**

Section 207 of the Standard Specification is hereby revised for this project as follows:

Subsection 207.01 shall include the following:

This work includes imported and onsite salvaged topsoil that is to be placed in the disturbed area within the project limits.

Subsection 207.02 shall include the following:

The source of topsoil for this project is undesignated. This imported topsoil is subject to approval by the Engineer before use. The Contractor shall submit a 1 pound sample of the product four (4) weeks before its use on the project site for the Engineer's approval. A Certificate of Compliance shall be provided to the Engineer to verify the organic matter content, pH and carbon matter to nitrogen ratio. Soil tests shall be method of Soil Analysis used at the Colorado State University Soil Testing Laboratory.

The topsoil shall have an acidic reaction of 6.0 to 7.5 pH and shall contain between 1 and 4 percent well composted organic matter. All organic amendments shall comply with Section 212.

The topsoil shall contain the following minimum ammonium DTPA (chelate) extractable nutrients (this is the extracting solution used by CSU Soil Testing Laboratory).

Nitrogen	5 ppm Air dried Basis
Phosphorus	5 ppm
Potassium	30 ppm
Iron (Fe)	5 ppm

Topsoil shall not include any minerals or elements detrimental to plant growth. Soluble salts measured in saturation extract shall be less than 3 mmhos/cm.

Subsection 207.05 shall include the following:

The addition of soil amendments needed to bring the topsoil into conformance with the specifications will not be measured and paid for separately, but shall be included in the work. Amendments shall conform to subsection 212. Stockpile topsoil activities shall be included in the price of the work. Soil Analysis shall not be paid for separately, but shall be included in the cost of the work.

**REVISION OF SECTION 208
EROSION CONTROL**

Section 208 of the Standard Specifications is hereby removed in its entirety and replaced with the following:

PART I: DEFINITIONS

Definitions used for this Section shall consist of those listed in Title 1 of the City and County of Denver “Standard Specifications for *Construction*, General Contract Conditions”, 2011 Edition.

Definitions used for this Section hereby incorporate those identified within the City and County of Denver Construction Activities Stormwater Manual (CASM).

Additional Definitions applicable to this Section are listed heretofore:

Basis of Payment: The terms under which “Work” is paid, as a designated “Pay Item” in accordance with the quantity measured and the “Pay Unit.”

Best Management Practices (BMPs): Schedules of activities, prohibitions of practices, installation of devices, maintenance procedures, and other management practices deployed to stabilize the construction site to prevent or reduce the pollution of State Waters (see definition below). Stormwater BMPs can be classified as "structural" (i.e., devices installed or constructed on a site) or "non-structural" (procedures, such as modified landscaping practices).

Colorado Department of Health and Environment (CDPHE): State of Colorado, Water Quality Control Division responsible for issuance of State Construction Stormwater Permit.

Construction Activities Stormwater Discharge Permit (CASDP): Permit issued by the City for compliance with City & County of Denver Revised Municipal Code and Department of Transportation & Infrastructure Rules & Regulations concerning the discharge of pollutants in storm generated runoff from construction sites to Municipal Separate Storm Sewer System (MS4, see definition below) or State Waters, via the Municipal Separate Storm Sewer System (MS4).

Construction Activities Stormwater Manual (CASM): City and County of Denver Construction Activities Stormwater Manual (CASM), 2010 edition.

Colorado Department of Transportation (CDOT): State agency that has published standards for Erosion Control with accompanying Erosion Control Supervisor certification courses.

Erosion Control Supervisor (ECS): The Erosion Control Supervisor is assigned by the Contractor to perform duties as described in this Section. The ECS shall be properly trained in BMPs per requirements of Part V below, and shall be under the direction of a Professional Engineer licensed in the State of Colorado when performing any modifications to the Project Stormwater Management Plan (SWMP), as required by CDPHE.

Final Stabilization: Point of construction when all ground surface disturbing activities at the site have been completed and uniform vegetative cover has reached 70% of pre-disturbance vegetative cover, or equivalent permanent features have been employed. At this point, all temporary BMPs can be removed, all construction and equipment maintenance wastes have been disposed of properly; and all elements of the Stormwater Management Plan have been completed.

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REVISION OF SECTION 208 EROSION CONTROL

Major SWMP Modification: Changes to the original SWMP that removes or adds additional area to the Project, or modifies the final hydrology or drainage of the Project.

A Major SWMP Modification requires the submission of revised Stormwater Management Plan (SWMP) elements to the Permit Authority for review and approval. Any adjustments to a SWMP must be performed either by or under the direction of a Professional Engineer licensed in the State of Colorado.

Minor SWMP Modification: Modification to the SWMP that does NOT increase the scope or change hydrology of the Project but: modifies/improves specific BMPs in use at site, indicates progression in phasing of the Project, or specifies relocation of previously approved BMPs within the Project. Any adjustments to a SWMP must be performed either by or under the direction of a Professional Engineer licensed in the State of Colorado.

Municipal Separate Storm Sewer System (MS4): A conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):

- a) Owned or operated by a State, city, town, county, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of stormwater or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or a designated and approved management agency under Section 208 of the Federal Clean Water Act that discharges to State Waters;
- b) Designed or used for collecting or conveying stormwater;
- c) Which is not a combined sewer; and
- d) Which is not part of a Publicly Owned Treatment Works (POTW).

Permit Authority: The Department authorized by the City to review and process CASDP Applications for Capital and/ or governmental sponsored Projects. The responsible City department serving as the Permit Authority is the Department of Transportation & Infrastructure Project Controls Office. As a clarification, the Development Services Department of the City serves as the point of intake and permit processing center.

Permit Enforcement Authority: The Department authorized by the City to inspect and enforce CASDP Rules and Conditions for all construction Projects within the City's MS4 Boundary. The responsible City department serving as the Permit Enforcement Authority is the Wastewater Management Division of the Department of Transportation & Infrastructure.

State Construction Stormwater Permit: Colorado Revised Statutes require that all construction sites/development Projects, which, by definition, disturb one or more acres in area, shall be covered by a State issued general permit for construction activities. Information on the application requirements for the State permit can be obtained by phone at 303-692-3500; or by visiting their offices located at 4300 Cherry Creek Drive South, Denver, CO 80246 – 1530, or on the Web at: <https://www.colorado.gov/pacific/cdphe/news/water-quality-permits>

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REVISION OF SECTION 208 EROSION CONTROL

State Waters: Any and all surface waters which are contained in or flow in or through this State, not to include waters in sewage systems, waters in treatment works of disposal systems, waters in potable water distribution systems, and all water withdrawn for use until use and treatment have been completed.

Examples of State Waters include, but are not limited to, perennial streams, intermittent or ephemeral gulches and arroyos, ponds, lakes, reservoirs, irrigation canals or ditches, wetlands, stormwater conveyances (when they discharge to a surface water), and groundwater.

Stormwater Management Plan (SWMP): The Stormwater Management Plan contains the requirements necessary to accomplish all the following:

The SWMP establishes a minimum standard to construct, install, maintain, and remove required BMPs during the life of the Contract to prevent or minimize pollution of stormwater due to erosion, sediment transport, and construction related pollutant generated during all phases of the Project. A SWMP consists of the following elements:

- (i) CASDP Narrative Worksheet with Narrative Report. The Narrative Report and supporting documents should fully address the methods to be used to prevent sediment, debris, and other pollutants from entering the MS4 and/ or State Waters in and around the Project area. Proposed structural and non-structural BMPs should be described with sufficient implementation detail to insure that the logical phases of the proposed construction Project meet the performance standards listed in the CASM.
- (ii) Proposed site drawings and Best Management Practice (BMP) installation details as they apply to the site conforming to the Urban Storm Drainage Criteria Manual, Vol. 3, "Best Management Practices", most current version as issued by the Urban Drainage and Flood Control District (UDFCD), or those established by the City's Department of Transportation & Infrastructure. If erosion control drawings were included within the bid documents for the Project, they shall be used for bid purposes and initial planning/ deployment of BMPs on the Project. If provided drawings are signed/ sealed by a Professional Engineer, they have been pre-approved by the Permit Authority and may be used without revision for purposes of submitting for CASDP. If provided drawings do not have signature/ seal of Professional Engineer licensed by the State of Colorado, they will require revision by the Contractor with Professional Engineer signature/ seal prior to submission to the City and County of Denver for CASDP.
- (iii) Supporting documentation related to proposed BMPs that are not currently identified in UDFCD Vol. 3 or as otherwise published by the City.

Any preparation of or adjustments to a SWMP must be performed either by or under the supervision of a Professional Engineer or Landscape Architect, licensed in the State of Colorado. SWMP elements submitted to the City shall also meet currently established criteria of the CDPHE as the SWMP must meet all local, State and Federal requirements.

Substantial Completion of Erosion Control: Point of construction when permanent BMPs have been installed, initial growth is in place, and the site is waiting for vegetative cover to reach 70% of pre-disturbance vegetative cover.

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REVISION OF SECTION 208 EROSION CONTROL

PART II: DESCRIPTION

This Work shall consist of constructing, installing, maintaining, and removing when required, BMPs during the life of the Contract until Final Stabilization to prevent or minimize erosion, sedimentation, and pollution of any waters including storm, drainageways, MS4, State Waters, and/ or wetlands.

Work under this Section includes the Contractor obtaining required Permits, utilizing SWMP elements provided in the Contract, and/ or SWMP elements specifically prepared by the Contractor as defined herein. The work shall also consist of providing on-going maintenance and monitoring of the SWMP as may be necessary due to the specific and/or dynamic needs of the Project as well as meet all requirements set forth within the CASM.

The Contractor shall coordinate the construction of temporary BMPs with the construction of permanent BMPs to assure economical, effective, and continuous erosion and sediment control and water pollution prevention throughout the construction period until Final Stabilization is achieved.

When a provision of this Section or an order by the Permit Enforcement Authority requires that an action be immediate or taken immediately, it shall be understood that the Contractor shall at once begin effecting completion of the action and pursue it to completion in a manner acceptable to the Permit Enforcement Authority, and in accordance with applicable Permitting requirements.

PART III: MATERIALS

Materials to be used for BMPs shall conform to each specific detail as set forth within the Project SWMP or as noted on the Contract Drawings.

PART IV: EROSION CONTROL PERMIT STATUS

The current SWMP status for the Project is as follows:

A CASDP is currently not required for this project as the proposed disturbed area and/ or proximity to stream does not meet the minimum criteria for requiring a CASDP. All provisions of the following Parts V-VIII of this Section are hereby deleted and shall not be made part of the Project. However, the responsibilities for minimizing sediment pollution from the Project have not been waived, and as such, the City hereby requires the Contractor to perform as specified in the following notes. Because a CASDP is not necessary for the Project, all cost for performance of the following notes shall not be paid for separately, but shall be included in the work unless otherwise specified in the section.

“A CASDP Permit will not be required for this project, however, the Contractor and/or their authorized agents shall ensure that all potential pollutants generated during demolition, excavation, trenching, boring, grading, or other construction Work associated with this permit, be prevented from discharge to stormwater conveyance systems in the vicinity of the Project.

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**REVISION OF SECTION 208
EROSION CONTROL**

The 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 of storm drainage appurtenances and public rights of ways of the City and County of Denver and CDOT as a result of construction activities associated with this Project. All removals shall be conducted in a timely manner.

The Contractor shall be held responsible for remediation of any adverse impacts to the CCD or CDOT MS4, State Waters, waterways, wetlands, and or other public or private properties, resulting from work done as part of this Project.

The Contractor and/or their authorized agents shall insure that all loads of cut and fill material imported to or exported from the Project shall be properly covered to prevent loss of the material during transport on public rights of way.” (Sec.49-552; Revised Municipal Code)

Approved erosion and sediment control ‘Best Management Practices’ shall be maintained and kept in good repair for the duration of the Project. All necessary maintenance and repair shall be completed immediately upon discovery of any deficiency or defect.

The Contractor and/or their authorized agents shall implement the following Best Management Practices (BMPs) on site during construction. Best Management Practice (BMP) installation details and maintenance shall conform to the Urban Storm Drainage Criteria Manual, Vol. 3, "Best Management Practices", most current version as issued by the Urban Drainage and Flood Control District (UDFCD), or those established by the City’s Department of Transportation & Infrastructure.

1. VEHICLE TRACKING CONTROL: This BMP is required at all access points for ingress/egress from off-site impervious surfaces to construction site pervious areas that are used by vehicular traffic or construction equipment.
2. INLET PROTECTION: This BMP is required on all existing or proposed storm sewer inlets in the vicinity of the construction site that may receive site runoff. The BMP must be appropriate to the type of storm inlet and appropriate for the ground surface at the inlet.
3. INTERIM SITE STABILIZATION: This BMP is required to provide a measure for preventing the discharge of sediment from construction sites where overlot grading or other site disturbance has occurred. This BMP is particularly necessary on sites where construction activities/disturbance will be limited to small areas of the Project site. Acceptable BMPs include:
 - a) Preserving existing vegetation
 - b) Seeding and planting
 - c) Mulching
 - d) Mulching and seeding
 - e) Temporary/Permanent re-vegetation operations
 - f) Chemical soil stabilizer application (requires WMD approval)

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**REVISION OF SECTION 208
EROSION CONTROL**

4. **WASTE MANAGEMENT/CONTAINMENT:** This BMP requires that all construction wastes, fuels, lubricants, chemical wastes, trash, sanitary wastes, contaminated soils or debris shall be contained on site, protected from contact with precipitation or surface runoff, periodically removed from the construction site, and properly disposed of.
5. **SPILL PREVENTION /CONTAINMENT:** This BMP defines the measures proposed for preventing, controlling, or containing spills of fuel, lubricants, or other pollutants; and protecting potential pollutants from contact with precipitation or runoff.
6. **CHUTE WASHOUT CONTAINMENT:** 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 concrete waste shall be removed from the containment area and properly disposed of. The direct or indirect discharge of water containing waste concrete to the storm sewer system is prohibited (Sec.56-102a, c; Revised Municipal Code, City and County of Denver).
7. **SWEEPING:** This BMP requires that impervious surfaces which are adjacent to or contained within construction sites be swept on a daily basis or as needed during the day 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.
8. **PERIMETER CONTROL:** This BMP requires that a construction site install a perimeter control measure along the edge of the construction Site, to prevent, or filter the discharge of surface runoff from the construction site. The type of perimeter control used shall be determined based on site conditions and location. Maintenance and repair of the control measure shall occur as needed, in a timely manner.
9. **STOCK PILES:** 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 Department of Transportation & Infrastructure 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 shall be required.
10. **SAW CUTTING OPERATIONS:** 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)

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**REVISION OF SECTION 208
EROSION CONTROL****PART V: CONSTRUCTION REQUIREMENTS****A) SCHEDULES:**

At least 10 working days prior to the beginning of any construction work, the Contractor shall submit for approval a schedule for accomplishment of temporary and permanent BMPs shown in the SWMP. This schedule shall specifically indicate the sequence of clearing and grubbing, earthwork operations, and construction of temporary and permanent BMPs. The schedule shall include BMPs for all areas within the Project boundaries, including but not limited to, haul roads, borrow pits, and storage and other staging sites.

Work shall not be started until the BMP schedule has been approved in writing by the Project Manager, and on site pre-construction inspection is performed and approved by CCD's NPDES inspector. Once the work has started, and during the active construction period, the Contractor shall update the schedule for all BMPs on a regular basis, and as required to keep the SWMP in compliance.

B) CONSTRUCTION IMPLEMENTATION:

The Contractor shall incorporate into the Project all BMPs that are appropriate for the current phase of work, as outlined in the accepted schedule.

C) UNFORSEEN CONDITIONS: The Contractor shall direct the ECS (under the supervision of a Professional Engineer licensed in the State of Colorado) to design and implement BMPs for correcting conditions unforeseen during design of the Project, or as possible for emergency situations, which arise during construction. The Project's SWMP, UDFCD Vol 3 standards and details, and CDOTs "Erosion Control and Storm-Water Quality Guide," and any approved modification to these documents as proposed by the Contractor, shall be used as reference documents for the purpose of designing appropriate BMPs. Measures and methods proposed by the Contractor to deal with unforeseen conditions shall be reviewed and approved in writing by the Permit Enforcement Authority and the Project Manager prior to implementation and construction.

In an emergency situation, the Contractor shall use best judgment for immediately responding to the emergency situation as it arises, and shall notify the Permit Enforcement Authority and ECS of the emergency situation and BMPs employed in response as soon as practical after installation.

D) PERMITS:

The Contractor shall obtain all required permits for the Project including those required by federal, state, and local agencies. The Contractor shall obtain (or transfer from the City when specified) required erosion control and water quality permits and shall be responsible for compliance with all requirements under any such permits.

E) EROSION CONTROL SUPERVISOR:

Contractor shall assign to the Project an employee or subcontractor to serve as Erosion Control Supervisor (ECS). The ECS shall be a person other than the Contractor's superintendent, foreman, or equivalent supervisory position. The ECS shall be experienced in aspects of BMP construction and have satisfactorily completed a Colorado DOT or equivalent ECS training program authorized by the City. Proof that this requirement has been met shall be submitted to the Project Manager at least ten working days prior to the beginning of any soil disturbance work. A list of authorized ECS training programs is available from the City upon request.

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REVISION OF SECTION 208 EROSION CONTROL

Additionally, per definition, the ECS shall be under the direction of a Professional Engineer licensed in the State of Colorado when performing any modifications to the Project Stormwater Management Plan (SWMP).

The ECS shall be responsible for oversight of the implementation, maintenance, and revision of the SWMP for the duration of the Project. CCD requires the ECS to fulfill responsibilities as outlined by CDPS such as having financial control and authority to implement BMPs. The ECS's responsibilities shall be as follows:

- 1) Ensure compliance with all water quality permits or certifications in effect during the construction work.
- 2) Supervise the installation, construction, and maintenance of all BMPs specified in the Contract and coordinate the construction of BMPs with all other construction operations.
- 3) Direct the implementation of suitable BMPs as necessary to correct unforeseen conditions or emergency situations. Direct the dismantling of those features when their purpose has been fulfilled due to completion of each Project phase unless the Permit Enforcement Authority agrees that the features be left in place.
- 4) Attend the preconstruction conference, erosion control preconstruction inspection, Project scheduling meetings, weekly construction/ field meetings, substantial completion and final stabilization inspections, and other meetings regarding construction that could impact water quality.
- 5) Evaluate all non-stormwater coming onto the site, such as springs, seeps, and landscape irrigation return flow. If such flow is identified, the ECS shall propose appropriate SWMP modifications to the Contractor to protect off-site water from becoming contaminated with sediment or other pollutants.
- 6) Coordinate with the Contractor to implement necessary actions to reduce anticipated or presently existing water quality or erosion problems resulting from construction activities.
- 7) Coordinate with the Contractor to ensure all labor, material, and equipment deployed to meet SWMP requirements is judged appropriately.
- 8) During construction, update and record the following items in the SWMP as changes occur:
 - (i) Construction boundaries (may require Major SWMP Modification)
 - (ii) Areas of disturbance (may require Major SWMP Modification)
 - (iii) Areas used for storage of construction materials, equipment, soils, or wastes.
 - (iv) Location of any dedicated asphalt or concrete batch plants.
 - (v) Location of construction offices and staging areas.
 - (vi) Location of work access routes during construction.
 - (vii) Location of borrow and waste.
 - (viii) Location of temporary and permanent stabilization

The ECS shall start a new site map before the current one becomes illegible. All site maps shall remain with the SWMP paperwork.

- 9) Amend the SWMP whenever there are: additions, deletions, or changes in locations of BMPs. SWMP revisions shall be recorded immediately. Items shall be dated and signed at time of occurrence. Specifically, amendments shall include the following:
 - (i) A change in design, construction, operation, or maintenance of the site which would require the implementation of new or revised BMPs; or

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**REVISION OF SECTION 208
EROSION CONTROL**

- (ii) Changes when the SWMP proves to be ineffective in achieving the general objectives of controlling pollutants in stormwater discharges associated with construction activity.
- (iii) Changes when temporary BMPs are no longer necessary from changes in Project phase and are removed. All inspection and maintenance activities or other repairs shall be documented.

All inspection and maintenance activities or other repairs shall be documented. The SWMP and documentation shall be kept on the Project site at all times.

- 10) Modify the site map with arrows to indicate direction of surface and storm water flowing across the Project site.
- 11) When adding or revising BMPs in the SWMP, amend the narrative to explain what, when, where, why, and how the BMP is being used, and add a detail to the SWMP.
- 12) If using existing topography, vegetation, etc. as a BMP, label it as such in the SWMP site map; amend the Narrative to explain when, why, and how the BMP is being used in the SWMP.
- 13) Record on the SWMP, and implement the approved plan for concrete and asphalt saw cutting, grinding, and milling containment and removal.
- 14) Update the potential pollutants list in the SWMP throughout construction meeting CASDP requirements.
- 15) Spills, leaks, or overflows that result in the discharge of pollutants shall be documented on the inspection form. The ECS shall record the time and date, weather conditions, reasons for spill, and how it was remediated. The ECS shall immediately report to the Contractor and Project Manager the following instances of noncompliance:
 - (i) Noncompliance which may endanger health or environment.
 - (ii) Spills or discharge of hazardous substance or oil which may cause pollution of the City MS4 or State Waters.
 - (iii) Discharge of stormwater which may cause an exceedance of a water quality standard.
- 16) Perform a thorough inspection of the stormwater management system at least every seven (7) days and within 24 hours after any precipitation or snowmelt event with the potential to cause surface erosion. If no land disturbing construction activities are present during a storm event, post-storm event inspections shall be conducted prior to commencing any new land disturbing construction activities, but no later than seventy-two (72) hours following the storm event. The inspection records shall be kept on-site in a written or previously approved format. Inspections shall be conducted during the progress of the work, during work suspensions, or until Final Stabilization of all disturbed areas is approved by Permit Enforcement Authority and shall include the following services at a minimum:
 - (i) The construction site perimeter, disturbed areas, and areas used for material storage that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. BMPs identified in the SWMP shall be observed to ensure that they are operating correctly.
 - (ii) The description of potential pollutant sources, and the BMPs identified in the SWMP, shall be revised and modified as appropriate based on the results of the inspection as soon as practicable after such inspection. Modification to the SWMP shall be implemented in a timely manner and in accordance with applicable Permit requirements.

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**REVISION OF SECTION 208
EROSION CONTROL**

- (iii) The operator shall keep a record of inspections. Uncontrolled releases of sediment or polluted storm water or measurable quantities of sediment found off the site shall be recorded with a brief explanation as to the measures taken to prevent future releases as well as any measures taken to clean up the sediment that has left the site. Inspection records shall be made available to the City upon request. Note: documentation of uncontrolled releases at site DOES NOT alleviate any State or Federal requirements for reporting of discharges or upset conditions. Care shall be taken to ensure compliance with all regulatory requirements at site.
- (iv) Seven (7) day inspections are required during construction and at all times until Final Stabilization has been achieved. Seeding and mulching of disturbed areas does NOT count as final stabilization until such time as 70% pre disturbed vegetative cover has been achieved. Sites with growth in place sufficient to deter erosion that have not yet achieved final stabilization may petition the City to grant an alternative inspection schedule while awaiting additional growth for final stabilization. These inspections must be conducted in accordance with the above paragraphs.

F) APPLYING BMPs TO STABILIZE SITE:

The duration of the exposure of incomplete construction to the effects of weather shall be as short as practicable. BMPs such as: seeding, surface roughening, mulching, applying tackifier, use of geotextiles and matting, permanent landscaping, or other selected BMPs shall be applied within fourteen (14) calendar days of completion of grading/soil disturbance activities to stabilize the construction site unless disturbed area is within 100 feet of an MS4 or State Waters or has slopes of 3 to 1 or greater in which case BMPs shall be implemented within seven (7) calendar days of completion of grading activities. Disturbed areas where work is temporarily halted shall be temporarily stabilized within seven (7) days after the activity ceased unless work is to be resumed within thirty (30) calendar days after the activity ceased.

Clearing and grubbing operations shall be scheduled and performed to minimize both the area of the Project disturbed at a given time and the amount of time that disturbed areas remain open. BMPs such as temporary seeding are required between successive construction stages when disturbed areas will not be stable or active for thirty (30) calendar days or more. No payment will be made for additional work required because the Contractor has failed to properly coordinate the BMP schedule, thus causing previously stabilized areas to be disturbed by operations that could have been performed prior to the stabilization. Upon failure of the Contractor to coordinate the permanent BMPs with the grading operations in a manner to effectively control erosion and prevent water pollution, the Permit Enforcement Authority can suspend the Contractor's grading operations and the Project Manager can withhold monies due to the Contractor on current estimates until such time that all aspects of the work are coordinated in an acceptable manner.

G) WORK OUTSIDE LIMITS OF CONSTRUCTION: Non-contiguous areas outside the limits of construction that are used by the Contractor that include, but are not limited to, borrow pits, haul routes, storage and disposal areas, field offices, maintenance, batching areas, etc., shall have appropriate BMPs implemented by the Contractor at the Contractor's expense. Should said areas meet applicable CASDP Permit criteria, the Contractor shall obtain a separate CASDP or amend existing CASDP for each area as applicable at no additional expense to the City.

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**REVISION OF SECTION 208
EROSION CONTROL**

H) MAINTENANCE: The Contractor shall continuously maintain erosion and sediment control BMPs on a daily basis or as directed by the ECS so that they function properly during and after construction (including work suspensions) until Final Stabilization has been approved by the Permit Enforcement Authority. Maintenance includes, but is not limited to, the following items:

- (i) From the time seeding and mulching work begins until the date the Project has reached Substantial Completion of Erosion Control, the Contractor shall keep all seeded areas stabilized at all times. Any damage to seeded areas or to mulch materials shall be promptly repaired.
- (ii) All inspection sediment removal, and BMP maintenance activities to comply with all Federal, State & Local erosion control permit requirements until Final Stabilization is reached.
- (iii) All removal and replacement of existing BMPs due to damage to same suffered either by the contractor, outside agencies, the public, or acts of God.
- (iv) All required mechanical and/ or manual street sweeping.
- (v) Discretionary changes required of any regulatory enforcement officer.

If the Contractor fails to maintain the BMPs in accordance with the Contract, or as directed, the City may at the expiration of a period of 48 hours, after having given the Contractor written notice, proceed to maintain BMPs as deemed necessary. The cost thereof will be deducted from any compensation due, or which may become due to the Contractor under this Contract.

I) MINOR SWMP MODIFICATIONS: Shall be made in the field by the Contractor and thoroughly documented in the Contractor's SWMP narrative and drawings. Should the Permit Enforcement Authority deem minor field modifications inadequate, the Contractor may be required to a) make specific modifications as requested by the Permit Enforcement Authority or b) return to the original approved design specifications. Minor SWMP Modifications are allowed, covered under the original CASDP, and required as part of standard maintenance and operation.

J) MAJOR SWMP MODIFICATION: The City reserves the right to require changes in the Work or Project Limits that may require a Major Modification to the SWMP and/ or CASDP due to unforeseen circumstances. Should this occur, the Contractor will be responsible for the following (as applicable) and applying for CASDP amendment:

- (i) Make required revisions to comply with changing Federal or State rulemaking if it occurs within timeframe of the Project
- (ii) Make required revisions due to unforeseen or unplanned conditions leading to deficient Drawings/ SWMP (hazardous materials encountered, landfills, expansion of work limits, etc.)
- (iii) Prepare revised SWMP elements endorsed by a Professional Engineer licensed in the State of Colorado.

K) SUBSTANTIAL COMPLETION OF EROSION CONTROL: When a CASDP is required for the Project, Substantial Completion of the Project as defined by the City and County of Denver General Contract Conditions cannot be reached until Substantial Completion of Erosion Control has been granted. Granting of Substantial Completion of Erosion Control must be requested by the Contractor and be approved by the Permit Enforcement Authority in the form of a "Certificate of Substantial Completion of Erosion Control".

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**REVISION OF SECTION 208
EROSION CONTROL**

L) FINAL STABILIZATION: Granting of Final Stabilization must be requested by the Contractor and be approved by the Permit Enforcement Authority. Other permanent soil stabilization techniques may be proposed, in writing, by the Contractor and used upon approval, in writing, by the Project Manager and Permit Enforcement Authority.

The Contractor shall follow the following procedures for approval of Final Stabilization:

- (i) The Contractor shall file Inactivation Request for Construction Activities Stormwater Discharge Permit (available within CASDP guidance documents) with the Permit Enforcement Authority.
- (ii) The Contractor shall coordinate with the Permit Enforcement Authority to hold a Final Inactivation Inspection.
- (iii) If passing, the Permit Enforcement Authority transmits a letter of approval for Final Stabilization.
- (iv) If not passing, the Permit Enforcement Authority transmits a letter of denial for Final Stabilization with associated inspection report to Contractor.
- (v) Stabilization, inspection and maintenance requirements shall continue until confirmation of having met final closure requirements have been granted in writing by the Permit Enforcement Authority.

When Final Stabilization has been reached, the Permit Enforcement Authority shall issue a "Certificate of Final Stabilization".

- (vi) Once the Inactivation request is approved by the City and County of Denver, the contractor can apply to close the State Stormwater Permit.

M) FINAL ACCEPTANCE:

CASDP obligations (including reaching Final Stabilization) may hinder the ability to reach Final Acceptance for the overall Project as defined in the City General Contract Conditions.

PART VI: CONSTRUCTION OF BMPs

BMPs shall be constructed so that they conform to all requirements as set forth within the Project SWMP. They shall meet all requirements set forth within each BMP detail and shall be installed and maintained so that they function in an effective and operable manner.

PART V: BASIS OF PAYMENT

Erosion Control items as specified in Part V shall be paid in accordance with Section 208. All other erosion control items, including to furnish, install, maintain, replace (if not due to contractor negligence), remove, and dispose of BMPs specified in the Contract shall not be paid for separately, but shall be included in the work.

Erosion Log and Aggregate Bag will be measured by each linear foot that is installed and accepted. Payment will be full compensation for all work, materials and equipment required to complete the item, including surface preparation, maintenance throughout the project, and removal upon completion of work.

Storm Drainage Inlet Protection will be measured and pay for separately in accordance with Section 208 of the Storm Drain Inlet Protection of this specification.

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**REVISION OF SECTION 208
EROSION CONTROL**

All other work required as set forth in this Revised Section 208 – Erosion Control including all materials, equipment and labor, to permit, set-up, maintain, document, remove and clean-up all erosion control BMP's as per current City of Denver Stormwater Management Plans /(SWMP) requirements will not be paid separately; all costs incurred by the Contractor to meet the requirements of this Section regarding Erosion Control unless provide for in the Bid shall be included in the related appurtenance.

The cost for any corrective actions required by the State or City due to contractor's failure to obtain or comply with applicable Permits will be borne by the Contractor, including fines and penalties. In the case of failures on the part of the Contractor in controlling erosion, sedimentation, and/or water pollution, the City may provide the necessary corrective actions. All corrective action costs, including Project engineering costs, will be charged to the Contractor, and appropriate deduction will be made from the Contractor's monthly pay estimate.

The sole remedy for additional costs associated with installation of BMPs as required by regulatory agencies to ensure compliance with local and State requirements shall be included in the cost of the adjacent concrete repair work as provided in the Bid Schedule of this Contract. The Contractor however may submit a separate itemized Change Order for any required Major SWMP Modification proposed by the City during the course of the Project.

The Erosion Control Supervisor (ECS) will not be paid for separately but shall be included in the cost of the BMPs.

Pay Item

Erosion Log Type 1 (12 Inch)
Aggregate Bag
Pre-fabricated Concrete Washout Structure (Type 1)
Removal and Disposal of Sediment (Labor)
Removal and Disposal of Sediment (Equipment)

Pay Unit

Linear Foot
Linear Foot
Each
Hour
Hour

**REVISION OF SECTION 208
STORM DRAIN INLET PROTECTION**

Section 208 of the Standard Specifications is hereby revised as follows:

Subsection 208.05(j) Construction of BMPs shall include the following:

Storm drainage inlet protection shall be placed at the nearest downstream inlet or any inlets immediately adjacent to any construction excavation or areas that require concrete work. The inlet protection shall be a sewn geotextile fabric unit enclosing a porous structure in the form of a cylindrical tube placed in front of and extending beyond the inlet opening on both sides. The inlet protection shall be a Beaver Dam style as manufactured by Dandy Products Inc. (1-800-591-2284) (www.dandyproducts.com) or approved equal.

Storm Drain protection shall remain in place throughout the entire project time to ensure protection of each individual construction site.

The Contractor shall review the sites which have completed construction to ensure that the inlet protection is achieving the proper protection and remediate all issues for the entire project time.

Subsection 208.12 shall include the following:

Payment will be full compensation for all work, materials and equipment required to complete the item, including surface preparation, maintenance throughout the project, and removal upon completion of the project.

Pay Item

Storm Drain Inlet Protection (Type I)
Storm Drain Inlet Protection (Type III)

Pay Unit

Linear Foot
Each

**REVISION OF SECTION 209
WATERING AND DUST PALLIATIVES**

Section 209 of the Standard Specifications is hereby revised as follows:

Subsection 209.07 paragraph 1 shall be deleted and replaced with the following:

Water for moisture-density control, landscaping, pre-wetting, and for dust palliatives will not be measured and paid for separately but shall be included in the cost of the work.

**REVISION OF SECTION 210
RESET STRUCTURES**

Section 210 of the Standard Specifications is hereby revised as follows:

Subsection 210.02 is hereby revised to include the following:

Resetting of structures is to be done in accordance with the plans. It is the Contractor's responsibility to document the condition of the structure prior to its removal. This includes but is not limited to photographs, videotapes and measurements. Any existing damage or condition that may be disputable after the structure is replaced should be brought to the Engineers attention prior to removal. If necessary, new material shall be used at the direction of the Engineer.

Subsection 210.12 is hereby revised as follows:

Any structure that is to be reset shall be measured per each, length, etc. and paid for under section 210 Reset Structure (Type).

Subsection 210.13 shall be revised to include the follows:

Pay Item

Reset Sign Panel

Pay Unit

Each

When the contract does not include pay items for Reset Structures, these items will not be paid for separately but shall be included in the work.

**REVISION OF SECTION 212
LANDSCAPE RESTORATION**

Section 212 of the Standard Specifications is hereby revised as follows:

Subsection 212.01 shall include the following:

Disturbance of existing landscaping shall be minimized wherever possible. The Contractor shall notify the Engineer or Project Manager of any potential disturbance before beginning of work.

Landscape restoration shall consist of the repair and/or replacement of all landscape materials that may be damaged through the actions of the Contractor or his agents. This work may include but is not limited to sod, fencing, plantings, sprinkler systems and decorative features.

Subsection 212.07 shall include the following:

Landscape Restoration will not be measured and paid for separately but shall be included in the project force account for Landscaping.

Subsection 212.08 shall include the following:

Payment will be made under:

Pay Item
Landscaping

Pay Unit
FA

**REVISION OF SECTION 304
AGGREGATE BASE COURSE**

Section 304 of the Standard Specifications is hereby revised as follows:

Subsection 304.02 shall include the following:

Materials for the base course shall be Aggregate Base Course (Class 6) as shown in subsection 703.03

The aggregate base course (Class 6) must meet the gradation requirements and have a resistance value of at least 78 when tested by the Hveem Stabilometer method.

Subsection 304.06 is revised as follows:

All material within the street section shall be compacted to 95% of maximum density as determined in accordance with AASHTO T-99; all areas outside the street section shall be compacted to 90% of the maximum density determined in accordance with AASHTO T-180. It is the Contractor's responsibility to provide Quality Control density testing and provide test results in a testing frequency, method and report as per Pre-construction submittal approved by the City Project Manager. Quality Control testing, reports and submittals will not be paid for separately but shall be included in the work.

Subsection 304.08 is hereby revised as follows:

Payment will be made under:

Pay Item

Aggregate Base Course (Class 6)

Pay Unit

Square Yard

When the contract does not include pay items for Aggregate Base Course, these items will not be paid for separately but shall be included in the work.

**REVISION OF SECTION
403 HOT MIX ASPHALT**

Section 403 of the Standard Specifications is hereby revised as follows:

Subsection 403.02 shall include the following:

The design mix for hot mix asphalt shall conform to the following:

Table 403-1		
Property	Test Method	Value For Grading
		Patching
Air Voids, percent at: N (design)	CPL 5115	3.5 – 4.5
Lab Compaction (Revolutions): N (design)	CPL 5115	100
Stability, minimum	CPL 5106	30
Aggregate Retained on the 4.75 mm (No. 4) Sieve for S, SX and SG, and on the 2.36mm (No. 8) Sieve for ST and SF with at least 2 Mechanically Induced fractured faces, % minimum*	CP 45	70
Accelerated Moisture Susceptibility Tensile Strength Ratio (Lottman), minimum	CPL 5109 Method B	80
Minimum Dry Split Tensile Strength, psi	CPL 5109 Method B	30
Grade of Asphalt Cement, Top Lift		PG 64 – 28
Grade of Asphalt Cement, Bottom Lifts		PG 64 - 28
Voids in the Mineral Aggregate (VMA) % minimum	CP 48	See Table 403-2
Voids Filled with Asphalt (VFA), %	AI MS-2	65 - 75
Dust to Asphalt Ratio Fine Gradation	CP 50	0.6 - 1.2
Coarse Gradation		0.8 – 1.6
<p>Note: AI MS-2 = Asphalt Institute Manual Series 2</p> <p>Note: Mixes with gradations having less than 40% passing the 4.75 mm (No. 4) sieve shall be approached with caution because of constructability problems.</p> <p>Note: Gradations for mixes with a nominal maximum aggregate size of one-inch or larger are considered a coarse gradation if they pass below the maximum density line at the #4 screen. Gradations for mixes with a nominal maximum aggregate size of 3/4" to 3/8" are considered a coarse gradation if they pass below the maximum density line at the #8 screen. Gradations for mixes with a nominal maximum aggregate size of #4 or smaller are considered a coarse gradation if they pass below the maximum density line at the #16 screen.</p> <p>*Fractured face requirements for SF may be waived by RME depending on project conditions.</p>		

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**REVISION OF SECTION 403
HOT MIX ASPHALT**

All mix designs shall be run with a gyratory compaction angle of 1.25 degrees and properties must satisfy Table 403-1. Form 43 will establish construction targets for Asphalt Cement and all mix properties at Air Voids up to 1.0 percent below the mix design optimum. CDOT will establish the production asphalt cement and volumetric targets based on the Contractor's mix design and the relationships shown between the hot mix asphalt mixture volumetric properties and asphalt cement contents on the Form 429. CDOT may select a different AC content other than the one shown at optimum on the Contractor's mix design in order to establish the production targets as contained on the Form 43. Historically, Air Voids adjustments typically result in asphalt cement increases from 0.1 to 0.5 percent. Contractors bidding the project should anticipate this change and factor it into their unit price bid.

Table 403-2

Nominal Maximum Size*, mm (inches)	Minimum Voids in the Mineral Aggregate (VMA)			
	***Design Air Voids **			
	3.5%	4.0%	4.5%	5.0%
37.5 (1½)	11.6	11.7	11.8	N/A
25.0 (1)	12.6	12.7	12.8	
19.0 (¾)	13.6	13.7	13.8	
12.5 (½)	14.6	14.7	14.8	
9.5 (⅜)	15.6	15.7	15.8	
4.75 (No. 4)	16.6	16.7	16.8	16.9
	* The Nominal Maximum Size is defined as one sieve larger than the first sieve to retain more than 10%. ** Interpolate specified VMA values for design air voids between those listed. *** Extrapolate specified VMA values for production air voids beyond those listed.			

The Contractor shall prepare a quality control plan outlining the steps taken to minimize segregation of HMA. This plan shall be submitted to the Engineer and approved prior to beginning the paving operations. When the Engineer determines that segregation is unacceptable, the paving shall stop and the cause of segregation shall be corrected before paving operations will be allowed to resume.

RAP will not be allowed in Hot Mix Asphalt.

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**REVISION OF SECTION 403
HOT MIX ASPHALT**

The Hot mix asphalt patching, shall be SX (100) PG (64-28).

A minimum of 1 percent hydrated lime by weight of the combined aggregate shall be added to the aggregate for all hot mix asphalt.

Acceptance samples shall be taken at the location designated by CDOT at the pre-paving conference.

Subsection 403.03 shall include the following:

The Contractor shall construct the work such that all roadway pavement placed prior to the time paving operations end for the year, shall be completed to the full thickness required by the plans. The Contractor's Progress Schedule shall show the methods to be used to comply with this requirement.

Delete subsection 403.05 and replace with the following:

403.05 The accepted quantities of hot mix asphalt will be paid for in accordance with subsection 401.22, at the contract unit price per ton for the bituminous mixture.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Hot Mix Asphalt (Patching)(Asphalt)	Ton

Aggregate, asphalt recycling agent, asphalt cement, additives, hydrated lime, and all other work and materials necessary to complete each hot mix asphalt item will not be paid for separately, but shall be included in the unit price bid. When the pay item includes the PG binder grade, any change to the submitted mix design optimum asphalt cement content to establish production targets on the Form 43 will not be measured and paid for separately, but shall be included in the work. No additional compensation will be considered or paid for any additional asphalt cement, plant modifications and additional personnel required to produce the HMA as a result in a change to the mix design asphalt cement content.

Historically, typical asphalt cement increases reflected on the Form 43 are from 0.1 to 0.5 percent. However, the Contractor should anticipate the AC increases typical of his mixes. Contractors bidding the project should anticipate this change and factor it into their unit price bid.

When the pay item does not include the PG binder grade, asphalt cement will be measured and paid for in accordance with Section 411. Asphalt cement used in Hot Mix Asphalt (Patching) will not be measured and paid for separately, but shall be included in the work.

Excavation, preparation, and tack coat of areas to be patched will not be measured and paid for separately, but shall be included in the work.

**REVISION OF SECTION 503
DRILLED SHAFT**

Section 503 of the Standard Specifications is hereby revised as follows:

Section 503.01 is hereby revised to include the following:

This work consisted of constructing the Traffic Signal Pole Foundations using a drill method at the locations as shown on the plans and as directed by the Engineer. The placing of reinforcing steel and concrete in the excavated holes must in accordance with these specifications and in conformity with the lines and grades on the plans or established.

Traffic Signal Pole Foundations shall conform to the requirements of the City and County of Denver's Standard Details for Signal Pole Foundations (Detail 16.1.8).

Section 503.08 is hereby revised to include the following:

Drilled Shafts (36 Inch, and 48 Inch) will be measured by the linear foot from the elevation shown on the plans to the bottom of the hole excavated.

Section 503.09 is hereby revised to include the following:

Pay Item

Drilled Shaft (36 Inch)

Drilled Shaft (48 Inch)

Pay Unit

Linear Foot

Linear Foot

The unit price of drilled shafts (36 Inch, and 48 Inch) shall be full compensation for making all excavations; hauling and disposal of excavated material; performing all necessary pumping; furnishing and placing required concrete and anchor bolts and reinforcement steel, including the reinforcement projecting above the tops of the caissons necessary for splicing; all backfilling; removing casings; and for furnishing all tools, labor, equipment, and incidentals necessary to complete the work. No extra payment will be made for casing left in place.

**REVISION OF SECTION 601
CONCRETE CLASS DR**

Section 601 of the Standard Specifications is hereby revised to include the following:

DESCRIPTION

This work consists of furnishing and placing concrete patching material in accordance with these specifications and in conformity with the lines, grades and dimensions as shown on the plans or established.

MATERIALS

The concrete patching material may be pre-packaged Concrete patching material or Class DR concrete.

(a) *Pre-Packaged Concrete Patching Material.* Concrete patching material shall be polymer modified hydraulic cement and shall be one of the following:

(1) Rapid Set DOT Concrete Mix as manufactured by:
CTS Cement Manufacturing Company
11065 Knott Avenue
Cypress, CA 90630

(2) HD 50 as manufactured by
Dayton Superior Corp.
1125 Byers Road
Miamisburg, Ohio 45342

(3) or approved equal

Alternate concrete patching materials shall demonstrate 1/32-inch maximum mid panel and end crack widths, 0 percent delamination, and 0 percent spalling as tested by NTPEP in a one-year field evaluation. The Contractor shall refer to rapid-set concrete patch materials at www.ntpep.org.

Before January 1, 2020 equivalent materials may be tested to meet minimum requirements by an independent testing lab or NTPEP. If the product has not been field tested by NTPEP, the Contractor shall submit documentation of a project demonstrating the successful use of the proposed product in Colorado. The submittal shall document the material used, the project location and detailed pictures of the patch after at least 1 year of service.

The Contractor shall obtain and provide to the Engineer documentation from the Concrete patching material supplier of the expiration dates of the material components that will be used on the project.

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**REVISION OF SECTION 601
CONCRETE CLASS DR**

Concrete patching material shall attain an average compressive strength of at least 2,500 psi prior to placing traffic and 4,500 psi at 28 days. Concrete patching material compressive strengths shall be tested according to ASTM C39 or ASTM C109. The compressive strengths shall be used to develop a strength versus time curve for the material. Three strength data points shall be determined to assess the necessary time to wait before traffic is allowed on the material. Maturity meter data may also be submitted to allow the use of maturity meter to determine when the patching material has gained the required strength for opening to traffic.

Concrete patching material shall provide a minimum bond strength of 2,000 psi at 28 days, as tested by ASTM C882.

Concrete patching material shall have a relative durability factor greater than 90 and a mass loss not to exceed 2.0 percent as tested by ASTM C666.

Concrete patching material shall have a maximum expansion of 0.05 percent, at 28 days as tested by ASTM C157

ASTM C39, C109, C882 and C157 testing shall be from the same lot of concrete patching material being used on the project. A CTR, in accordance with subsection 106.13, shall be submitted to the Engineer for approval at least 2 weeks prior to placement.

Two bags of the concrete patching material, and two bags of the extending aggregate if used, from the same lot to be used on the project shall be submitted to an accredited Lab to verify compressive strength, and set time properties, by the Contractor before the concrete patching material is to be used on the project. Test results shall be submitted to the Engineer for acceptance. Verification of the strength properties will be achieved if the test results are either equal in strength or stronger than those advertised. Verification of the set time will be achieved if the set time is equal or less than the advertised value. Testing shall be included in the cost of the materials. Test results from other projects using the same lot may be submitted. If the project uses material from more than one lot, test results are required for each lot used.

When Anodes are specified and are to be installed with pre-packaged concrete patching material, the Contractor shall submit test results of ASTM C1760 that the concrete patching material has an electrical resistivity of 15,000 Ohm-centimeters or less. Concrete patching materials that do not meet the electrical resistivity requirements may be used with special anode installation methods recommended by the anode manufacturer and approved by the Engineer. Additional work for special anode installation methods shall be included in the bid price.

- (b) *Class DR Concrete.* Class DR Concrete shall have a minimum cement content of 615 pounds per cubic yard, an air content of 5 to 8 percent, a maximum water to cement ratio of 0.44, a minimum 6 hour compressive strength of 2,500 psi and a minimum 28 day compressive strength of 4,500 psi. The concrete mix shall consist of a minimum of 50 percent AASHTO M 43 Size No. 7 or Size No. 8 coarse aggregate by weight of total aggregate. Lab test results shall show that the unrestrained shrinkage is less than 0.050 percent when tested by CP-L 4103.

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**REVISION OF SECTION 601
CONCRETE CLASS DR**

ASTM C150 Type III or ASTM C1157 Type HE cement may be used in lieu of Concrete Class DR, as approved.

The Contractor shall develop maturity relationships in accordance with CP 69. The Contractor shall provide a multi-channel maturity meter and all necessary wire and connectors. The Contractor shall be responsible for the placement and maintenance of the maturity meter and wire. Placement shall be as directed by the Engineer.

CONSTRUCTION REQUIREMENTS

- (a) *Pre-Packaged Concrete Patching Material.* Concrete patching material shall be placed in the repair areas before the expiration date of the material. Proportions of all mix components shall be measured by volume measurement (number of bags of standard weight and quantity of water or liquid component in gallons or quarts). If partial bags are used the bagged mix, extending aggregate, and water shall be weighed on a calibrated scale provided by the Contractor. The Contractor shall submit the Concrete patching material mix design for approval two weeks before any concrete patching material is placed. The Contractor shall also submit a method statement describing what type of equipment will be used to batch the patching material, including the type of mixer, the type of material, volume measures to be used, scales for partial bags, procedures to insure accurate proportioning of the patching material components, and tools to be used in placing and finishing the surface of the patch.

The Contractor shall produce a batch ticket for each mixed batch of concrete patching material with the following information shown on each ticket:

- (1) Project No.
- (2) Bridge No.
- (3) Structure Temperature
- (4) Date and Time of batch
- (5) Material Type, name, and manufacturer
- (6) Material expiration date
- (7) Weight or volume of bag mix concrete
- (8) Weight or volume of extending aggregate
- (9) Weight or volume of water or liquid component
- (10) Location of placement (Lane and Station Limits)

The tickets shall be available on site for inspection by the Engineer.

Each day the Contractor shall provide to the Engineer tickets for each bridge in separate envelopes stating Project Number, Bridge Number, Date of Paving, Type of Material, Daily Total, and Cumulative Total.

Concrete patching material minimum and maximum thicknesses shall be per recommendation of the material manufacturer.

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REVISION OF SECTION 601 CONCRETE CLASS DR

Concrete patching material site preparation, batching, extending with aggregate, mixing, placement, placement during cold temperatures, consolidation, and curing shall be in accordance with the manufacturer's recommendations. A mix may be extended up to 90 percent of the manufacturer's maximum extension.

The surface of concrete patching material shall have a similar texture as the adjacent sidewalk surfaces.

The Contractor shall submit a report consisting of the mix proportions and compressive strength vs time curve information to the Engineer at least two weeks before the material is to be used on the project.

Field cast cylinders or cubes shall be taken by a qualified testing representative, with a minimum ACI Field Testing Technician Grade I certification, and test results shall be submitted to the Engineer within 24 hours, the first day and every other subsequent day deck patching material is placed with compressive strength determined at 24 hours according to ASTM C 39 or ASTM C109.

Areas patched with Concrete Class DR shall not be opened to traffic until concrete patching material has reached a compressive strength of 2,500 psi using the compressive strength versus time curve developed for the material.

- (b) *Class DR Concrete.* Class DR Concrete shall be placed in accordance with Class D concrete with the following changes:

The area to be patched with Class DR Concrete and anodes shall be saturated surface dry before placement and shall be free of standing water at the time of placement.

Portions of decks patched with Concrete Class DR shall not be opened to traffic until the concrete's compressive strength, determined by CP 69, has achieved at least 2500 psi.

Concrete Class DR shall be cured until a compressive strength of at least 2500 psi has been achieved. The curing compound shall conform to ASTM C309, Type 2 applied at a rate of 1 gallon per 100 square feet. The curing compound shall be applied as a fine spray within 10 minutes of discontinuing the finishing operation. Before and during application the curing compound shall be kept thoroughly mixed. Curing blankets with a minimum R-value of 0.5 shall be provided and shall be placed as soon as they can be placed without marring the surface. When the ambient temperature is below 50°F, the Contractor shall maintain the concrete temperature above 50°F during the curing period.

METHOD OF MEASUREMENT

Concrete Class DR will be measured and paid for as the actual quantity placed and accepted by the Engineer. The Contractor may stockpile material at their own risk. All unused concrete patching material shall remain the property of the Contractor. Any leftover materials will not be purchased or paid any restocking fees.

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**REVISION OF SECTION 601
CONCRETE CLASS DR**

BASIS OF PAYMENT

The accepted quantities will be paid for at the contract unit price per unit of measurement for each of the pay items listed below that appear in the bid schedule.

Pay Item

Concrete Class DR

Pay Unit

Cubic Yard

Payment for Concrete Class DR will be full compensation for all the work, materials, tools, equipment, testing, and incidentals required to complete patching, excluding special installation of anodes when specified, when required.

Furnishing all appurtenances including the molding, curing and breaking of cylinders or cubes for generating the strength versus time curve and for determining the information cylinder or cube strength will not be measured and paid for separately, but shall be included in the work. Concrete patching material or Class DR Concrete will not be measured and paid for separately, but shall be included in the Concrete Class DR bid item.

**REVISION OF SECTION 608
SIDEWALKS AND CURB RAMPS**

Section 608 of the Standard Specifications is hereby revised as follows:

Subsection 608.01 shall be deleted in its entirety and replaced with the following:

Concrete Sidewalk construction shall conform to the requirements of the City and County of Denver's Standard Details for Curb/Gutter and Sidewalk (Detail 5.2 through 5.4).

Concrete Curb Ramp construction shall conform to the requirements of the City and County of Denver's Standard Details for Curb Ramps (Detail 7.0 through 7.7). Construction of concrete ADA curb ramps to include the installation of detectable warnings.

Concrete Driveway construction shall conform to the requirements of the City and County of Denver's Standard Detail for Standard Commercial Driveway (Detail 6.0 through 6.2).

Subsection 608.02, delete in its entirety and replace as follows:

Materials shall meet the requirements specified in the following subsections:

Joint Fillers 705.01

Concrete for sidewalks, curb ramps, and driveways shall be Class "P", broom finish with natural color as specified in subsections 601.02 and 601.03, except that No. 67 coarse aggregate shall be used.

Detectable warnings shall be the composite dome (Armor-Tile Tactile Systems) for 5' wide curb ramps or the cast-iron dome for the 6' and wider curb ramps. Installation of the detectable warnings on ADA curb ramps shall be in strict accordance with the manufacturer's recommendations.

Alternate materials may be used, if pre-approved by the Engineer. The Contractor shall submit a sample of the product, the name of the selected supplier, and documentation that the product meets all contrast requirements and will be fully compatible with the curb ramp surface to the Engineer for approval prior to the start of work.

Concrete shall be cured with a non-pigmented "clear" curing compound.

All concrete used for sidewalks, curb ramps, and driveways shall be reinforced with polypropylene fibers. Polypropylene fibers shall be FIBERMESH or FORTA FIBRE. Length of fibers shall be as recommended by the manufacturer. Add 1.5 pounds FIBERMESH or FORTA FIBRE per cubic yard of concrete. The fiber additive utilized in the concrete mix shall be that supplied by the Fibermesh Company, 4019 Industry Drive, Chattanooga, TN, 37416, (800) 635-2308, or approved equal. The Contractor shall submit five (5) copies of fibrous concrete reinforcement product data for use by the Engineer.

Concrete will be subject to inspection and tests as required to assure compliance with quality requirements.

The use of calcium chloride, as permitted under Revision of Section 412, subsection 412.04, is prohibited in colored concrete.

**REVISION OF SECTION 608
SIDEWALKS AND CURB RAMPS**

Subsection 608.03(a) shall include the following:

Delete the third sentence and add:

Where excavation to the finished grade elevation results in subgrade of unsuitable soil, the Engineer may designate the unsuitable material to be removed and replaced with approved material. Removal of unsuitable material shall be backfilled with Aggregate Base Course (Class 6), or other material approved by the Engineer.

Subsection 608.03(d) shall be revised to include the following:

Finishing shall occur only after the disappearance of bleed water. The addition of superficial water to the surface of the concrete to assist in finishing operations will not be permitted. Sprinkling of pigment onto the fresh surface will not be permitted. ASTM C-1315 cure+seal shall be applied to all paving and flatwork concrete placed Sept 1 thru April 1st to minimize damage from deicer chemicals. Any Class P concrete used shall be placed with air entrainment at 4.5% to 7.5%.

Subsection 608.03(f) shall be revised to include the following:

The Contractor shall insure that new concrete items built under this contract drain properly and, as such, there are no areas of standing water on new concrete items.

The Contractor shall protect all new concrete items built under this Contract against defacement, or other injury, from any cause. If said damage cannot be adequately repaired to the satisfaction of the Engineer, the Contractor shall remove and replace the unacceptable items at Contractor's expense.

Add subsection 608.03(g) as follows:

(g) Protection of New Concrete. The Contractor shall protect all new concrete items built under this Contract against defacement, or other injury, from any cause. If said damage cannot be adequately repaired to the satisfaction of the Project Manager and replace the unacceptable items at Contractor's expense.

Subsection 608.05 shall include the following:

Detectable warnings on new curb ramps, including all work and materials necessary for fabrication, transport and installation will not be measured and paid for separately, but shall be included in the work.

Subsection 608.06 shall be revised to include the following:

<u>Pay Item</u>	<u>Pay Unit</u>
Concrete Sidewalk (6 Inch)	Square Yard
Concrete Curb Ramp	Square Yard

Excavation to proposed subgrade elevation will not be paid for separately but shall be included in the work.

Detectable warnings on new curb ramps, including all labor and materials necessary for fabrication, transport and installation, will not be measured and paid separately, but shall be considered included in the work.

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**REVISION OF SECTION 608
SIDEWALKS AND CURB RAMPS**

It is the Contractor's responsibility to provide Quality Control concrete strength testing and provide test results in a testing frequency, method and report as per Pre-construction submittal approved by the City Project Manager. Quality Control testing, reports and submittals will not be paid for separately but shall be included in the work.

Payment shall be full compensation for labor and materials including, but not limited to prep work, reconditioning, forms, grading, bed course, backfill, curing compound, control and expansion joint and sealant as required to complete these Pay Items.

Excavation to proposed subgrade elevation will not be paid for separately but shall be included in the work.

**REVISION OF SECTION OF 609
CURB AND GUTTER**

Section 609 of the Standard Specification is hereby revised as follows:

Subsection 609.02 shall be revised as follows:

In the first paragraph, reference to Section 703.07, Bed Course Material, shall be deleted.

Subsection 609.02, paragraph 2 shall be deleted and replaced with the following:

Concrete shall conform to the requirements for Class “P” concrete as specified in subsections 601.02 and 601.03. When curb machines are used, the Contractor will be permitted to use AASHTO M 43 Size 57 or 67 aggregate in lieu of the coarse aggregate specified in Table 601-1, and a lesser slump will be permitted.

Subsection 609.03(a) shall be revised as follows:

Excavation: Excavation shall conform to the requirements of the Revision of Section 608, Subsection 608.03(a).

Subsection 609.03(c) shall be revised to include the following:

The Contractor shall protect all new concrete items built under this Contract against defacement, or other injury, from any cause. If said damage cannot be adequately repaired to the satisfaction of the Engineer, the Contractor shall remove and replace the unacceptable items at Contractor’s expense.

Subsection 609.03(d) shall be revised to include the following:

For construction of curb and gutter adjacent to existing concrete pavement, the joint pattern shall match that of the concrete pavement. The joint pattern shall be approved by the Engineer prior to construction.

Subsection 609.03(i) shall be revised to include the following:

The Contractor shall insure that new concrete items built under this contract drain properly and, as such, there are no areas of standing water on new concrete items.

It is the Contractor’s responsibility to provide Quality Control concrete strength testing and provide test results in a testing frequency, method and report as per Pre-construction submittal approved by the City Project Manager. Quality Control testing, reports and submittals will not be paid for separately but shall be included in the work.

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**REVISION OF SECTION OF 609
CURB AND GUTTER**

Subsection 609.04 shall be added as follows:

ASTM C-1315 cure+seal shall be applied to all paving and flatwork concrete placed Sept 1 thru April 1st to minimize damage from deicer chemicals. Any Class P concrete used shall be placed with air entrainment at 4.5% to 7.5%.

Subsection 609.06 is hereby revised to include:

ASTM C-1315 cure+seal will not be paid for separately but included in the work.

Subsection 609.07 shall be revised to include the following:

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Curb and Gutter Type 2 (Section I-B)	Linear Foot
Curb and Gutter Type 2 (Section II-B)	Linear Foot

Excavation to proposed subgrade elevation will not be paid for separately but included in the work associated with Section 202, Removal of Structures and Obstructions.

Payment shall be full compensation for labor and materials including, but not limited to, reconditioning, grading, backfill, curing compound, control and expansion joint and sealant as required completing these Pay Items.

Excavation to proposed subgrade elevation will not be paid for separately but shall be included in the work.

**REVISION OF SECTION 610
MEDIAN COVER MATERIAL**

Section 610 of the Standard Specifications is hereby revised as follows:

Subsection 610.02 shall include the following:

Aggregate for concrete median cover material shall be #67 or #57.

Subsection 610.03 shall include the following:

Landscape weed barrier fabric shall be installed in accordance with Subsection 420.08.

Subsection 610.05 shall include the following:

The accepted quantities will be paid for at the contract unit price for each of the pay items listed below.

Payment will be made under:

Pay Item

Median Cover Material (Concrete)

Pay Unit

Square Foot

**REVISION OF SECTION 613
ELECTRICAL CONDUCTOR IDENTIFICATION**

Section 613 of the Standard Specifications is hereby revised as follows:

Subsection 613.08 shall include the following:

All electrical conductors shall be tagged as follows:

Electrical conductor cable tags shall be located below the termination in the base of the streetlight, in the pull box, in the pedestal, and at the point of termination to existing facilities of the Local Utility Company supplying electrical service. The tags shall be attached with a cable tie. The information written on the tag shall include the direction and approximate length of cable, feeds running from where and to, etc.

Each incoming conductor shall be individually color coded with one (1) tape mark, while outgoing conductors shall have two (2) tape marks.

Example:

FEEDS TO PULL BOX 50' NORTH & 75' WEST THEN TO HIGHWAY SIGN	FEEDS FROM XFMR 250' SOUTH & EAST 200' WEST
---	---

Uniform tags are available in a Tag Kit. *The Tag Kit consists of: 100 tags, 3-part yellow with 1 hole, 100 black nylon ties and 1 black Sharpie pen.

<u>Manufacturers</u>	<u>Catalog Numbers</u>	
Uticom Systems Inc.	U5025Y1 Or approved equal	

Subsection 613.11 shall include the following:

Electrical conductor tagging will not be paid for separately, but shall be included in the cost of wiring.

<u>Pay Item</u>	<u>Pay Unit</u>
Wiring	Lump Sum

**REVISION OF SECTION 613
ELECTRICAL CONDUIT – GENERAL**

Section 613 of the Standard Specifications is hereby revised as follows:

Add the following to subsection 613.07:

This work is for the installation electrical conduits. These conduits (laterals) shall be to connect the already installed traffic signal conduits to the traffic signal controller cabinets, electric meters, and traffic signal poles. The conduit installation shall be in accordance with this specification:

All conduit bends, including factory-installed bends, shall not have a bend radius less than six times the inside diameter of the conduit.

The excavations required for the installation of conduit or cable shall be performed in such a manner as to avoid unnecessary damage to streets, sidewalks, landscaping, sprinkler systems and other improvements. Trenches shall not be excavated wider than necessary for the installation of the electrical appurtenances. Excavation shall not be performed until immediately before installation of conduits. The material from the excavation shall be placed in a position not to cause damage or obstruction to vehicular or pedestrian traffic or interfere with surface drainage.

Trenches shall be made with a rock-wheel or other machine capable of cutting a narrow trench (4") so as to allow traffic to pass over prior to back filling. The machine shall be equipped with shields to direct the spoil downward and away from passing vehicles, workmen and pedestrians.

Off-street trenches shall be back-filled with the same material that was removed and shall be compacted and shaped to match the surrounding surface. On-street trenches within ALL roadway areas shall be back-filled with CDOT approved Structure Backfill (Flow-Fill) and capped with 9" minimum of Hot Mix Asphalt Pavement (Patching) in accordance with Section 403 and City and County of Denver Street Cut Regulations if applicable. If surrounding pavement depth is greater than 9 inches, the HMA (Patching) depth shall match the existing pavement.

All surface materials including sprinkler systems, landscaping, shrubs, sod grass, and native growth vegetation which is disturbed by trenching and back-filling operation shall be restored in kind equal to or exceeding the original conditions.

All conduit runs that will not have a copper conductor installed shall have a #12 AWG stranded copper conductor placed inside for locating purposes. Locating conductor and tape will not be measured and paid separately, but shall be included in the unit price for conduit.

Conduit shall always enter a pull box, hand-hole, or any other type structure from the direction of the run only.

All conduits shall be fully compatible with fiber optic cable. Plastic conduit shall be Schedule 80 in the diameters shown on the plans and shall be compliant with Bellcore TW-NWT-000356 requirements. Each conduit shall be equipped with a pull tape and each bore shall have a copper tracer wire of at least 12 gauge.

Plastic PVC conduit shall be certified by the manufacturer as meeting ANSI/UL 6 and 651. The manufacturer shall be ISO 9000 compliant.

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**REVISION OF SECTION 613
ELECTRICAL CONDUIT – GENERAL**

All conduit bends, including factory-installed bends, shall not have a bend radius less than six times the inside diameter of the conduit.

Conduit plugs for sealing conduit shall also be supplied and installed in all open conduit ends as soon as the conduit is installed. Plugs shall be durable, fabricated from no metallic parts, be of the split design to allow removal and reinstallation around in-place cables and be easily removable and reusable. Plugs shall be capable of being installed by hand without any tools and shall provide a water and air tight seal of at least 100 psi and shall cause no damage to the cable when installed.

At some locations (as illustrated on the Plans or in these specifications, or as directed by the Engineer), new conduits shall be installed in an existing pull box. At these locations, the Contractor shall carefully excavate around the pull box and install the new conduit in the pull box in a manner that meets the requirements of this Special Provision. The Contractor shall not damage the existing pull box. If the existing pull boxes or concrete collars are cracked or damaged during conduit installation, the Contractor shall be required to replace either or both conforming to the requirements of the contract at no additional cost.

Subsection 613.10 shall include the following:

Electrical Conduit will be measured by the linear feet of conduit installed in accordance with these Special Provisions, the Project Standards or as directed by the Engineer. Electrical Conduit will include groundwork, sweeps, pull cord, copper tracer wire, adapters, fittings, splice couplings, conduit plugs (for conduits both with and without fiber optic cable), equipment, labor, and all other items necessary to complete the work.

Electrical Conduit (Bridge) (Special) shall include the material and installation of deflection couplers as shown in the plans.

Subsection 613.11 shall include the following:

<u>Pay Item</u>	<u>Pay Unit</u>
2 Inch Electrical Conduit (Bridge) (Special)	Linear Foot
3 Inch Electrical Conduit (Bored)	Linear Foot
2 Inch Electrical Conduit (Plastic)	Linear Foot
3 Inch Electrical Conduit (Plastic)	Linear Foot

**REVISION OF SECTION 613
ELECTRIC METER PEDESTAL CABINET AND BASE**

Section 613 of the Standard Specifications is hereby revised as follows:

Subsection 613.07 shall include the following:

New traffic signal installations require an Electric Meter Pedestal Cabinet and Base for the new traffic signal. Xcel Energy will furnish only the electric meter. The Contractor shall furnish the electric meter pedestal cabinet, and shall install the pedestal cabinet and base, by a licensed electrician (journeyman), at the locations as show on the plan and in accordance with the City and County of Denver’s standard – sheets 16.1.19 and 16.1.20.

Subsection 613.10 shall include the following:

Electric Meter Pedestal Cabinet and Base will be measured and installed in accordance with these Special Provisions, the Project Standards or as directed by the City. The Electric Meter Pedestal Cabinet and Base installation will include groundwork, sweeps, pull cord, copper tracer wire, adapters, fittings, splice couplings, conduit plugs, equipment, labor, and all other items necessary to complete the work.

Contractor shall submit material specifications to the Engineer for prior approval.

Subsection 613.11 shall include the following:

<u>Pay Item</u>	<u>Pay Unit</u>
Electric Meter Pedestal Cabinet and Base	Each

**REVISION OF SECTION 613
PULL BOXES – GENERAL**

Section 613 of the Standard Specifications is hereby revised as follows:

Subsection 613.07 shall include the following:

Electrical pull box shall be the type A pull box. The covers of the type A pull box shall have the word “ELECTRIC” physically impressed (not painted) on top. Traffic signal pull box shall be the type B pull box. The covers of the type B pull box shall have the word “TRAFFIC” physically impressed (not painted) on top. Communication pull boxes shall be the either type C (24x36x24) or type D (30x48x18) pull boxes. The covers of the type C and D pull boxes shall have the words “TRAFFIC COMM” physically impressed (not painted) on top.

The covers shall be attached to the pull box body by screw-in bolts and shall have two lift slots to aid in the removal of the lid.

All concrete collars, footings, and location marker supports shall be Portland Cement Concrete Class B and shall be in accordance with Section 601.

Pull boxes that are to be in traveled ways shall be outfitted with traffic bearing lids rated for HS 20- 44 loads. The pull boxes shall have a special concrete footing extending 8 inches around the outside and 6 inches around the inside of the pull box bottom, as shown in the plans. Pull boxes installed in dirt or landscape areas shall have a 12 inch wide by 6 inch thick concrete collar placed around the top in lieu of the concrete footing, as shown in the plans.

When the plans call for a fiber optic cable location marker to be installed at the pull box location, the concrete foundation support for the location marker shall be placed monolithically with the concrete collar.

Pull Box (Surface Mounted) shall be metal type with a hinged front door and have at least a NEMA 3R rating. The hinged door shall be provided with both a weather tight seal and a key lock mechanism. Surface mounted pull boxes shall be of the dimensions shown in the plans, and shall be mounted on or embedded into hard surfaces such as bridge decks, concrete barriers, retaining walls, or buildings, as shown on the plans. Surface mounted pull boxes shall be attached using 3/8-inch epoxy anchors or other methods, as approved by the Engineer. Surface mounted pull boxes shall not be used for ground installations.

Subsection 613.12 shall include the following:

Pay Item

Pull Box (Type C)

Pay Unit

Each

Type C and type D pull boxes shall include the removal of any existing pull boxes, installation of the new pull boxes, modification of conduit ends, restoration of disturbed surface materials, and all other work necessary to complete the installation. All work necessary for the removal and installation of pull boxes will not be measured and paid for separately but shall be included in the cost the work.

Type C and type D pull boxes will be paid for on the basis of the number of pull boxes installed.

All other pull boxes required to complete the work will not be measured and paid separately but shall be included in the work of the conduit installation.

**REVISION OF SECTION 613
LIGHTING - LUMINAIRE (LED)(5,300 LUMENS)**

Section 613 of the Standard Specifications is hereby revised as follows:

Subsection 613.02 shall include the following:

The Contractor shall furnish and install LED Street Light Luminaire at locations as shown on the plans. The LED Street Light Luminaire shall be compatible or interchangeable with standard LED Street Light Luminaire as stocked by the City and County of Denver.

The current LED Street Light Luminaire that is compatible with and stocked by the City and County of Denver is as follows:

<u>Manufacturer</u>	<u>Catalog Numbers</u>
E-Lite Star	ESU-CA012M03042S-525CCD1-1

The luminaire shall also include a photo cell (S-T P124-1.5-PTW or equal) and the luminaire finish shall be in Federal Green.

The Contractor shall submit a lighting materials list to the City and Denver for approval prior to ordering. 720-865-4002.

Subsection 613.08 shall include the following:

At least one grounding electrode shall be installed adjacent to each light standard. Wiring shall be a 120/240 volt or 120/208 volt, 3-wire system with individual luminaire wired for 120 volts.

Subsection 613.11 shall include the following:

Luminaires (LED)(5,300 Lumens) will be measured by the actual number of units that are installed and accepted..

Subsection 613.12 shall include the following:

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Luminaire (LED)(5,300 Lumens)	Each

**REVISION OF SECTION 614
CONCRETE FOOTING (TRAFFIC SIGNAL POLE)**

Section 614 of the Standard Specifications is hereby revised as follows:

Subsection 614.01 shall include the following:

This work consists of installing concrete footing (foundations) for traffic signal pedestal pole; traffic signal imbedded steel poles (span wire poles); and traffic signal street light poles (no mast arms). Locations of the concrete footing (foundations) are shown on the plans or as directed by the Engineer.

Subsection 614.08 (g) shall include the following:

Concrete Footing (Pedestal Pole) shall conform to the requirements of the City and County of Denver's Traffic Signal Standard Detail sheet no. 16.1.13.2 and detail nos. 4 and 5.

Concrete Footing (Imbedded Steel Pole) for span wire traffic signal poles shall conform to the requirements of the City and County of Denver's Traffic Signal Standard Detail sheet no. 16.1.14 and detail no. 6.

Concrete Footing (Traffic Street Light Pole – no mast arm) shall conform to the requirements of the City and County of Denver's Traffic Signal Standard Detail sheet no. 16.1.15 detail no. 9 for foundation on XCEL facilities, and Traffic Signal Standard Detail sheet no. 16.1.16 for foundation on city owned facilities.

Subsection 614.13 shall include the following:

Concrete Footings for Pedestal Poles, Imbedded Steel Poles, and Traffic Street Light Poles will not be measured and pay for separately but shall be included in the cost of Pedestal Poles, Imbedded Steel Poles, and Traffic Signal Light Poles installation.

**REVISION OF SECTION 614
LED PEDESTRIAN SIGNAL FACE (COUNTDOWN)**

Section 614 of the Standard Specifications is hereby revised as follows:

Subsection 614.01 shall include the following:

This work includes the installation of LED Pedestrian Signal Faces with countdown timers as shown in the Contract.

Subsection 614.08 (h) shall include the following:

Pedestrian signal faces with count down timers shall meet the following requirements:

- i. The dimensions of the signal housing and the LED symbols, as well as moisture and dust resistance requirements shall be in accordance with the current ITE PTCSI Standards.
- ii. Signal housing shall be aluminum, painted in Federal Green and “clam-shell” mounted.
- iii. The signal shall have user-selectable modes for countdown for walk cycle only, pedestrian cycle only, or both walk and pedestrian clearance.
- iv. The countdown module shall have an internal conflict monitor to prevent any possible conflicts between the Hand/Person signal indications and the time display. The display shall not countdown during a Solid Hand indication.
- v. LED symbols shall be solid icons and shall provide uniform light dispersion such that the “pixel” effect is minimized. Lettered or outline symbol styles will not be permitted.
- vi. The Man/Hand configuration shall provide clear and distinct lamination where either symbol is in use.
- vii. The LED module shall be rated for use in an ambient operating temperature range of - 40° F to 165° F.
- viii. The signal shall meet NEMA Standard TS2 for voltage surge protection, and shall have an automatic reset in case of a power outage.

Subsection 614.13 shall include the following:

LED Pedestrian Signal Face (16) (Countdown) will be measured by the actual number of units that are installed and accepted.

Subsection 614.14 shall include the following:

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Pedestrian Signal Face (16) (Countdown)	Each

**REVISION OF SECTION OF 614
TRAFFIC CONTROL DEVICES (TRAFFIC SIGNAL FACE)**

Section 614 of the Standard Specification is hereby revised as follows:

Subsection 614.08 (h) shall include the following:

“Light Emitting Diode” (LED) signal lenses shall be installed in all Red, Yellow, Green, signal displays. The LED signal lenses for the 12” and 8” circular balls and 12” circular arrows are hereby added to the Standard Specifications and shall comply with the following specifications:

Manufacturer Requirements and Approvals:

- The manufacturer supplying product to this specification shall have a minimum of 13 years of experience in the manufacture of LED Traffic Signals with High Flux LEDs used in the North American market.
- Manufacturers supplying products to this specification must be a registered participant and have the unique long life module part numbers being provided certified and listed on the Intertek-ETL LED Traffic Signal Modules Certification Program approved products website prior to bid opening.
- Manufacturers supplying products to this specification shall manufacture and assemble product on an Intertek ETL audited line located in the USA.
- Unique part number shall be listed on manufacturers label proving difference between standard modules and long life modules.
- If requested, documentation shall be provided by manufacturer demonstrating the changes made to their standard product that allows for ITE specification compliance over 15 year warranty period.

Physical & Mechanical Requirements: General

- Tinted or Non-Tinted Lens. Unless designated otherwise in the below table the standard lens color shall be tinted with a color meeting the colors required in paragraph 4.2 of the ITE specification. The products shall be available with non-tinted lenses as an option.
- The LED module shall utilize high flux LEDs rated at 1 watt or higher and have an incandescent, non-pixelated appearance when illuminated. The use of low power LEDs, for example 5 mm LEDs, is not permissible in the design and production of long life arrow products.
- The external lens shall have a smooth outer surface to prevent the build up of dirt/dust and shall be designed to minimize the potential for sun phantom signals.
- All LEDs utilized to illuminate circular signal modules, shall be LEDs that have been manufactured utilizing materials that have industry acceptance as being suitable for uses in outdoor applications. At no time is the use of LEDs that utilize AlGaAs technology acceptable.
- The thermal management system used in the traffic ball must be self-contained and internal to the traffic module. At no time shall the thermal management system used for the power supply or LEDs form any part of the external surface of the LED module.
- All plastic components shall be molded and assembled in the USA. This includes: back housing, spreading lens and front lens. Certificate of manufacturing location must be available and supplied at time of bid requested.
- All lenses shall be hard coated in the USA. Certificate of manufacturing location must be available and supplied at time of bid requested. All reflectors shall be metalized in the USA. Certificate of manufacturing location must be available and supplied at time of bid requested.

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REVISION OF SECTION OF 614 TRAFFIC CONTROL DEVICES (TRAFFIC SIGNAL FACE)

Module Identification

- In addition to the required ITE labeling all modules must be labeled with the ETL Verified label shown in Figure 1. This label designates the compliance and listing with the Intertek-ETL Traffic Signal Certification Program.

Electrical: General

- The following color scheme shall be used for all modules AC power leads: White for Common, Red for the Red ball signal, Yellow for the Yellow ball signal, and Brown for the Green ball signal.
- The AC power leads shall exit the module via a rubber grommetted strain relief, and shall be terminated with insulated female quick connect terminals with spade/tab adapters. The leads shall be separate at the point at which they leave the module.
- All external wiring utilized in the LED traffic signal module shall be anti-capillary type wire to prevent the wicking of moisture to the interior of the module.
- LED Module and power supply shall be design to remain ITE compliant over a 15 year life.
- To minimize the temperature exposure of the power supply all power supplies should be located at the bottom of the module when the arrow is facing left.
- For additional protection from moisture, all power supplies shall be conformal coated for additional protection.

Transient Voltage Protection

- In addition to the transient test requirements defined in the Design Qualification Testing section of ITE Vehicle Traffic Control Signal Heads (VTCSH) specification all power supplies used in the circular signals supplied to this specification shall be capable of passing an additional ring-wave surge testing in accordance with the IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000V and less) AC Power Circuits, ANSI/IEEE C62.41.2-2002, 6KV, 100 kHz ring-wave with an output impedance of 30 ohms. The short circuit current shall be 200 Amps.

Power

- Typical wattages at 25 o C for the 12” circular arrow LED traffic Signal Modules shall be: Red - 8 watts, Yellow - 13 watts, and Green - 8 watts.
- Typical wattages at 25o C for the 12” circular ball LED traffic Signal Modules shall be: Red - 7 watts, Yellow - 11 watts, and Green - 7 watts. Typical wattages at 25o C for the 8” circular ball LED traffic Signal Modules shall not exceed: Red - 8 watts, Yellow - 10 watts, and Green - 8 watts.

Quality Assurance General

- Upon Request, the supplier must provide an Intertek-ETL test report for the base model being supplied to this specification.
- The base products must be listed in the Intertek Directory of LED Traffic Signal Modules Certified Products listing at the time of bid. Upon request the supplier must provide a copy of the listing in the bid package.

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**REVISION OF SECTION OF 614
TRAFFIC CONTROL DEVICES (TRAFFIC SIGNAL FACE)**

Warranty Requirements:

Warranty

- Manufacturers shall provide a detailed written warranty issued by the factory of module origin with the following minimum provisions:
- Modules shall, at the manufacturer's option, be repaired or replaced if the module fails to function as intended due to workmanship or material defects within the first 15 years from the date of delivery.
- Modules shall, at the manufacturer's option, be repaired or replaced if the module exhibit luminous intensities less than the minimum specified values within the first 15 years of the date of delivery.
- Upon request, the LED lamp module manufacturer shall provide written documentation of its ability to satisfy a worst-case, catastrophic warranty claim.
- A current corporate annual report duly-certified by an independent auditing firm, containing financial statements illustrating sufficient cash-on-hand and net worth to satisfy a worst- case, catastrophic warranty claim is an example of suitable documentation.
- The documentation shall clearly disclose:
 - The country in which the factory of module origin is located
 - The name of the company or organization that owns the factory of module origin including any and all of its parent companies and/or organizations, and their respective country of corporate citizenship
- For firms with business and/or corporate citizenship in the United States of less than fifteen years, the process by which the end-users/owners of the modules will be able to obtain worst-case, catastrophic warranty service in the event of bankruptcy or cessation-of-operations by the firm supplying the modules within North America, or in the event of bankruptcy or cessation-of-operations by the owner of the factory of origin, shall be clearly disclosed.

Subsection 614.14 shall include the following:

LED signal lenses shall be included in the cost of the item for Traffic Signal Face and will not be paid for separately.

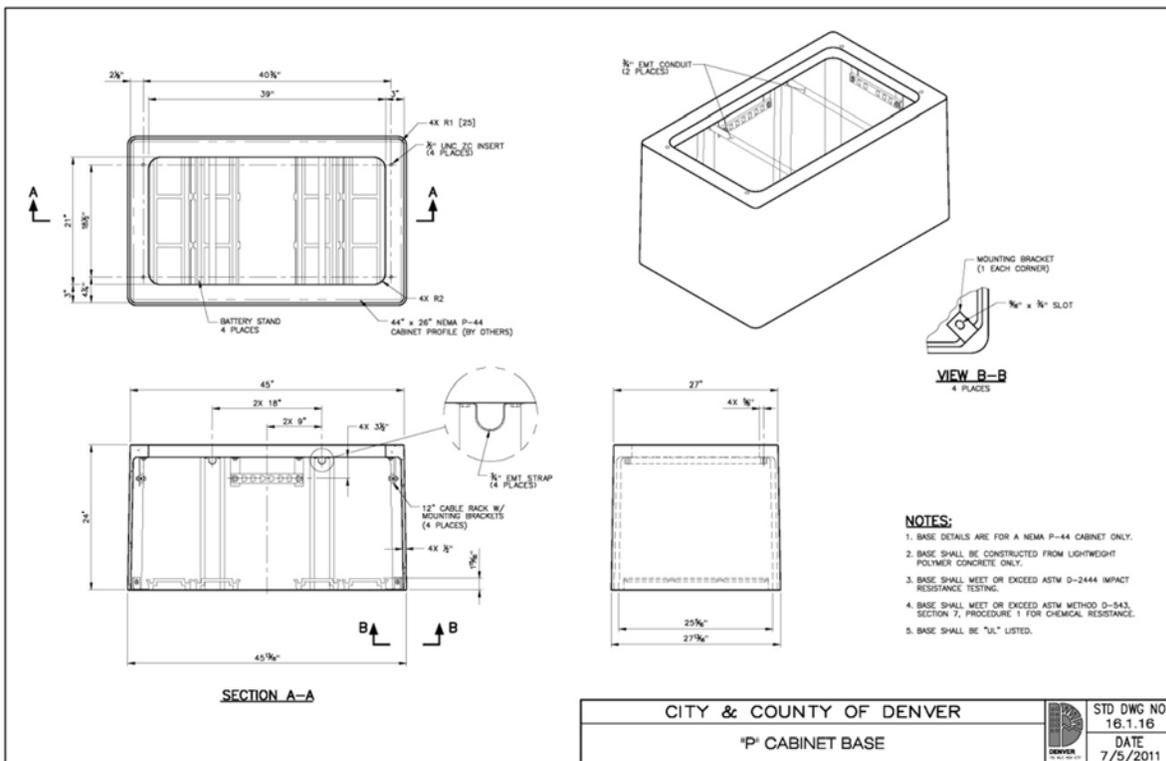
**REVISION OF SECTION 614
TRAFFIC SIGNAL CABINET BASE**

Section 614 of the Standard Specifications is hereby revised as follows:

Subsection 614.01 shall include the following:

This work is of the installation of a composite Traffic Signal Controller Cabinet Base in accordance with City & County of Denver standards. The Contractor shall furnish and install the base that will fit the City and County of Denver’s P-size traffic signal controller cabinet at the locations as shown on the plan.

Dimensions of the cabinet base (City & County of Denver Traffic Engineering Services STD DWG NO. 16.1.16) are as shown in the following drawing:



Subsection 614.10 shall include the following:

Prior to starting cabinet base installation, Contractor shall obtain field verification of the location of the cabinet from the Engineer.

Cabinet base installation shall include all labor and materials to completely install a new P- size cabinet base as directed in the plans. The item shall include all excavation, conduit installation and modification work, backfill and restoration of adjacent surface area.

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**REVISION OF SECTION 614
TRAFFIC SIGNAL CABINET BASE**

Subsection 614.13 shall include the following:

Installation of the traffic signal cabinet base shall not be measured and paid for separately, but shall be included in the cost for installation of the Traffic Signal Controller Cabinet.

Subsection 614.14 shall include the following:

Installation of the traffic signal cabinet base will not be measured and paid for separately, but shall be included in the cost of the Traffic Signal Controller Cabinet.

**REVISION OF SECTION 614
TRAFFIC SIGNAL CONTROLLER CABINET**

Section 614 of the Standard Specifications is hereby revised as follows:

Subsection 614.01 shall include the following:

This work shall consist of furnishing, assembling, programming, and installing a completed Traffic Signal Controller Cabinet assembly. The Cabinet assembly shall be assembled in accordance with the City and County of Standards and Specifications, and the completed Traffic Signal Controller Cabinet shall include but not limited to the traffic signal controller, malfunction management unit (MMU), vehicle detector amplifiers, other ancillary hardware, and traffic signal cabinet base as per City and County of Denver standards. The Contractor shall install the completed Traffic Signal Controller Cabinet assembly at the locations as shown in the plans.

Delete Subsection 614.08 (b), and replace with the following:

1.1 Applicable Standards

All electronic components, workmanship, and functionality of the traffic signal controller shall conform to the applicable standards for TS-2 traffic signal controllers mandated by the National Electrical Manufacturers Association's (NEMA) current edition NEMA Standards Publication TS2-2003 v02.06 for Traffic Controller Assemblies with National Transportation Communications for ITS Protocol (NTCIP) Requirements. Controller engine board and operating system shall support open architecture and be compliant with current ITE, AASHTO, and NEMA Standard Publication for Advanced Transportation Controllers (ATC) 5201.

All major components shall meet the environmental, design, and operating standards outlined in NEMA Standards Publication TS2-2003 v02.06, Section 2.

These standards specify minimum requirements for the traffic signal controller except where requirements specified in this document exceed the aforementioned documents.

1.2 Hardware

1.2.1 Enclosure

The Controller enclosure shall be designed for placement on a shelf. The enclosure shall be aluminum with a protective finish and enclose all electrical components of the controller. The enclosure size shall be equal to or less than the following: TS-2 Type 1 Controller: 8.5" Tall x 8.5" Deep x 14 ¾" Wide; TS-2 Type 2 Controller: 10 3/8" Tall x 8.5" Deep x 14 ¾" Wide. All hardware and electrical components shall be modular for ease of replacement and repair. All controller input/output connectors, fuse holders, indications, displays, switches and control devices required for the operation and adjustments of the controller shall be mounted on the front panel. The front panel of the controller shall be permanently marked to identify I/O connections, fuse holders, indicators, etc.

1.2.2 Additional Hardware Requirements

- Power supply must be capable of supplying 95-250 VAC 50/60HZ Auto Sensing

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REVISION OF SECTION 614 TRAFFIC SIGNAL CONTROLLER CABINET

- Engine Board and CPU shall be compliant with the ATC 5201 Standard as noted above and shall meet the following additional specifications:
 - Minimum Processor: Motorola PowerPC (Freescale) 8248 Processor;
 - 32-bit
 - 750 MIPs at 400 MHz
 - Minimum Required Memory
 - 1 MB SRAM
 - 64 MB SDRAM
 - 64 MB DRAM
 - On-board 5-Pin USB Motherboard Connector
- There shall be no batteries or moving parts such as fans or memory storage devices with rotating parts on the controller unit
- Display shall be a 16-line x 40-character LCD
- All keypads to be mounted on the controller front panel and are to be weather resistant and backlit
- Controller hardware shall facilitate the use of the controller in TS-2 Type 1 traffic signal control cabinets.

1.2.3 Communications Ports

In addition to the NEMA TS-2 with NTCIP v02.06 Standard, the traffic signal controller shall include the following communications ports and configurations:

- Ethernet Support:
 - Side mounted, four-port 10/100 Mbit Ethernet network switch
 - Front panel mounted four-port 10/100 Mbit Ethernet network switch
 - Integrated network card supporting two independent, user programmable subnets (IP Address, Subnet Mask, and Default Gateway)
- USB Support
 - Front Mounted three-port Universal Serial Bus (USB) Hub
 - Side Mounted single USB port

1.3 Operating System

1.3.1 O/S Version

The Traffic Signal Controller shall use a Linux operating system (O/S) with kernel version 3.14 or later and shall include standard POSIX libraries for application support including real-time extensions of POSIX 1003.1b. To facilitate application level access to the ATC hardware, a Board Support Package (BSP) shall be provided by the controller manufacturer for access to hardware-specific drivers.

The operating system shall include enabled support for cgroups (control groups) for the purpose of limiting, accounting for, and isolating resource usage (CPU, Memory, etc.) of all running processes to ensure the reliability and stability of the traffic signal control application.

The Linux operating system shall include an application programming interface in compliance with the ITE, AASHTO, and NEMA Application Programming Interface (API) Standard 5401 for the ATC v2.0.

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REVISION OF SECTION 614 TRAFFIC SIGNAL CONTROLLER CABINET

1.3.2 O/S Updates

Operating System updates shall be completed from a personal computer over an Ethernet connection and also directly from a USB flash drive plugged into the controller's front panel. The update process shall be automated and packaged as a simple executable file enabling the user to perform the update within a few steps. Minor operating system updates shall allow the user to perform the operating system update without removing the controller from operation or without placing the intersection in flash. The controller shall also allow for all traffic signal controller software updates through the Application Programming Interface without removing the controller from operation or without placing the intersection in flash.

1.4 Intersection Control Software

The intersection control software should provide at a minimum, the functionality and operations specified in the NEMA TS-2 with NTCIP v02.06 Standard. All objects and functions available in the local control software should be named and defined according to the current NTCIP standard. Additional, non-required or manufacturer specific objects and functions should have a straight-forward, logical label and/or definition.

1.4.1 Basic Functionality

In addition to the aforementioned NEMA TS-2 Standard, the controller must satisfy the following additional requirements:

- 40 programmable phases
- 16 timing rings that can be configured by the user to run concurrently or independently
- 32 overlaps
- 20 unique phase sequences that can be programmed and operated by time of day. Each sequence should allow the user to specify specific phase order and sequence beyond basic phase pair reversal/switching
- 128 unique timing patterns, each with a unique:
 - Cycle length, free, or flash command
 - Phase split table
 - Offset
 - Phase or pedestrian recall or omit (per pattern)
- User can easily configure:
 - Flashing Yellow Arrow functionality
 - Pedestrian Overlaps
 - Pedestrian advance or exclusive pedestrian intervals
 - Trailing green sequences for compound intersections
 - Preemption routines in accordance with the NEMA TS-2 specification (v02.06)
 - HAWK Signals
- Detectors
 - 10 detector tables selectable by TOD
 - 72 detectors per detector table
 - Ability to call multiple phases with one detector
 - Ability to call overlaps directly
 - Detector Diagnostics

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REVISION OF SECTION 614 TRAFFIC SIGNAL CONTROLLER CABINET

- 16 Preempt Routines
 - Return to Coord without transition
 - Return to the longest waiting phase
 - Return to the last phase skipped in sequence
- 10 Overlap tables selectable by TOD
- Transit Priority functionality
- Peer to Peer communications
 - Allows for direct messaging between two controllers
 - Allows user to send the status of ANY input/output function in the controller as well as phase intervals, preempt intervals, etc.
- 32 Customizable Alarms

1.4.2 User Interface

In addition to the front panel screen, the traffic signal controller shall have an on-board web server which hosts a graphical user interface for monitoring and configuring the intersection control software. The web server interface shall provide access from any internet enabled device with a web browser. No additional or proprietary software shall be needed to use the graphical user interface. The user interface shall include the following features and functionality:

- User Access Control: Local software shall allow for configuration of user groups to limit read/write permissions of individual controller programming and status menus to a set of users; permissions and user accounts shall be synced to all network connected controllers via included central-based profile server,
- Real-Time Signal Performance Analytics: The local controller web-server shall support graphical signal performance analytic tools such as a split monitor, a cycle length plot, phase termination diagrams, coordination diagrams, etc., without the need of a central signal system,
- On-Board Replay: Controller shall include a graphical based, on-board utility to replay recent operation to troubleshoot a failures. At a minimum, replay shall include ring timers, phase and overlap states, detector calls, channel status, etc. for the previous 3 minutes of operation,
- Change Tracking: Front panel or web-UI entered database changes shall be logged with the time/date stamp and username.

1.4.3 Input/output Configuration

The intersection control software should allow the user to dynamically configure and modify input and output pins on an individual, pin by pin basis. In addition, the user should be able to configure the signal output channels (phase/overlap to load-switch) so that any phase, overlap, or pedestrian output can drive any available load-switch in the traffic signal cabinet. The user shall perform such configurations and modifications from the controller front panel and also through the web user interface, without the need for additional configuration software or downloading additional files to the controller.

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REVISION OF SECTION 614 TRAFFIC SIGNAL CONTROLLER CABINET

1.4.4 Master and Peer-to-Peer Communications

The signal controller shall be capable of operating in a closed loop network with other controllers as a master or slave controller without the need for additional software or licensing. The master unit must be able to perform the duties of a master controller in the closed loop network while simultaneously conducting traffic signal operations at the local intersection. The signal controllers within the network will communicate with other controllers via serial or Ethernet communications.

The Intersection Control Software shall support Peer-to-Peer functionality. Peer-to-Peer allows the controllers to send messages to other controllers connected in the same network via Ethernet communications.

1.4.5 Advanced User Programs (User Logic)

In addition to standard operations specified in the NEMA TS-2 for NTCIP v02.06 Standard, the intersection control software shall have a logic processor where the user can develop advanced logic statements and operations to be used as custom solutions or for feature development. In addition to standard Boolean logic, the user shall be able to specify conditions using all input and output functions including but not limited to phase indications and intervals, detector calls, preempt status, interval/service times, and greater than/less than relationships. For example, the processor shall provide a way for the user to program the following condition in the controller front panel: "Call preempt 5 if phase 2 is green for more than 25 seconds. Also send a message to the downstream controller to start preempt 2 in 15 seconds if the coordinator is currently in transition."

1.4.6 Database Management

The intersection control software and traffic signal controller shall be capable of storing multiple traffic signal databases (timing files) on the controller at any given time. The software should allow the user to save to or select from the list of stored databases on the controller from the front panel or web user interfaces. Databases shall be transferred between a personal computer and the traffic controller via an Ethernet connection using the web-user interface or using a standard FAT (or FAT-32) formatted USB flash drive using the controller front panel user interface. The software shall provide a user interface to select and save a database from the USB flash drive to the controller when multiple databases are located on the USB flash drive. The controller shall be able to switch between the current and stored databases at any time. The controller will set the selected database as "Active" at the end of the current sequence during an all-red condition timing less than 4 seconds.

1.4.7 Windows Based Controller Emulation Software

In addition to the above, one copy of a Windows based traffic signal controller emulation software package shall be supplied. This program would allow the user to program a traffic signal controller on a Windows based computer and shall be compatible with the latest version of the Windows operating system. The program supplied shall be the same version as the firmware version supplied with the controller. This program would allow the user to program a complete traffic signal controller and can be saved on a USB memory drive for transfer to a controller. This program shall be updated and supplied to the City at the same time as the Linux firmware for the controller and shall be supplied no charge for any updates.

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**REVISION OF SECTION 614
TRAFFIC SIGNAL CONTROLLER CABINET**

1.4.7 Connected Vehicle Ready

Controller shall be CV Ready: “Time to Green” and associated confidence intervals must be supported via standard or manufacturer specific NTCIP objects and over XML protocol and included in manufacturer’s NTCIP MIBs.

Delete Subsection 614.08 (c) and replace with the following:

All new cabinets shall be the latest P-type cabinets as per the City & County of Denver Traffic Signal Standards. Each cabinet shall be installed on a newly installed traffic signal controller cabinet base unless otherwise specified on the plan.

Controller cabinet assemblies shall include an integrated uninterrupted power supply (UPS) units, and an Ethernet Field Switch that comply with the City and County of Denver standards (see UPS and Ethernet Field Switch specifications).

The Controller Cabinet shall also include a malfunction management unit (MMU) that meets the following requirements:

- NEMA Standard TS2-2016 for MMU2 configuration will maintaining compatibility with the NEMA TS1-1989 assemblies.
- Flashing Yellow Arrow PPLT operation and meets / exceeds the NEMA Standard MMU2 requirements of TS2-2016 FYA, providing modes for both TS-2 or TS-1 cabinet configurations.
- Real-time SDLC communications with the Controller Unit exchanges field input status, Controller Unit output status, fault status, MMU programming, and time and date.
- A time-stamped nonvolatile event log records the complete intersection status as well as AC Line events, configuration changes, monitor resets, temperature and true RMS voltages.
- A Sequence History log stored in nonvolatile memory graphically display up to 30 seconds of signal status prior to each fault event.
- View the intersection signal status remotely with manufacturer provided software via the MMU Ethernet port.

Subsection 614.09 shall include the following:

The Contractor shall assemble the traffic signal controller, cabinet, and other auxiliary hardware in accordance with the City and County of Denver Department of Transportation & Infrastructure – Transportation Operations criteria, and program the traffic signal controller per the approved traffic signal timing work order. All traffic signal timing (controller programming) shall be bench tested with a minimum of 72-hours burn time to verify successful operation prior to installation. The Contractor shall coordinate all testing and installation procedures with the City and County of Denver’s Department of Transportation & Infrastructure Transportation Operations staff. The Contractor shall contact Denver Traffic at (720) 865-4002 for all testing and installation requirements.

The controller shall be installed in accordance with the details shown in the plans and in accordance with manufacturer's recommendations.

**REVISION OF SECTION 614
TRAFFIC SIGNAL CONTROLLER CABINET**

Subsection 614.10 shall include the following:

The Contractor shall demonstrate successful traffic signal operations at all new controller cabinet locations to the satisfaction of the Engineer or Engineer's designee prior to acceptance of this item. The Contractor shall contact the Engineer or Engineer's designee 3 days before turning on signal. Work shall include all required programming of controllers and establishing or re-establishing all required wiring connections. Phasing and timing information at each location shall be furnished to the Contractor by the City & County of Denver.

All new wiring shall conform to City & County of Denver and International Municipal Signal Association (IMSA) specifications.

Subsection 614.13 shall include the following:

The unit price for the installation of traffic signal controller cabinet shall include all labor, materials, ancillary hardware, traffic signal cabinet base, wiring and wiring re-connection (including Xcel Energy power feed) required to provide and install a complete system and successful operation of the item. Connection of the controller to the fiber optic interconnect system shall be paid for separately under item 614 "Telemetry (Field)".

Removal and disposal of existing cabinets shall be in accordance with Revision of Section 202 – Removal of Traffic Signal Equipment.

Subsection 614.14 shall include the following:

<u>Pay Item</u>	<u>Pay Unit</u>
Traffic Signal Controller Cabinet	Each

**REVISION OF SECTION OF 614
PEDESTRIAN PUSH BUTTON AND INSTRUCTION SIGN**

Section 614 of the Standard Specification is hereby revised as follows:

Subsection 614.08 (f) shall include the following:

1-1 : Push button assemblies shall be of the direct push button solid state contact type and shall not have any levers, handles or toggle switches externally or internally. The pushbutton shall be of tamperproof and all weather construction. The pushbutton shall have a protective shroud that is an integral part of the cover and it shall encircle the pushbutton actuator to deter vandalism. The assembly shall be made weatherproof and shockproof by means of synthetic rubber gaskets between the cover and the enclosure and between the plunger and the cover so that it shall be impossible to receive an electrical shock under any weather conditions. The front cover plate shall be secured with stainless steel vandal resistant screws. The push button shall operate on logic ground.

1-2 : The solid state switch shall be entirely insulated from the housing and operating button. The pushbutton shall consist of a 2 inch 303 stainless steel metal plunger and an oil and gasoline resistant Piezo driven solid state switch, all encased in a high impact thermoplastic enclosure with four (4) stainless steel mounting screws. The solid state switch shall be normally open and shall be closed with a minimum of pressure on the button ($3lb \pm 1lb$), restoring immediately to the normally open position when the pressure is released.

The aluminum housing shall be the flat back frame type with adjustable mounting staves that will readily enable it to be mounted on any size traffic signal pole or push button standard. The housing shall have a $\frac{1}{2}$ inch access hole in the rear for wiring. The housing shall have a bottom threaded conduit entrance hole and shall be provided with a threaded plug so that access is only possible from the rear of the housing. The plug shall not be removable with ordinary tools. The housing shall be painted Dark Olive/Federal Green baked enamel matching to Federal Standard 595A color #14056.

The frame shall have a cast aluminum attachment to allow the mounting of a 9" X 12" pedestrian instruction sign. By removal of 4 screws the frame shall convert to allow the mounting of a 5" X 7 $\frac{3}{4}$ " pedestrian instruction sign. Pedestrian

Instruction Sign:

2-1 : Pedestrian instruction signs shall conform to the latest version of the M.U.T.C.D., published by the U.S. Department of Transportation Federal Highway Administration.

2-2 : Pedestrian instruction signs shall be Type R10-3a, Type R10-3b, Type R10-3c, R10-3d, and R10-3e as specified in the contract documents (or bid documents).

Pedestrian instruction signs shall be constructed in accordance with the applicable provisions of the current CCD Standard Specifications. Pedestrian instruction sign need not be reflectorized. The sign shall be fabricated with 0.063 aluminum. The signs shall be mounted using four $\frac{5}{16}$ " mounting holes 4" X 6 $\frac{3}{4}$ " for the 5" X 7 $\frac{3}{4}$ " sign and 7" X 10" for the 9" x 12" sign. The pedestrian instruction signs shall have rounded corners $\frac{3}{4}$ " radius for the 5" X 7 $\frac{3}{4}$ " sign and 1 $\frac{1}{2}$ " radius for the 9" X 12" sign.

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**REVISION OF SECTION OF 614
PEDESTRIAN PUSH BUTTON AND INSTRUCTION SIGN**

Subsection 614.13 shall include the following:

Pedestrian Push Button and Instruction Sign shall be measured by the number of units installed and accepted.

Subsection 614.14 shall include the following:

Pay Item

Pedestrian Push Button

Pay Unit

Each

**REVISION OF SECTION 614
PEDESTRIAN PUSH BUTTON POST ASSEMBLY**

Section 614 of the Standard Specifications is hereby revised as follows:

Subsection 614.08 (g) shall include the following:

Pedestrian Push Button Post Assembly shall conform to the requirements of the City and County of Denver's Standard Detail 7, Standard drawing No. 16.1.14. Pedestrian Push Buttons and Signs shall be handled through other items.

Subsection 614.13 shall include the following:

Pedestrian Push Button Post Assembly shall be measured by the number of units installed and shall include post, foundation and all work necessary to complete the item.

Subsection 614.14 shall include the following:

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Pedestrian Push Button Post Assembly	Each

**REVISION OF SECTION 614
FIRE PREEMPTION UNIT AND TIMER (SYSTEM)**

Section 614 of the Standard Specifications is hereby revised as follows:

Subsection 614.08 shall include the following:

System Description:

The Fire Preemption Unit and Timer (System) shall enable designated vehicles to remotely cause the traffic signal controller to advance to and/or hold a desired traffic signal display by using existing controller functions. The control shall be activated at a minimum distance of 548.6M (1,800 feet) along an unobstructed "line of sight" path. The control shall not terminate until the vehicle is within 12.2M (40 feet) of the detector or at the intersection.

The system shall consist of the following components:

- A. Vehicle Emitter which shall be mounted on the emergency vehicle and shall transmit optical energy signals only in the forward direction. If the municipality presently uses optical pre-emption, the emitters shall be of the same manufacture currently used by the City and County of Denver Fire Department.
- B. Phase Selector (minimum 2 channels) which shall cause the signal controller to advance to and/or hold the desired traffic signal display for the emergency vehicle. A pre-emption system chassis shall house two phase selectors.
- C. Optical Detector which shall be mounted on or near a traffic signal and shall receive the optical energy signals generated by the Vehicle Emitter.
 - a. Detector (Type A), 1 Direction, 1 Channel
 - b. Detector (Type B), 2 Direction, 1 Channel
 - c. Detector (Type C), 2 Direction, 2 Channel
- D. D. Detector Cable (Optical).

System Operations:

- A. The operating sequence shall be initiated when the optical detector receives the required optical energy signal from the Emitter.
- B. The phase selector shall cause the traffic signal controller to advance to and/or hold the desired traffic signal display for the emergency vehicle.
- C. The phase selector shall cause the controller to advance to and/or hold the desired traffic signal display even if the optical energy signals cease before the desired display is obtained.
- D. The phase selector shall allow the traffic signal controller to resume normal operation within ten seconds after optical energy signals cease if the optical energy signals cease after the desired traffic signal display is obtained.
- E. The phase selector shall not respond to optical energy signals from an emergency vehicle if it is already processing optical energy signals from another emergency vehicle.

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**REVISION OF SECTION 614
FIRE PREEMPTION UNIT AND TIMER (SYSTEM)**

System Components:

A. Vehicle Emitter:

The emitter assembly consists of an emitter and power supply and an emitter control switch assembly. The emitter assembly is mounted on a vehicle and produces a flashing optical signal when in operation. The following shall apply to the vehicle emitter:

1. Shall operate on ten to fifteen volts DC input voltage, but shall not be damaged by input voltage surges up to twenty-five volts DC.
2. Shall be controlled by a single on/off switch that requires no other adjustments by the operator. The on/off condition shall be indicated by a light located adjacent to the switch.
3. Shall be automatically disabled or de-activated by one or a combination of the following: seat switch, emergency brake switch, door switch, and transmission safety switch.
4. Shall operate over an ambient temperature range of minus 34O C to plus 60O C. (minus 30O F. to plus 140O F.)
5. Shall operate in 0 to 95 % humidity.
6. Shall be a pulsed optical energy source with a controlled repetition rate.
7. Shall not generate voltage transients on the battery input line which exceed battery voltage by more than four volts.
8. Shall produce optical energy in a cone of not more than 90 degrees horizontal and not more than 30 degrees vertical. The detectors and/or phase selector shall not sense a pre-emption signal from an emitter outside this cone.

B. Optical Detector:

The optical detector receives the high intensity optical pulses produced by the emitter. These optical energy pulses are transformed by the detector into appropriate electrical signals which are transmitted to the phase selector. The optical detector is mounted at or near the intersection in a location which permits an unobstructed line of sight to vehicular approaches. The units may be mounted on signal span wires, mast arms or other appropriate structures. The following shall apply to the optical detector:

1. Shall produce optical energy in a cone of not more than 90 degrees horizontal and not more than 30 degrees vertical. The detectors and/or phase selector shall not sense a pre-emption signal from an emitter outside this cone.
2. Shall be of solid state construction.

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**REVISION OF SECTION 614
FIRE PREEMPTION UNIT AND TIMER (SYSTEM)**

3. Shall operate over an ambient temperature range of minus 34O C to plus 60O C. (minus 30O F. to plus 140O F.)
4. Shall have internal circuitry potted in a semi-flexible compound to ensure moisture resistance.
5. Shall operate in 0 to 95 % humidity.
6. Shall have a cone of detection of not more than 13 degrees. The detector and/or phase selector shall not sense a pre-emption signal from an emitter outside this cone.

C. Phase Selector:

The phase selector supplies power to and receives electrical signals from the optical detector. When detector signals are recognized as a valid call, the phase selector causes the signal controller to advance to and/or hold the desired traffic signal display. This is accomplished by activating the pre-empt input to the controller.

The phase selector is capable of assigning priority traffic movement to one of two channels on a first-come, first-serve basis. Each channel is connected to select a particular traffic movement from those normally available within the controller. Once a call is recognized, "commit to green" circuitry in the phase selector functions so that the desired green indication will be obtained even if optical communication is lost. After serving a priority traffic demand, the phase selector will release the controller to follow normal sequence operation. The following shall apply to the phase selector:

1. Shall include an internal power supply to supply power to the optical detectors.
2. Shall have minimum two-channel operation with the capability of interfacing with an additional phase selector for expansion of channels of operation.
3. Shall have adjustable detector range controls for each channel of operation, from 12M (40 feet) to 548M (1800 feet).
4. Shall have solid state indicator lights for power on and channel called.
5. Shall operate over an ambient temperature range of minus 34O C to plus 60O C (minus 30O F. to plus 140OF.)
6. Shall operate in 0 to 95 %humidity.

D. Detector Cable (Optical):

The following shall apply to the detector cable:

1. 3-Conductor cable with shield and ground wire.
2. AWG #20 (7x28) stranded.

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**REVISION OF SECTION 614
FIRE PREEMPTION UNIT AND TIMER (SYSTEM)**

3. Individually tinned copper strands.
4. Conductor insulation: 600 volt, 75 deg. C (167O F.).
5. 1 Conductor-yellow; 1 Conductor-blue; 1 Conductor-orange.
6. Aluminized Mylar shield tape or equivalent.
7. AWG #20 (7x28) stranded uninsulated drain wire
8. DC resistance not to exceed 11.0 ohms per 305M (1000 feet).
9. Capacitance from one conductor to other two conductors and shield not to exceed 157pf/M (48pf /ft.).
10. Jacket: 600 volts, 80 deg. C (176O F.), minimum average wall thickness - 1.14mm (.045").
11. Finished O.D.: 7.62mm (0.3") max.

System Interface:

System shall be capable of operating in a computerized traffic management system when appropriate interfacing is provided by the computer supplier.

General:

The Contractor shall furnish the manufacturer the phasing diagrams indicating controller sequence and timing.

The Contractor shall secure from the manufacturer a guarantee for the equipment for a period of sixty (60) months, which time shall commence from the date of delivery. Manufacturer shall certify upon request that all materials furnished will conform to this specification. The manufacturer or his designated representative shall be responsible for determining and setting all required range and emitter intensity for the emergency vehicle operation.

Construction Methods:

All equipment except the vehicle emitter assembly shall be installed and wired in a neat and orderly manner in conformance with the manufacturers' instructions. The vehicle emitter assembly shall be delivered to a designated City representative.

Installation of the vehicle emitter assembly shall be the responsibility of the City and County of Denver Fire Department.

Traffic signals owned and maintained by the State that have optical pre-emption equipment owned and maintained by the city shall have an Auxiliary Equipment Cabinet (AEC) attached to the controller cabinet. The optical pre-emption equipment shall be housed in the AEC.

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**REVISION OF SECTION 614
FIRE PREEMPTION UNIT AND TIMER (SYSTEM)**

Traffic signals owned and maintained by the city do not require an AEC to house the pre-emption equipment.

Detector cables shall be continuous with no splices between the optical detector and the AEC.

Detector locations shown on the plan are for illustration purposes only. Exact location shall be determined by the contractor or the designated representative for the best possible line of sight.

- Controller “D” harness and adapter.
- Pre-emption termination panel with terminal block and relay bases.
- Pre-emption disconnect switch, mounted on the emergency switch panel (on inside of cabinet door).
- Pre-emption test buttons, mounted on the pre-emption termination panel.

All connections from the phase selector to the “D” harness and to the cabinet wiring shall be made at the termination panel. The termination panel shall have AC+ Lights, AC-, and a switched logic ground. The switched logic ground feeds all the pre-empt inputs to the phase selector. When switched off by the pre-emption disconnect switch, the traffic controller shall not be affected by pre-empt calls from the optical pre-emption system. A minimum of two test buttons shall be provided.

If there are more than two pre-empt runs, a button for each shall be installed. A chart or print out indicating the program steps and settings shall be provided along with the revised cabinet wiring diagrams.

Test the Pre-emption System According to the following Guidelines:

1. Notify the system owner/user, such as the Municipal Fire Chief or City Traffic Engineer, of the scheduled inspection
2. Request a fire department representative and an emergency vehicle, which has an emitter to conduct the test. If not available, the contractor shall provide an emitter.
3. In the presence of the Engineer and the municipal representative, test each pre-empted approach with the emergency vehicle. Test the following items of the system:
 - a. Confirm that the emitter activates the phase selector and the phase selector activates the correct pre-emption input to the controller.
 - b. Confirm adequate range. The traffic signal must be pre-empted to green sufficiently in advance of the emergency vehicle arrival. The vehicle emitter shall initiate pre-emption at a minimum distance of 548.6M (1800 feet).
 - c. Confirm there are no false calls. Keep the emitter active as the emergency vehicle passes through the intersection. No other optical detectors shall sense the strobe.

**REVISION OF SECTION 614
FIRE PREEMPTION UNIT AND TIMER (SYSTEM)**

- 4. Document the test. Provide the Engineer and, upon request, the municipality copies of the test results.

If a malfunction is found or the system needs adjustment (such as range, emitter intensity, or detector location), schedule a follow-up test. Repeat the above steps for all approaches that did not pass.

All adjustments such as emitter intensity, phase selector range, sensitivity, detector placement, shall be made at the intersection by the contractor so that the optical pre-emption operates correctly with other major manufacturers' equipment currently owned by the city.

Subsection 614.13 shall include the following:

Fire Preemption Unit and Timer (System) shall include a four-channel card and the number of detectors as shown on the plans. Fire Preemption Unit and Timer (System) shall be measured and paid by the number of intersections at which the system is installed. The item shall include all labor, materials, and ancillary hardware required to provide a fully functioning system to the satisfaction of the Engineer.

Subsection 614.14 shall include the following:

Pay Item

Fire Preemption Unit and Timer (System)

Pay Unit

Each

**REVISION OF SECTION 614
INTERSECTION DETECTION SYSTEM (CAMERA) (INFRARED DETECTION)**

Section 614 of the Standard Specifications is hereby revised as follows:

Subsection 614.01 shall include the following:

This work is for the installation of a fully-functional infrared vehicle detection camera system. The Contractor shall furnish and install the infrared vehicle detection camera system at the locations as shown in the plans or as directed by the Engineer.

The Intersection Detection System (Camera) shall be compatible or interchangeable with standard infrared cameras and equipment as stocked by the City and County of Denver.

The current infrared camera that are compatible with and stocked by the City and County of Denver are the FLIR infrared detection cameras.

Subsection 614.08 shall include the following:

Detection Camera:

The detection camera shall consist of a thermal camera, thermal lens, and enclosure; and shall meet the following specifications:

- ***Thermal Camera & Lens***
The detection camera shall be a 320 x 240 (minimum) and 10 frames per second (minimum) thermal camera that fits into the camera enclosure specified herein. The lens shall be a fixed thermal lens. Digital zooming is allowed.
- ***Camera Enclosure***
The camera enclosure shall consist of a dustproof and waterproof outdoor camera housing designed specifically to fit the thermal camera and thermal lens specified herein. The enclosure shall have a sun shield to prevent direct and indirect sunlight entering the lens. A thermostatically controlled heater for window defogging and defrosting is allowed.
- ***Power***
The detection camera shall be powered by a 120/240VAC, 50/60Hz power source or by a 24VDC (±10%) power source.
- ***Reliability***
The interface card shall be designed and manufactured to have a MTBF (Mean Time Between Failure) prediction figure of greater than or equal to 10 years continuous operation.
- ***Certifications & Environmental***
The detection camera shall meet the following Certifications and Environmental specifications:

<i>Certifications</i>	Comply with Electromagnetic Compatibility - 2004/108/EG
	Comply with FCC Part 15, Class A
<i>Weatherproof</i>	IP66 ingress protection standards (minimum)
<i>Operating Temperature</i>	-34°C to +74°C (-29°F to +165°F) (minimum)
<i>Relative Humidity</i>	Up to 100% non-condensing
<i>Shock & vibration</i>	NEMA II

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**REVISION OF SECTION 614
INTERSECTION DETECTION SYSTEM (CAMERA) (INFRARED DETECTION)**

- ***Mounting Brackets***
A versatile mounting bracket shall be supplied to mount the camera enclosure, specified herein, to a horizontal luminaire or vertical traffic signal pole. All mounts shall be secured with stainless steel mounting straps or bolts. The mounts, including the mass and size of the detection camera, shall be designed to withstand a wind load of 120km/h (or 75mph) with a 30-second gust factor.
- ***Camera to Controller Cabinet Cable***
Cable needed to power the detection camera specified herein, transmit thermal video and data information to the controller cabinet shall be provided and meet the specifications of the thermal video imaging detection system manufacturer.

Thermal Video Processor:

A thermal video processor shall be included in the detection camera, specified herein, or in the interface card, specified herein; and shall meet the following specifications:

- ***Functionality***
The thermal video processor shall provide the following functionality:

<i>Detector Display</i>	Capable of displaying bike detection regions on the thermal video image with associated outputs with output status shown on the screen
<i>Detector Placement</i>	By using a portable PC with graphical user interface software or web server
<i>Detector Function</i>	Capable of detecting within the view of the connected detection camera the presence of bicycles in user defined bicycle detection regions
<i>Detector Type</i>	Configurable as presence, count, delay, extension, or pulse mode of either arrival or departure of bicycles. The detector shall be capable of detecting pedestrians and small motorcycles too.
<i>Detector Modification</i>	All detectors and parameters shall be able to be changed without interrupting detection. When one detector is modified, all existing detectors shall continue to operate, including the one that is being modified. When the new detector position is confirmed, the new detector shall have no learning phase and shall be operating while the one being modified ceases to operate
<i>Detector Failure State</i>	Provide a constant call on each active detection channel, in the event of unacceptable interference or loss of the thermal video signal
<i>Regions per Video Output</i>	Up to 4 (minimum)
<i>Detector Delay & Extension</i>	Defined between 0.1-99 seconds and pulse mode between 0-500ms in 10ms increments.
<i>Direction Sensitivity</i>	Able to make a detector directional sensitive

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**REVISION OF SECTION 614
INTERSECTION DETECTION SYSTEM (CAMERA) (INFRARED DETECTION)**

Camera Interface/Surge Suppression Panel

When the thermal video processor is in the detection camera, a UV resistant signal cable with 3 wires (maximum) of wire diameter AWG18 (minimum) shall be provided to power the detection camera, transmits detection information to the interface card specified herein, and provides remote communication specified herein. The cable distance between detection camera and interface card is 300m or 1,000ft (maximum).

When the thermal video processor is in the interface card with coax thermal video cables being used between the detection camera and the interface card, a surge suppression panel shall be provided that powers the detection camera with high-voltage transient protection and power isolation, and suppresses electrical spikes on the thermal video coax cable.

The camera interface/surge suppression panel shall meet the following specifications:

- ***Certifications and Environmental***

The interface card shall meet the following Certifications and Environmental specifications:

<i>Certifications</i>	Comply with Electromagnetic Compatibility - 2004/108/EG
	Comply with FCC Part 15, Class A
<i>Weatherproof</i>	IP66 ingress protection standards (minimum)
<i>Operating Temperature</i>	-34°C to +74°C (-29°F to +165°F) (minimum)
<i>Relative Humidity</i>	0-95% non-condensing (minimum)
<i>Shock & vibration</i>	NEMA II

Interface Card:

Input/output main and expansion cards shall be supplied that are designed to convert real-time detection signals from the video processor, specified herein, into contact closure signals to the traffic light controller; and to relay traffic signal phase status to the video processor, specified herein. The interface card shall meet the following specifications:

- ***Functionality***

The interface card shall provide the following functionality:

<i>Cabinet/Controller Compatibility</i>	US: EDGE card for TS-1 cabinet and 2070 TS-1 and TS-2 controllers Rest of World: EURO card for various standard controllers
<i>Status Indicators</i>	Visual for state of each detection output, visual state of power status (ON/OFF), visual state of camera status (operational/not operational)
<i>Identification</i>	Individually addressable with serial number, MAC address, IP-address, subnet mask and default gateway

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**REVISION OF SECTION 614
INTERSECTION DETECTION SYSTEM (CAMERA) (INFRARED DETECTION)**

- | | |
|--|---|
| <i>Program Retention</i> | Continue to operate in accordance with previous program after recovering from communication system or power failure |
| <i>Time Synchronization</i> | Manually or NTP time source |
| <i>Detector Failure State</i> | Provide a constant call on each active detection channel, in the event of unacceptable interference or loss of the thermal video signal |
| <i>Regions per Video Output</i> | Up to 4 (minimum) |
| <i>Detector Delay & Extension</i> | Defined between 0.1-99 seconds and pulse mode between 0-500ms in 10ms increments. |
| <i>Direction Sensitivity</i> | Able to make a detector directional sensitive |
- ***Communication***
The interface card shall meet the following specifications:

<i>Controller Interface Output</i>	Contact closure via interface backplane, providing up to four channels of vehicle detection with no front panel connectors being used
<i>ETHERNET</i>	RJ45 port for hard-wired system set-up and monitoring
<i>USB</i>	USB 2.0 (minimum) on front panel for connecting a USB dongle to allow wireless set-up and monitoring via portable PC, tablet and/or smart phone 4°C to +74°C (-29°F to +165°F) (minimum)
 - ***Remote Communications***
Remote communications to allow remote management specified herein shall be provided via the interface card and shall meet the following specifications:
 - a) ***Functionality***
Remote communications shall provide the following functionality:

<i>Cabinet/Controller Compatibility</i>	US: TS-1 cabinet and 2070 TS-1 and TS-2 controllers when Rest of World: EURO card for various standard controllers
<i>Thermal Video Compression</i>	MJPEG, MPEG-4 (ISO 14496-2) and/or H.264 (ISO/IEC MPEG-4 AVC)
<i>Thermal Video Frame Rate</i>	Constant and variable 10 frames per second (minimum)
<i>Thermal Video Bandwidth</i>	Between 32 kbps and 4 Mbps (minimum)
<i>Status Indicators</i>	Ethernet link/activity
<i>Identification</i>	Individually addressable with serial number, MAC address, IP-address, subnet mask and default gateway
<i>Program Retention</i>	Continue to operate in accordance with previous program after recovering from communication system or power failure

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**REVISION OF SECTION 614
INTERSECTION DETECTION SYSTEM (CAMERA) (INFRARED DETECTION)**

b) Communication

The remote communications shall meet the following specifications:

Ethernet Port	One 10/100Base-T front-panel RJ45 port (minimum)
Thermal Video Input	Via front panel connector

- **Power**

The interface card shall meet the following power specifications:

Input Voltage	24VDC \pm 10% (via cabinet detector rack backplane)
Power Consumption	10W (maximum)

- **Physical Properties**

The interface card shall meet the following physical properties specifications:

Size	US: Fits directly into NEMA TS-1 cabinet detector rack or fits on DIN-rail Rest of world: Fits directly in EURO half/full 19" rack or fits on DIN-rail
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- **Reliability**

The interface card shall be designed and manufactured to have a MTBF (Mean Time Between Failure) prediction figure of greater than or equal to 10 years continuous operation.

- **Certifications and Environmental**

The input/output main and expansion cards shall meet the following Certifications and Environmental specifications:

Certifications	Comply with FCC Part; 15 NEMA TS 2-2003 v02.06
Operating Temperature	-37°C to 74°C (-35°F to 165°F) (minimum)
Humidity	0 – 95% non-condensing

Remote Management System

Remote management system shall be provided to monitor, control, and troubleshoot the thermal video imaging detection devices remotely via the Ethernet communication system. The vendor shall provide all software that will be loaded and configured by staff on furnished server hardware that is connected to the thermal video imaging detection devices via the Ethernet communication system. Remote management shall meet the following minimum requirements:

- **Diagnostic & Health Monitoring**

Management Status	Provide real-time status display of services required to access, troubleshoot, and archive data from the thermal video imaging detection system network connected devices
Network Device View	Provide view of all thermal video imaging detection system network connected devices
Operation Log	Support retrieving, displaying, and saving operational messages, warnings, and errors

**REVISION OF SECTION 614
INTERSECTION DETECTION SYSTEM (CAMERA) (INFRARED DETECTION)**

- ***Remote Management & Maintenance***

<i>Video Viewing/Recording</i>	Support viewing and recording streaming video including detector overlay
<i>Device Management</i>	Support creating, editing, downloading, and uploading detector configurations
<i>Remote Firmware Updates</i>	Support updating firmware of any device from a remote location
<i>Remote Backup/Restore</i>	Support backup/restore device configuration from remote location
<i>Access Permissions</i>	Support password implementation
<i>Clock Synchronization</i>	Support the Network Time Protocol (NTP) to synchronize the internal clocks of the thermal video imaging detection system network connected devices a minimum of once a day

Subsection 614.13 shall include the following:

Intersection detection system (Camera) shall be measured and paid by the number of cameras installed and accepted at each intersection. The item shall include all labor, materials, and ancillary hardware required to provide a fully functional cethernamera system to the satisfaction of the Project Manager.

Subsection 614.14 shall include the following:

<u>Pay Item</u>	<u>Pay Unit</u>
Intersection Detection System (Camera)	Each

**REVISION OF SECTION 614
UNINTERRUPTED POWER SUPPLY SYSTEM**

Section 614 of the Standard Specifications is hereby revised as follows:

Subsection 614.08 shall include the following:

1.1 SUMMARY

- A. **Scope:** This specification describes the operation and functionality of a continuous duty, single-phase Uninterruptible Power Supply unit, hereafter referred to as the UPS.
- B. **Included Features of the UPS:**
1. The UPS utilizes double conversion online topology designed to protect electronic equipment by supplying reliable, clean power featuring extremely tight voltage and frequency regulation.
 2. Wide operating temperature range -40C to 74C.
 3. Field replaceable air filter.
 4. Field replaceable fan assembly.
 5. The UPS features internal bypass and input power factor correction.
 6. The primary sections of the UPS are: input disconnect and filter stage, input PFC power stage, energy storage stage (DC bus capacitor bank), output power (inverter) stage, bypass and a bidirectional DC-DC converter / battery charger. The control of power module and fault detection logic is microcontroller-based.
 - a. The input disconnect and filter stage contains an input back-feed relay, input filter and transient suppression.
 - b. The input PFC power stage contains non-isolated power factor correcting AC/DC converters. This converter is capable of full power operation over a very wide input voltage range.
 - c. The energy storage stage is a split DC bus capacitor handling seamless transitions from battery to line and vice versa, as well as the low and high frequency power stages.
 - d. The output power stage operates directly from the DC bus and develops an output of 120V AC ,60Hz. The AC output of the inverter is connected to bypass relay. The bypass relay output is routed to the output terminals of the UPS.
 - e. The UPS contains a battery charger, which operates from the DC bus. The UPS can be restarted immediately after a prolonged power outage without waiting for the battery to be recharged.
 7. The UPS provides early-warning fault analysis on batteries and will project battery replacement dates, enabling timely preventive maintenance.
 8. The UPS has flash memory to facilitate firmware upgrades.
 9. The graphical LCD display with multicolor backlight provides detailed information, with the ability to configure the display locally.
 10. An integrated Network Management Card 2 (reference APC part # AP9537SUM-FC) with Environmental Monitoring is embedded into the UPS.
- C. **Performance, Design, and Configurations:** The UPS and associated equipment operates in conjunction with a primary power supply and an output distribution system to provide quality uninterrupted power for mission-critical, electronic equipment and other load devices.

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**REVISION OF SECTION 614
UNINTERRUPTED POWER SUPPLY SYSTEM**

1. This specification describes the performance, functionality, and design of the UPS, the external Battery Systems, and connectivity solutions.
2. All programming and miscellaneous components for a fully operational system as described in this section are available as part of the UPS.
3. The UPS and battery packs are available in the following configurations:

Type	Model	SKU
UPS	APC SECUREUPS 1300VA / 1300W, 120VAC IN/OUT RM CONFORMAL COATED	XU1K3LLXXRCC
ACCESSORIES	APC SECUREUPS BATTERY HARNESS SBS75 CABINET ACCESORY 8FT	XHHXS7A8F
	APC SECUREUPS BATTERY HARNESS SBS75 CABINET ACCESORY 4FT	XHXXS7A4F
	APC SECUREUPS BATTERY HEATER MAT 256 SQ IN 115/120VAC SINGLE PHASE IN CABINET ACCESSORY	XM050DXXXA
	APC SECUREUPS BATTERY HEATER MAT 365 SQ IN 115/120VAC SINGLE PHASE IN CABINET ACCESSORY	XM102DXXXA
	APC SECUREUPS BATTERY 50AH 12VDC EXTENDED TEMPERATURE SHELF MOUNT	XB050XX1XS
	APC SECUREUPS BATTERY 100AH 12VDC EXTENDED TEMPERATURE SHELF MOUNT	XB102XX1XS

1.2 REFERENCE

- A. **General:** The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by the basic designation only. The edition/revision of the referenced publications is the latest date as of the date of the Contract Documents, unless otherwise specified.
- B. **Institute of Electrical and Electronics Engineers, Inc. (IEEE):**
 1. ANSI/IEEE 519, "Guide for Harmonic Control and Reactive Compensation of Static Power Converters" (copyrighted by IEEE, ANSI approved).
- C. **International Organization for Standardization (ISO):**
 1. ISO 9001, "Quality Management Systems - Requirements."
 2. ISO 14001, "Environmental Management Systems - Requirements with Guidance for Use."

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**REVISION OF SECTION 614
UNINTERRUPTED POWER SUPPLY SYSTEM**

1.3 STANDARDS

A. Regulatory Compliance:

Model Description	SKU	Approvals
APC SECUREUPS 1300VA / 1300W, 120VAC IN/OUT RM CONFORMAL COATED	XU1K3LLXXRCC	UL, cUL/CSA UL-1778 (CSA 107.3 for Canada), IEC62040-2 2005 Edition and FCC Part 15 Class A,

1.4 SYSTEM DESCRIPTION

A. Mechanical Design

1. The UPS is contained in a Powder coated steel chassis with plastic display panel embedded into the chassis.
2. The UPS has a field replaceable filter and fan assembly.
3. The chassis weights and dimensions are:

Description	SKU	Weight kg (lb)	Height mm (in)	Width mm (in)	Depth mm (in)
APC SECUREUPS 1300VA / 1300W, 120VAC IN/OUT RM CONFORMAL COATED	XU1K3LLXXRCC	10.0 (22.0)	88 (3.46)	432 (17.0)	260 (10.2)

B. System Characteristics

1. **General:**
 - a. **Power Rating:** 1300VA/1300W
 - b. **Output power factor :**1
 - c. **Charger Power:** 750 Watts
 - d. **Topology:** Double Conversion On-Line
 - e. **Cooling:** Fan cooled
2. **Online Efficiency:** The UPS efficiency stated here is at full load and without degradation of output regulation as specified. Efficiency is 89% at rated load.
3. **Input:**
 - a. **AC Input Nominal Voltage:** 120 V.
 - b. **AC Input Voltage Window:**
 - 1) Full Load, 85-155 V +/- 2V, 5 V hysteresis.
 - c. **Input Frequency Range:** 40 – 70 Hz, auto-selecting.
 - d. **Online Input Power Factor:** 0.95% for Full Charger power Load and > 75% Loads.

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**REVISION OF SECTION 614
UNINTERRUPTED POWER SUPPLY SYSTEM**

- e. **Input Current Distortion:** <5% for 100% load.
 - f. **Input Circuit Breaker (UPS):** 30A UL Listed
 - g. **Input Surge Protection:** 432 Joules.
4. **UPS Output:**
- a. **Nominal Output Voltage:** 120 V
 - b. **Output Connector:** Terminal Block - Hardwire
 - c. **Output Frequency:** 50/60 +/- 3Hz (auto-sense); 50/60 +/- 0.1 Hz (user-selectable).
 - d. **Output Frequency Regulation:** Free Running: Nominal +/- 0.1 Hz.
 - e. **AC output voltage distortion:**
 - 1) 5% @ 100% full linear load; 10% @ 100% full non-linear load.
 - f. **AC output static voltage regulation:** ± 1%.
 - g. **AC output dynamic voltage regulation:** ± 5% rms in 2cycles for 10% to 90% resistive load step of the initial value.
 - h. **Output Voltage Harmonic Distortion:**
 - 1) <5% THD for a 100% linear load.
 - 2) <10% THD for a 100% non-linear load.
 - i. **Overload Rating:** % and duration
 - 1) **Normal Operation (Online):**
 - a) 120Vac: 105% No Limit; 125% for 1min, 150% for 30 seconds and >175% on AC for 500mSec.
 - 2) **Bypass Operation:** Overload is limited by the internal 30A input circuit breaker feeding the UPS:
 - a) Bypass is internal
 - b) Voltage range: 120Vac 86-148Vac,.
 - c) Frequency range: 47-53 Hz or 57-63 Hz based on bypass frequency setting.
 - d) Transfer time: To Bypass mode – 15ms max.
 - e) Transfer time: Bypass to Online mode – 15ms max.
 - f) Bypass can be commanded through the diagnostic menu
 - j. **Derating over temperature:** Supports 100% load at 65 °C, Linearly de rate to 70% load at 74 °C.
 - k. **Output Load Power Factor Rating:**
 - 1) 0.7 lagging to 0.7 leading.
 - l. **Crest Factor:** 3:1
5. **Charger:**
- a. **Nominal Battery Voltage:** 48 V.
 - b. **Charger capacity:** 850W Max, 15A Max, whichever is applicable.
 - c. **Runtime at 100% load:** >2 hours for 100Ah battery
6. **Battery: Not supplied with UPS sold as an accessory, user must select the rating of the battery AH though the UPS user interface.**
- Battery Types available:** Sealed maintenance free valve regulated lead acid battery (VRLA) with suspended electrolyte, leak proof:
- 1) 100 Ah qty 4 required for 48 Vdc battery system
 - 2) 50 Ah qty 4 required for 48 Vdc battery system

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1.5 SUBMITTALS

A. Proposal Submittals:

1. Product catalog sheets or brochures.
2. Product guide specifications.
3. Product technical specifications.
4. System package submittal drawings including a single-line and mechanical diagrams.

B. Delivery Submittals:

1. User Manual: which includes safety information, specifications, UPS features, configuration, UPS settings and troubleshooting information, accessories details, installation details, and start-up of UPS.

1.6 PROJECT CONDITIONS

- A. Environmental Requirements:** The UPS is designed to be installed inside an Intelligent Traffic System cabinet i.e. NEMA, Caltrans etc. The cabinet should be weather proof and have particulate filtering in lieu of the filtering provided by the UPS. The UPS should be kept dry as possible if being serviced in wet weather.

The UPS is capable of withstanding any combination of the following environmental conditions in which it must operate without mechanical or electrical damage, or without a need for de-rating of the output Power.

- a. **Storage Ambient Temperature:** -45 to 85°C UPS only (without batteries)
- b. **Operating Ambient Temperature:** -40°C to 74°C (LCD display -20 to 70°C)
- c. **Relative Humidity:** 0% to 95% non-condensing.
- d. **Altitude:**
 - 1) **Storage Altitude:** 0 to 50,000 feet (0 to 15,000 meters) above sea level
 - 2) **Operating Altitude:** 0 to 10,000 feet (0 to 3000 meters) above sea level. At altitude of 10,000 feet the UPS must be loaded only up to 90% of its nominal capacity.
- e. **Audible Noise:**
 - 1) <55 dBA at 100% load at 3 ft (1 m).
- f. **Protection Class:** IP 20.

1.7 WARRANTY

- A. Limited Warranty:** Schneider Electric IT Corporation (SEIT) warrants the UPS to be free from defects in materials and workmanship for a period of 3 years from the date of purchase,

1. Warranty Limitations:

- a. The obligation of Schneider Electric IT Corporation (SEIT) under this warranty is limited to repairing or replacing, at its own sole option, any defective product.
- b. This warranty does not apply to equipment that has been damaged by accident, negligence, or misapplication or has been altered or modified in any way.
- c. This warranty applies only to the original purchaser who must have properly registered the product within 10 days of purchase.

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- d. EXCEPT AS PROVIDED HEREIN, Schneider Electric IT Corporation (SEIT) MAKES NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Some states do not permit limitation or exclusion of implied warranties; therefore, the aforesaid limitation(s) or exclusion(s) may not apply to the purchaser.
 - e. EXCEPT AS PROVIDED ABOVE, IN NO EVENT WILL Schneider Electric IT Corporation (SEIT) BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OF THIS PRODUCT, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE. Specifically, Schneider Electric IT Corporation (SEIT) is not liable for any costs, such as lost profits or revenue, loss of equipment, loss of use of equipment, loss of software, loss of data, costs of substitutes, claims by third parties, or otherwise.
 - f. This warranty gives you specific legal rights and you may have other rights that vary from state to state.
2. **Warranty Procedures:**
- a. To obtain service under warranty the purchaser must obtain a Returned Material Authorization (RMA) number from customer support.
 - b. Products must be returned with transportation charges prepaid and must be accompanied by a brief description of the problem encountered and proof of date and place of purchase.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. **Basis of Design:** Products specified is SECUREUPS Uninterruptible Power Supply Unit as manufactured by APC by Schneider Electric and as listed on page 2 of this specification. Items specified are to establish a standard of quality for design, function, materials, and appearance. Equivalent products by other manufacturers are acceptable. The Architect/Engineer will be the sole judge of the basis of what is equivalent.

2.2 MODES OF OPERATION

- A. **Normal:** The UPS output power stage (inverter) constantly recreates the UPS output AC voltage waveform by converting the DC bus voltage to AC voltage through a set of IGBT switches. In both online operation and battery operation, the output power stage (inverter) creates an output voltage waveform independent of the mains input voltage waveform. Input voltage anomalies such as brown-outs, spikes, surges, sags, and outages do not affect the amplitude or sinusoidal nature of the recreated output voltage sine wave of the output power stage (inverter). The input Power Factor Correction (PFC) power stage and the output power stage (inverter) operate in an on-line manner to continuously regulate power to the critical load. The input PFC stage is capable of full battery recharge while simultaneously providing regulated power to the load for all line and load conditions within the range of the UPS specifications.
- 1. **Overload Capability:** See above specification

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2. **Output Relay:** The output power stage (inverter) is equipped with an output mechanical relay to provide physical isolation of the inverter from the critical bus. The UPS when installed with Bypass Panel, allows the user to replace the failed UPS from the critical bus without interruption.
 3. **Battery Protection:** The inverter is provided with monitoring and control circuits to limit the level of discharge on the battery system. The UPS employs a DC Breaker to protect the system from shorting of the battery supply. The battery harness which is sold as an accessory employs fuse protection.
- B. **Battery:** Upon failure of the AC input source, the critical load continues being supplied by the output inverter, which derives its power from the battery system. There is no interruption in power to the critical load during both transfers to battery operation and retransfers from battery to normal operation.
1. The UPS battery system and battery harness are sold separately as accessories. Batteries can be purchased in a 50 Ah or 100 Ah configuration, a total of 4 batteries are need to create the 48VDC that the UPS battery input requires. These replacement batteries are user-replaceable.
 2. The batteries of the UPS models in this specification are maintenance-free, leak-proof, valve-regulated lead-acid (VRLA) batteries with suspended electrolyte.
 3. The UPS incorporates the Intelligent Battery Management system to continuously monitor the health of the battery system. This UPS notifies the user in the event that a failed or weak battery is found.
 4. The UPS is not shipped with batteries; they must be purchased separately.
- C. **Charging:** Upon restoration of the AC input source, the UPS simultaneously recharges the battery and provides regulated power to the critical load.
1. The intelligent battery management system contains a temperature monitoring circuit and temperature compensation algorithm that regulates the battery charging voltage and current so as to optimize battery life.
 2. The battery charging circuit remains active when in bypass or online states.
 3. The UPS can be restarted immediately after a prolonged power outage without waiting for the battery to be recharged.
- D. **Bypass:** During bypass operation the utility power is connected to the load, bypassing the internal converters. The system automatic bypass provides a transfer of the critical load from the Inverter output to the automatic bypass input source during times when the inverter cannot support the load. The design of the automatic bypass switch power path consists of a bypass relay.
1. **Automatic Transfers:** An automatic transfer of load to bypass takes place if the load on the critical bus exceeds the overload rating of the UPS. Automatic transfers of the critical load from bypass back to normal operation takes place when the overload condition is removed from the critical bus output of the system or when other causes are corrected. When the system is in bypass mode, if bypass line becomes unavailable, the UPS will automatically switch to Online mode operation. In the event that mains power is unavailable the UPS will switch to battery power.
 2. **Manual Transfers:** Manually initiated transfers to and from bypass may be initiated by the user display interface.

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2.3 INPUT PFC POWER STAGE

- A. **General:** The input Power Factor Correction (PFC) power stage of the UPS constantly rectifies the power imported from the mains input of the system, converting input mains AC power to DC power for precise regulation of the DC bus voltage, battery charging, and output power stage (inverter) regulated output power.
- B. **Input Current Total Harmonic Distortion:** The input current THDI at full system load will be held to 7% at 50% load and 5% at full load while providing conditioned power to the critical load bus and charging the batteries under steady-state operating conditions. This is true while supporting loads of both a linear or nonlinear type. This will be accomplished with no additional filters, magnetic devices, or other components.
- C. **Input Current Limit:**
1. In cases where the source voltage to the UPS is nominal and the applied UPS load is equal to or less than 100% of UPS capacity, input current will not exceed 178% of UPS output current, while providing full battery recharge power and importing necessary power for system losses.
- D. **Charging:**
1. The battery charging circuit contains a temperature monitoring circuit, which regulates the battery charging current to optimize battery life.
 2. The battery charging circuit remains active when the UPS is in automatic bypass and in normal operation
 3. The UPS charging circuit can deliver charge current at 15 Amps. Charge current is automatically adjusted with battery Ah, temperature and load.

2.4 OUTPUT POWER STAGE (INVERTER)

- A. **General:** The UPS output power stage (inverter) constantly recreates the UPS output voltage waveform by converting the DC bus voltage to AC voltage through a set of IGBT-driven power converters. In both normal operation and battery operation, the output power stage (inverter) creates an output voltage independent of the mains input voltage. Input voltage anomalies such as brown-outs, spikes, surges, sags, and outages, shall not affect the amplitude or sinusoidal nature of the recreated output voltage sine wave of the output power stage (inverter).
- B. **Overload Capability:** The output power stage (inverter) is capable of withstanding 150% overload for 30 seconds or 125% overload for 1 minute or 105% overload for indefinite length of time.
- C. **Output Relay:** The output power stage (inverter) is equipped with an output mechanical contactor to provide physical isolation of the inverter from the critical bus. With this feature a failed inverter will be removed from the critical bus. The UPS when installed with Bypass panel, has the provision of isolating the defective UPS from the critical Bus. This is achieved through Contactors used in the Bypass panel. This feature allows the user to replace the defective UPS without disrupting the power to the critical loads

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REVISION OF SECTION 614 UNINTERRUPTED POWER SUPPLY SYSTEM

- D. **Battery Protection:** The inverter is provided with monitoring and control circuits to limit the level of discharge on the battery system. The UPS comes with a 48 Vdc breaker to protect the battery supply. The battery harness is fused adding an additional layer of protection.

2.5 DISPLAY AND CONTROLS

- A. **Control Logic:** The UPS is controlled by an embedded microcontroller which performs the following functions:
1. Monitoring the quality of the output voltage.
 2. Monitoring vital parameters of the UPS.
 3. Executing the state machine.
 4. Intelligent battery management.
 5. Controlling the input and output power stage.
 6. Remaining runtime calculation.
 7. Self-diagnostics, self-test, and proactive fault detection.
 8. Communication to the integrated Network Management Card.
- B. **Display Interface:** Located on the front of the UPS is an LCD user display comprised of a graphical, high resolution (3"x3") LCD (256 x 128 Pixels) and 5 pushbutton switches.
- Control Functions:** The following controls functions can be accomplished by use of the pushbutton switches:
1. POWER ON/OFF button.
 2. Escape button.
 3. OK button.
 4. Up button.
 5. Down button.
- C. **LED Status:** Located 4 Led's on the front of the UPS to read the status of the secure UPS
1. Green LED - Output ON
 2. Yellow LED - SecureUPS notification
 3. Red LED - Unit needs attention
 4. Blue LED - Information
- D. **Data displayed on the Display Interface:** The following indicators are available on the Display Interface Unit:
1. Load icon and disable/mute audible alarm icon.
 2. The UPS status information (Input and Output Voltage, Battery voltage and Load,).
 3. Operation mode (On-Line mode, Bypass mode, and Battery mode).
 4. Battery status icons.
 5. Output relay Icon (Open/Close).
 6. Backlight screens: Amber is an indication that requires attention and Red indicates a UPS alarm that requires immediate attention
- E. **Audible Alarms:** Using audio signal, the UPS will notify the user about important events. The following is the list of distinct audio alarms:
1. The UPS is on battery.
 2. The UPS is on battery and the remaining battery capacity is low.
 3. The UPS has shut down due to low battery capacity.

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REVISION OF SECTION 614 UNINTERRUPTED POWER SUPPLY SYSTEM

4. The battery needs to be replaced.
 5. The UPS is overloaded.
 6. The UPS is in fault state.
- F. **Output Relays:** The UPS provides 6 programmable Output relay ports on the front panel. The following function can be programmed to each output relay.
1. On Battery
 2. On Battery Peak
 3. Low Battery
 4. Alarm
 5. Fault
 6. Output ON
 7. Output Off
 8. Online (Inverter Mode)
 9. Bypass
 10. Timer – Peak load, ON battery,
- G. **Input Contacts:** The UPS provides 2 programmable Input contacts on the front panel: The following function can be programmed to each input contacts.
1. Self-Test
 2. Alarm ON (External Alarms to System)
 3. Alarm OFF (External Alarms to System)
 4. Output ON
 5. Output OFF
- H. **Flash Mode Setting:**
1. Signal flash Voltage (Battery Voltage): Can be configured by the user to enable the flash mode operation.
 2. For details of the available settings refer to the operation manual.
- I. **Communication Interface:** For purposes of remote communications with the UPS the following are available and contained within the UPS:
- 1) The UPS has the following ports available; serial port (RJ45 – for manufacturing purposes only, USB Host port for use with a USB flash drive.
 - 2) Ethernet Port allows communications over a network via web browser or SNMP or with APC StruxureWare™ management software.
 - 3) Universal I/O port can be used to connect Temperature/Humidity sensors for environment monitoring.

2.6 BATTERY

- A. The UPS does not ship with batteries. Batteries can be purchased separately and are available in 50 Ah and 100 Ah formats. Other amp hour types can be used but the user must program the battery amp hour into the UPS to ensure appropriate charging of the battery system.
- B. Battery Temperature Sensor connector – Used with the battery system, monitors the temperature of the battery system which is used by the UPSs temperature compensated charger circuitry.

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- C. The batteries are of the valve regulated lead acid (VRLA) type. The following are the recommended Batteries for different AH.
50Ah: XB050XX1XS
100Ah: XB102XX1XS

2.7 SMART BATTERY MANAGEMENT

A. Features:

1. Monitors and informs the user of the health of each battery system.
2. Monitors and shows on the UPS Display Interface screen the date for the end of useful life for the battery system.
3. Emits an alarm and shows a message on the UPS Display Interface screen to indicate the estimated battery end of life. On the UPS Display Interface screen, the user can set the number of days before the alarm is heard and the message appears on the UPS Display Interface screen.
4. Monitors the temperature of the battery system and automatically adjusts the battery charging.

B. Maintenance:

1. Uses sealed lead acid battery cells and does not require maintenance.
2. Runtime Test (Calibration): This should be performed anytime the steady state load is changed significantly, for example when a new load is added to or removed from the UPS.
3. Battery health monitoring: The battery energy output and voltage are monitored to assess the health of the installed batteries when the UPS is operating on battery.
4. Battery health monitoring is done during a UPS Self-Test and also during a Runtime Calibration Test. These Self-tests are activated when the UPS is operating on battery power. The UPS can be configured to perform periodic, automatic Self Tests.

C. End of useful life

1. Near end of life notification: A warning message will appear on the UPS display interface screen when the battery system is approaching the end of its useful life. For configuration details refer to Replacement Notification Time and Replacement Battery Alarm Time. The estimated replacement date for the battery system is available through the UI.
2. Needs replacement notification: The UPS display interface screen shows when the battery system replacement is required. All the four batteries must be replaced immediately after the notification.

CAUTION: Continued operation after end of useful life notification may cause damage to the batteries.

3. Recycling: Please recycle the battery system.

PART 3 - ACCESSORIES

3.1 BATTERIES

The Battery supplied by the vendor shall meet, at a min, the following requirements

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**REVISION OF SECTION 614
UNINTERRUPTED POWER SUPPLY SYSTEM**

A. Battery Type:

1. Be deep discharge rated and the battery enclosure shall be made up flame arresting, self-sealing, valve regulated lead acid (VRLA) batteries. The batteries shall have a high rate of discharge and be superior in rate of charge absorption. The internal construction shall be of Absorbent Glass Mat (AGM). The battery container shall be made up of flame retardant material. The batteries shall be hermetically sealed, when subjected to extreme condition, the hydrogen gas emitted shall not be more than 10 ppm. The supplied batteries are designed to be installed in any position without any leakage.

B. Battery Specification:

Capacity (Ah) 20 hrs to 1.8 Vpc at 77° F	Nominal Voltage (V)	Power Per Cell (W) 20 Min to 1.67 Vpc/cell	Weight (Kg)	Length (Inches)	Width (Inches)	Height (Inches)	Copper Inserted Terminals (inches)
50	12	111.5	16.6	9.02	5.43	8.07	0.63 - 0.236 T6
96	12	223	31	12.99	6.81	8.35	0.787-0.236 T11

C. Battery Status and Health:

1. The BBS shall have a provision to select the battery Ah capacity through User Interface on the front panel of the BBS. The BBS also shall have the run time prediction software and the remaining run time shall be displayed on the User Interface provided on the BBS. The BBS shall also have the provision for the user selectable temperature compensation settings for the optimal charging of the selected batteries. The BBS shall also include the battery life prediction analytics to determine the end of life of the connected batteries.

3.2 BATTERY HARNESS

The battery harness supplied by the contractor shall be designed to facilitate an easy connection and disconnection of the cables between the batteries and BBS system. Also, the harness should have a provision to seamlessly include an additional set of batteries. The harness should allow the replacement of the battery set without the use of tools. All the battery harness interconnected wiring shall conform to UL Style 1015 CSA TEW or equivalent. Wiring shall be of proper gauge with respect to design current and with sufficient strand count for flexibility.

A. Battery harness set:

1. The battery harness set consists of
 - a) 4 battery connection cables
 - b) 1 battery interconnection harness with a provision for BBS connection

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**REVISION OF SECTION 614
UNINTERRUPTED POWER SUPPLY SYSTEM**

- c) 1 extension cable harness for installations where the distance between the batteries and the BBS is greater than the length of the battery interconnection harness
2. Battery Connection Cables:
- a) The battery connection cables consist of a pair of cables that connect to the battery positive and negative terminals. The other end of these two cables are terminated on a connector of the type SBS75 from Anderson connectors or equivalent. The battery side connection of the cables shall be provided with a ring lug with a provision for an M8 screw. The battery side ring lug must be secured with an insulating cap that covers the battery terminals when installed. The cap should provide protection against accidental contact with live terminals of the battery. The caps are ergonomically designed for easy installation and removal. The quality of the caps provided should withstand repetitive usage.
3. Battery Interconnection Harness
- a) The main purpose of this harness is to facilitate the interconnection between batteries and the BBS system. The battery interconnection harness shall have mating connectors that match the connectors on the battery connection link and the BBS. The battery interconnection harness should include a 200 Amp fuse to protect against any short circuit on the BBS side. The battery interconnection harness should support the connection of an additional set of batteries.
4. Extension Cable Harness
- a) The extension cable harness is to be installed along with battery interconnection harness for extending distance between the BBS and the battery bank. The cable ends are terminated on the matching connector to accommodate the BBS connection on one end and battery interconnection harness on the other end. Extension cable harness shall be 8 ft in length.
- B. Other Harness Accessories included:
- 1. The other accessories to be included are battery cable hardware, cable ties, temperature sensor cables and any other accessory necessary for completing the installation.

3.3 SERVICE BYPASS UNIT

A. Service Bypass Unit (SBU):

The SBU provides power to the critical load bus from the bypass source during times when maintenance or service of the BBS is required. The SBU provides a mechanical means of complete isolation of the BBS from the electrical wiring of the installation.

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REVISION OF SECTION 614
UNINTERRUPTED POWER SUPPLY SYSTEM

1. Output Specifications

	Parameter	Specification
1	Nominal Output Voltage (V)	120
2	Changeover Switch capacity (Amps)	30 (Minimum)
3	Output Current (Amps)	30
4	Output Connections	30 Amps, 3 Pole, Anderson quick disconnect type

2. Input Specifications

	Parameter	Specification
1	Nominal Input Voltage (V)	120
2	Input frequency (Hz)	50/60
3	Input Connections	30 Amps, 3 Pole, Anderson quick disconnect type
2	Load Power Factor Range	0 to 1
4	Maximum Input Current (Amps)	30

3. SBU Construction

- a) The SBU is constructed in a rack-mounted 2U enclosure unless otherwise stated in this specification. This unit may also be mounted in a vertical orientation.

4. SBU Bypass Switch Type

- a) The SBU shall have a manually operated rotary switch with **MAKE BEFORE BREAK** mechanism. The switch shall have two operating positions; Normal mode and Bypass mode. In Normal mode, power is directed from the utility outlet, through the bypass panel and BBS to connected equipment at the output of the SBU. In Bypass mode, power from the utility is directly fed to connected equipment. Also, in Bypass mode, the BBS shall be galvanically isolated from the SBU for safe maintenance or replacement

5. SBU and BBS Connection

- a) The connection between SBU and BBS should be achieved with a single harness with an easy connect-disconnect facility. The easy connect-disconnect may be achieved by an Anderson Powerpole connector of adequate capacity. The construction and insulation levels of the Powerpole connectors should provide protection against accidental contact with live parts in the connector housing. The connectors should be ergonomically designed for an easy connect and disconnect operation. The connectors should also have a locking mechanism to avoid any loose contacts

**REVISION OF SECTION 614
UNINTERRUPTED POWER SUPPLY SYSTEM**

PART 4 – EXECUTION

4.1 FIELD QUALITY CONTROL

A. Manufacturer Field Service:

1. **Worldwide Service:** The UPS manufacturer has a worldwide service organization available, consisting of factory-trained field service personnel to perform startup, preventive maintenance, and service of the UPS system and power equipment. The service organization offers service support 24 hours a day, 7 days a week, 365 days a year.
2. **Replacement Parts:** Parts are available through the worldwide service organization 24 hours a day, 7 days a week, 365 days a year. The worldwide service organization is capable of shipping parts within four working hours or on the next available flight, so that the parts may be delivered to the customer site within 24 hours.

4.1.1 MAINTENANCE

- A. A complete offering of preventive and full service maintenance contracts for the UPS system and the battery system are available from APC by Schneider Electric. Contract work is performed by Schneider Electric factory-trained service personnel.

Subsection 614.13 shall include the following:

The unit price for the furnish and install of the Uninterrupted Power Supply System shall be for a complete system and successful operation of the item. The UPS installation will be tested in accordance with this specification or as directed by the Engineer. The UPS system shall be measured and paid by the number of units installed. The item shall include all labor, materials, and ancillary hardware required to provide a fully functioning system to the satisfaction of the Engineer.

Subsection 614.14 shall include the following:

Pay Item

Uninterrupted Power Supply System

Pay Unit

Each

REVISION OF SECTION 614 ETHERNET MANAGED FIELD SWITCH

Section 614 of the Standard Specifications is hereby revised as follows:

Subsection 614.01 shall include the following:

This work consists of the installation of an Ethernet Managed Field Switch in the CCD controller cabinets. The Contractor shall furnish and install the switch within the Traffic Signal Cabinet as an integral part of the Traffic Signal Controller Cabinet Assembly.

Subsection 614.08 shall include the following:

The Ethernet Managed Field Switch installation is hereby added to the Special Provision and the Ethernet Switch shall comply with the following specifications:

The Ethernet Managed Field Switch shall be compatible or interchangeable with standard Ethernet switches stocked by the City and County of Denver.

The current Ethernet switch that is compatible with and stocked by the City and County of Denver are the Hirschmann Managed Fast/Gigabit Industrial Ethernet Switch which includes the following parts:

- (1) Quantity 1- “OpenRAIL Switch Power - Managed Fast/Gigabit Industrial Ethernet Switch, Fanless Design, Power over Ethernet (PoE+) Support with up to 24 Ports and 120 Watt, 24x 10/100 Mbit/s Ethernet Ports, 4x 10/100/1000 Mbit/s Ethernet Ports, 4x FE/GE Combo Ports”
The OpenRAIL Switch Power currently stock by the City and County of Denver is the HIRSCHMANN RSPE32-24044O7T99-TPPZ999HHSE2AXX.X.XX

 - (2) Quantity 4 - “SFP Fiberoptic Gigabit Ethernet Transceiver, Extended Temperature Range, 1 x 1000BASE-LX with LC Connector, SFP-GIG-LX/LC EEC”
The Gigabit Ethernet Transceiver currently stock by the City and County of Denver is the HIRSCHMANN 942 196-002

 - (3) Quantity 2 - “Empty Module Slot Cover, RSPM”
The Empty Module Slot Cover currently stock by the City and County of Denver to be used for the HIRSCHMANN RSPE32-24044O7T99-TPPZ999HHSE2AXX.X.XX OpenRAIL Switch Power is the HIRSCHMANN 942131001 RSPM-COVER
- Quantity 1 - 48VDC Rail Power Supply”
The 48VDC Rail Power Supply currently stock by the City and County of Denver to be used with the HIRSCHMANN RSPE32-24044O7T99-TPPZ999HHSE2AXX.X. OpenRail Switch Power is the BELDEN 942 200-001, “RPS 260/PoE EEC.

Test Requirements - Contractor shall supply one unit of Ethernet Managed Field Switch to the Engineer for specification compliance testing and approval. If the product passes the compliance test and evaluation, the Contractor will be notified to complete the order. If the product does not pass the specification compliance testing and approval evaluation by City and County of Denver’s Department of Transportation & Infrastructure – Transportation Operations, the unit will be returned to the Contractor. The Contractor shall supply other units until satisfactory test results are achieved.

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**REVISION OF SECTION 614
ETHERNET MANAGED FIELD SWITCH**

Subsection 614.13 shall include the following:

Each individual Ethernet Managed Field Switch package shall contain one Ethernet Managed Field Switch, set of mounting bracket(s), Installation and User guides, and Product Registration Card.

The unit price for the furnish and install of the Ethernet Managed Field Switch shall be for a complete system installed and accepted. The Ethernet Switch installation will be tested in accordance with this specification or as directed by the Engineer. Installation shall include all wiring for hook-up, related labor, material, ancillary hardware, and all necessary documentation of testing.

Subsection 614.14 shall include the following:

Pay Item

Ethernet Managed Field Switch

Pay Unit

Each

**REVISION OF SECTION 614
TRAFFIC SIGNAL POLES – GENERAL**

Section 614 of the Standard Specifications is hereby revised as follows:

Subsection 614.08 (g) shall include the following:

This work is for the installation of the mast arm traffic signal poles, traffic signal light poles (no mast arm), traffic signal span wire poles (imbedded steel poles), and traffic signal pedestal poles. The Contractor shall furnish and install the traffic signal poles at locations as shown on the plans. All traffic signal poles shall be painted dark olive green in conformance with Federal Specification No. 14056.

The mast arm traffic signal poles and the traffic signal light poles (no mast arms) will be in accordance with the latest City and County of Denver's Traffic Standards and Specifications.

General specifications of the mast arm traffic signal poles, traffic signal light poles (no mast arms), traffic signal imbedded steel poles, and traffic signal pedestal poles are as follows:

TRAFFIC SIGNAL POLES: All traffic signal poles (imbedded poles, mast arm traffic signal poles, traffic signal light poles - no mast arms) shall conform to latest City and County of Denver's Traffic Standard Details 16.1.3 and 16.1.9.1 to 16.1.12.2.

Traffic Signal Pedestal Poles shall conform to the requirements of the City and County of Denver's Traffic Signal Standard Detail 16.1.13.1 to 16.1.13.2.

The Contractor shall furnish and install a 5300 Lumens LED luminaire at all traffic signal poles as shown on the plans or as directed by the Engineer. The LED luminaire shall be in accordance with the City and County of Denver's specifications and Sections 613 - LIGHTING (LUMINAIRE)(LED 5300 LUMENS). The luminaire shall be installed on the traffic signal poles with a 10-foot luminaire arm as per the City and County of Denver's Traffic Standard Details 16.1.3, and 16.1.9.1 to 16.1.12.2.

FINISH: All traffic signal poles and mast arms – except for the imbedded steel poles and the aluminum pedestal poles – shall be finish in hot dipped galvanized, epoxy primer, and powder coated in accordance with the Valmont F540 finish process or equal.

PAINTING: All traffic signal mast arm poles shall be powder coated in accordance with the following specifications:

General:

Super Durable Powder Coating: The super durable powder coating shall consist of a Urethane or Triglycidylisocyanurate (TGIC) Polyester Powder, and provide a minimum of 3 times the gloss retention, color retention and ultraviolet light (UV) resistance as standard powder coatings. Color shall be dark olive green, in conformance with Federal Specification No. 14056.

Surface Preparation:

The exterior steel surface shall be blast cleaned to Steel Structures Painting Council Surface Preparation Specification No. 6 (SSPC-SP6) requirements utilizing cast steel abrasives conforming to the Society of Automotive Engineers (SAE) Recommended Practice J827. The blast method is a recirculating, closed cycle centrifugal wheel system with abrasive conforming to SAE Shot Number S280.

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**REVISION OF SECTION 614
TRAFFIC SIGNAL POLES – GENERAL**

Interior Color:

Interior surfaces (pole shafts only) at the base end for a length of approximately 2.0' shall be mechanically cleaned and coated with a zinc rich epoxy powder. The coating shall be electrostatically applied and cured in a gas fired convection oven by heating the steel substrate to a minimum of 350 degrees Fahrenheit and a maximum of 400 degrees Fahrenheit.

Exterior Coating:

All exterior surfaces shall be coated with Urethane or Triglycidylisocyanurate (TGIC) Polyester Powder to a minimum film thickness of 2.0 mils (0.002"). The coating shall be electrostatically applied and cured in a gas fired convection oven by heating the steel substrate to a minimum of 350 degrees Fahrenheit and a maximum of 400 degrees Fahrenheit. The thermosetting powder resin shall provide both intercoat as well as substrate fusion adhesion that meets 5A or 5B classifications of ASTM D3359.

Packaging:

Prior to shipment, small poles shall be wrapped in 0.188" thick Ultraviolet inhibiting plastic backed foam. Larger poles shall be cradled in a 1.0" rubberized foam base.

Handling and Shipment:

Poles shall be handled in a manner that will preserve the overall appearance and prevent damage to the coating. The use of chains or cables for loading, unloading, or installing is prohibited. Only 3/4 inch diameter or larger nonabrasive nylon rope or equivalent nylon belting will be used. Adequate hold-downs and appropriate blocking shall be utilized for shipping to prevent load movement and damage to the outer coating in transit. No handling should be allowed until "dry through" condition has been achieved with the coating.

Extra care will be taken not to damage the coating. Upon arrival of the poles at the delivery point, neither chains nor cables will be used to either unloading or installation of poles.

Procedure for Field Touch-Up:

The pole manufacturer will furnish extra paint, both primer and color coat, to satisfy the needs of field touch-up requirements, in the event of minor physical damage to the coating from handling or transit. Damaged area must be clean and dry before repair application. Field touch-up will be at the direction of the pole manufacturer or their authorized representative.

Subsection 614.14 shall include the following:

<u>Pay Item</u>	<u>Pay Unit</u>
Traffic Signal-Light Pole Steel	Each
Traffic Signal Light Pole Steel (1-xx Foot Mast Arm)	Each
Traffic Signal Pedestal Pole Aluminum	Each

**REVISION OF SECTION 614
TELEMETRY (FIELD)**

Section 614 of the Standard Specifications is hereby revised as follows:

Subsection 614.01 shall include the following:

This work consists of termination of fiber optic cable for the Denver Area Fiber Network Ecosystem (DAFNE) at each traffic signal controller cabinet (“traffic signal cabinet”) location(s) as identified in the planned or contracted scope of work. This work also includes furnishing and installing all necessary fiber optic cable and telemetry equipment including, but not limited to, optical splice closures, Gator Patch Terminations and Patch Cords. For questions or concerns related to the Denver Area Fiber Network Ecosystem (DAFNE), please contact the DAFNE Engineer; DAFNE@dencvergov.org.

The work also includes installation and splicing of a 72-strand fiber optic backbone cable across the Yosemite bridge.

Subsection 614.08 shall include the following:

Fiber Optic Patch at the Termination inside Traffic Signal Cabinet:

Fiber optic patch cord cables, Single-Mode (SM) or Multi-Mode (MM), shall be of length suitably long to be connected between the interconnect panel and the communications equipment (i.e. fiber optic ethernet switch). Patch cord couplings, Straight Tip Connector (ST) or Lucent Connector (LC), shall be compatible with termination points. Appropriate strain relief consisting of zip ties, shall be applied to the cables in the traffic signal cabinet at a minimum of three locations. 10 ft of slack shall be left inside each traffic signal cabinet. The preferred method of termination is a detachable Gator Patch Distribution Terminal (verify with DAFNE Engineer). Handhole/comm box locations, backbone connection locations, splice diagrams and Ethernet Switch port designations will be provided by the DAFNE Engineer.

Gator Patch Distribution Terminal:

List of Materials for Gator Patch installation:

Quantity one:

Detachable Pre-terminated SM or MM Gator Patch – minimum four (4) ports (reference location splice diagram) ST or LC– Length is to be field determined, allowing for a 10-foot loose coil in the base of the cabinet and adequate length to connect to the nearest back bone hand hole location (40’ to 200’)

Quantity one:

Runt Enclosure with Splice tray

Quantity Two (or Three):

ST to LC or LC to LC Patch Cords (verify with DAFNE Engineer)

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**REVISION OF SECTION 614
TELEMETRY (FIELD)**

Procedure:

- ① If Backbone is located in cabinet, back pull to nearest hand hole location install runt and terminate per-splice diagram. Hand hole/ comm box location and splice diagram provided by DAFNE Fiber
- ② If a lateral exists to a splice enclosure; remove lateral, land and splice Gator in place of lateral in existing enclosure (Verify with DAFNE Engineer).
- ③ Install Patch cords from Gator into correctly identified ports in ethernet switch (correctly identified ports provided by DAFNE Engineer).

Optical Splice Closures:

Preform Line Products (PLP) Coyote splice enclosures shall be deployed as follows:

- Coyote Runt 8006671
- Coyote Pup 6" x 17" 8006622
- Coyote 6" x 22" 8006560
- Coyote 8" x 22" 8006561

Compatible PLP Coyote splice trays shall be used as follows:

- Runt and Pup splice enclosures shall use 80806033 splice trays with no more than 12 backbone fibers inside each tray.
- Splice enclosures 8006560 and 8006561 shall use the large 80805514 splice tray with no more than 24 backbone fibers inside each tray.

All splice enclosures and splice trays shall be provided by the Contractor or Subcontractor for splicing lateral fiber optic cables to the main (backbone) fiber cable in all pull box locations that are identified in the plans.

- Runt splice enclosures shall be used where no more than three cables enter the splice enclosure and the total backbone strand count is equal to or less than 36 strands.
- Pup splice enclosures shall be used where no more than six cables enter the splice enclosure and the total backbone strand count is equal to or less than 60 strands unless otherwise directed by City and County of Denver Fiber Network Management.
- 8006560 splice enclosures shall be used where no more than six cables enter the splice enclosure and the total backbone strand count is equal to or less than 72 strands unless otherwise directed by City and County of Denver Fiber Network Management.
- 8006561 splice enclosures shall be used where no more than six cables enter the splice enclosure and the total backbone strand count is equal to or less than 144 strands unless otherwise directed by the DAFNE Engineer.

**REVISION OF SECTION 614
TELEMETRY (FIELD)**

Subsection 614.13 shall include the following:

Telemetry (Field) shall be measured by the total number of traffic signal cabinets at which the interconnect cable is terminated, and cross connected to the ethernet switch. All labor and materials required to perform the patch panel termination and cross connect to the ethernet switch is considered included in the unit price for this item.

This item, therefore, includes the following:

1. All required materials, hardware and labor required to interconnect the fiber optic lateral cable from the DAFNE backbone to and inside the Traffic Signal Cabinet as shown in the planned or contracted scope of work;

- All required termination materials and ancillary hardware and labor required to accomplish the cabinet termination;
- All required fiber optic lateral cable;
- All required fiber optic backbone cable;
- All required optical splice enclosures;
- All required optical splice trays;
- All other labor and material necessary to complete the item.

All labor and materials necessary to complete this item shall be considered included in the unit price and will not be paid separately. Verify all materials and hardware with the DAFNE Engineer.

Subsection 614.14 shall include the following:

Payment will be made under:

Pay Item
Telemetry (Field)

Pay Unit
Each

**REVISION OF SECTION 614
FIBER OPTIC CABLE - GENERAL**

Section 614 of the Standard Specifications is hereby revised as follows:

Subsection 614.01 shall include the following:

This work is for furnishing and installation of fiber optic communications cable to be installed in conduit or duct as specified in the plans. All labor and materials required to terminate, splice or otherwise connect fiber optic cables at individual controller cabinets, will be paid separately under Telemetry (Field) pay item. The contractor shall be required to demonstrate successful signal system communications to the Engineer as a requirement of acceptance of this item.

Subsection 614.10 shall include the following:

All fiber optic cable shall be furnished by the Subcontractor, and installed, spliced (if required and only as approved by the Engineer), terminated, tested, and connected by the Contractor or Subcontractor as shown on the plans. Manufacturer's recommended limits for cable pull lengths shall not be exceeded.

Fiber optic cable ends shall be stored in pull boxes or splice enclosures at locations indicated in the plans or as directed by the DAFNE Engineer. Fibers to be spliced and/or connected in any manner shall be limited to those identified in the plans, and only in designated traffic signal cabinets or splice enclosures.

Fiber optic cable shall be installed in a continuous run between all splice enclosures as shown in the plans. Lateral fiber optic cable shall be spliced in splice enclosures and routed to the traffic signal cabinet as shown in the plans. Under no conditions shall the fiber optic cable be cut out or spliced at intermediate points without the express written direction of the Engineer.

Fiber optic lateral cable shall be installed in new conduit or existing conduit as specified in the plans. The Contractor or Subcontractor shall be required to leave a minimum of 10 ft of cable slack in the traffic signal cabinet. The Subcontractor shall leave a minimum of 50 ft of cable slack in the communication hand hole as either a loop or a tail (i.e. 50 ft cable sheath length measured by the variance of the stamped length sequential markings at the duct and at the tail; or, 50 ft cable sheath length measured by the variance of the stamped length sequential markings at both ducts for a slack loop).

Fiber optic cable shall be neatly coiled and clearly tagged and labeled at each communication hand hole.

Cable tags and Labels shall be as follows:

Materials: Heavy plastic orange fiber optic cable identification tags with a clear sticker field lamination. The labeling shall done with a professional label creation machine (i.e. P-touch, Brady, etc.) The label shall contain direction, destination and cable strand construction (for example: 12SM/12MM). Labels shall be provided at the duct and at the splice enclosure on all fiber optic cables.

Manufacturer: Tags shall be 3M, Panduit or an approved equivalent.

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**REVISION OF SECTION 614
FIBER OPTIC CABLE - GENERAL**

Traffic signal cabinets to be connected in accordance with this specification (Fiber Optic Cable – General) shall connect directly to the appropriate ethernet switch as shown in the plans. This connection will be paid under Telemetry (Field). The DAFNE Engineer referenced in the Telemetry (Field) section is directly related to the Fiber Network and components of the Fiber Network.

Whereas the Project Manager referenced in the following sections, is directly related to the previous sections, contractual requirements, initial design/build, installation and removal of the Traffic Signals.

General Requirements:

The Contractor shall provide the Project Manager with a copy of the manufacturer's fiber optic cable specification. All installation shall be in accordance with industry standard practices.

Additional fiber optic cable costs due to damage caused by the Contractor's neglect of recommended procedures shall be the Contractor's responsibility. The main fiber optic cable shall be installed in continuous runs. The manufacturer's recommended limits for fiber optic cable pull tensions shall not be exceeded. Fiber optic cable slack shall be stored in communications hand holes. Lateral Cables to Cabinets will utilize procedures, terminations and cabling specified in the previous Telemetry Field Section.

Lateral fiber optic cable shall be installed using appropriate strain relief in the traffic signal cabinet (through cable ties) at a minimum of three locations.

It is the choice of the Contractor or Subcontractor to verify acceptance of fiber optic cable reels by performing reel tests using an Optical Time Domain Reflectometer (OTDR). All fiber optic cables to be installed shall be tested with an OTDR after installation. Documentation of fiber performance shall be provided to the DAFNE Engineer or Engineer's designee within 30 days of test. All fiber strands shall be within the manufacturer's recommended tolerances. Data shall be supplied to the DAFNE Engineer or Project Manager prior to completion of the project.

Each fiber strand of every fiber optic cable reel underwent testing at the factory of origin during final phases of the manufacturing process. It is the option of the fiber installation subcontractor to perform on-reel testing prior to installation to ensure continuity.

All OTDR traces shall be collected with EXFO and submitted in .trc (dual wavelength) format and shall include a 1000 meter Launch Reel (pulse suppressor).

All fiber strands within all fiber optic cable spans with one or more fusion splice events (not including pigtail splices) shall be tested at dual wavelength bi-directionally with matching OTDR models and modules, calibration dates, dynamic ranges, launch levels, parameters, and header screen information in both directions of the fiber optic cable span. The single mode wavelengths used shall be 1550nm and 1310nm. All final OTDR fiber optic cable span test results must be made after the splice handhole is closed in order to check for macro-bending problems during replacement of the slack fiber and splice enclosure.

All fiber strands shall be tested using a 1000 meter Launch Reel connected on both ends. Coupling of a patch cord onto the end of the Launch Reel for the purpose of matching connector type at a

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**REVISION OF SECTION 614
FIBER OPTIC CABLE - GENERAL**

termination is not recommended and should be avoided. In the event that this is the only option feasible to complete a test it shall be noted in the comments section of every trace file and the Contractor's Construction Superintendent shall be immediately notified for approval. The Launch Reel length should accommodate the chosen pulse width meaning the Launch Reel shall not be lost inside of a dead zone.

The reflective event caused by the mated connector pair on the end of the Launch Reel and the beginning of the fiber optic cable span shall be clearly visible on the OTDR trace with several hundred feet of smooth even backscatter previous to this event. All fusion splice events shall not exceed .20db bi-directional average loss. Any event that has a loss at 1550nm that is higher than the corresponding loss at 1310nm representing a variance .08dB or greater shall be troubleshot and repaired even if the loss is .20dB or less bi-directional loss. This means that any bend on the glass (fiber strand) that is discovered on the OTDR trace comparison between two wavelengths shall be identified, located in the field, repaired and re-tested. All fiber optic cable spans that have splice events and have a bare fiber tail at one or more ends shall be continuity checked on every fiber strand (from the connector if there is a termination) using an OTDR running on real time and a technician at the bare fiber tail manually bending the tail end of the glass (fiber strand) on each fiber strand one at a time.

If collected test data identifies a splice that does not meet the loss criteria herein, the splice shall be further tested at 1310nm in order to determine if a bend in the glass (fiber strand) exists. After determining that a bend is not present at the out of specification splice event, the subcontractor shall make a minimum of three (3) attempts to rectify the out of specification splice testing after each "re-burn". If after three (3) splice attempts the subcontractor is still unable to produce the acceptable loss value, then the Contractor's Construction Superintendent shall be immediately notified in order to decide as to whether or not the splice shall be marked out of specification and accepted. Terminated fibers shall not exceed a .60dB mated connector pair loss measured between the Launch Reel connector and the connector at the beginning of the fiber optic cable span through its assigned bulkhead at the patch panel including the pigtail splice. The reflectance at this event shall not exceed a -40dB. If patch cord implementation between patch panels is necessary to link fiber optic cable spans the loss shall not exceed .60dB per mated connector pair and the reflectance shall not exceed -40dB through the entire patch configuration.

All OTDR traces submitted with inaccurate parameter selection shall be rejected and re-testing shall be conducted solely at the Sub-Contractor's expense. The Subcontractor shall be responsible for determining and using the shortest pulse width possible while testing that allows for a clean trace to the end of the fiber optic cable span under test. The length of noise floor at the end of the trace shall be no less than 1/3 the length of the entire fiber optic cable span including the Launch Reel and no greater than 1/2 the length of the entire fiber optic cable span. During testing, Subcontractor shall allow enough time for the OTDR to perform sufficient averaging on each fiber strand as to "normalize" the trace and provide clear test results, especially on longer fiber optic cable spans. Traces with inadequate averaging to produce quality test data shall result in Subcontractor having to collect the data again solely at Subcontractor's cost.

Subcontractor shall test the fiber optic cable using a Contractor approved OTDR. All OTDR's used shall also incorporate the use of exactly the same Launch Reel length for both directions of the fiber optic cable span testing for purposes of analyzing the traces. Contractor approved OTDR test instruments shall, at a minimum, have the following features:

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**REVISION OF SECTION 614
FIBER OPTIC CABLE - GENERAL**

Telcordia Technologies GR-196 compliancy or Laser Precision/GN Nettest software compatibility.

- Minimum dynamic range of 34.0 dB
- Minimum overall range of 120 km
- 1550 nm and 1310nm laser source for testing single mode fibers
- Ability to save test data for delivery to owner via transfer utilizing email with digital file attachments.
- Bi-directional OTDR files shall be submitted as soon as possible via email to the Contractor's Construction Superintendent's email address.
- The Subcontractor shall store and provide to Contractor for analysis all OTDR trace data including bi-directional fiber optic cable span shots.
- Subcontractor shall fill out a location sheet for every location completely as requested by Contractor. The comments section of the location sheet shall include the materials used, the work performed, and the splice configuration implemented.

When storing OTDR traces, Subcontractor shall use the Contractor approved name format as follows:

All base file names of trace files collected with EXFO OTDRs shall be set up to indicate Launch location_Far site location_wavelength_3-digit fiber # in the OTDR set up screen.

All trace files shall be named in the following 8-character format for Anritsu OTDRs:
AAAbbbCC.xxx

AAA = three-letter code* for launch location.

bbb = three-letter code* for far site.

CC = 13 for 1310nm, 15 for 1550 nm.

xxx = three-digit number of individual fiber (e.g. fiber #1 = .001, fiber #144 = .144)

OTDR header screen information shall be filled out completely and include detailed information about the fiber optic cable span tested in the comments section, such as: location of test points, building address, cabinet address, patch panel type, patch panel position in the rack or location on a wall including room number, connector type, port assignments of the cable, and access information.

Subcontractor shall be responsible for visually examining every fiber strand of every fiber optic cable span during the initial fiber optic cable span testing. If any attenuation events are discovered between splice locations the Contractor's Construction Superintendent shall be immediately notified. All attenuation events that occur inside the splice enclosure shall be the Subcontractor's responsibility to remedy. All events outside of the splice enclosures indicating fiber optic cable damage shall be troubleshot, located, and repaired outside of this subcontract and performed under the direction of the Contractor's Construction Superintendent.

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**REVISION OF SECTION 614
FIBER OPTIC CABLE - GENERAL****Post Placement Testing**

All fiber optic cable spans that do not have a splice point shall be tested at both 1310nm and 1550nm unidirectionally using a Launch Reel and OTDR. Accurate fiber optic cable sequential marks from both ends of the fiber optic cable shall be collected by visiting both the manhole and the hand hole locations where the fiber optic cable ends have been coiled. The total sheath footage shall be calculated based upon the fiber optic cable sequentials gathered from both tail ends. The sheath footage and tail sequentials shall be indicated on the OTDR files in the comments section along with location of the tails, fiber optic cable span information, fiber count, cable construction and type of test being performed.

If the fiber optic cable is terminated on one end, then the fiber optic cable shall be tested from the connectors at the termination using a Launch Reel and shall not exceed a .60dB mated connector pair from the end of the Launch Reel through the connector on the fiber optic cable span. If the fiber optic cable is not terminated on either end, then bare fiber shots shall be done from one of the bare fiber ends of the fiber optic cable using a Launch Reel connected on both ends. A pigtail of 10 feet in length or less shall be used on the end of the Launch Reel in order to maintain a reflection caused by the mated connector pair. This reflection shall be used for measurement purposes to indicate the start of the fiber optic cable span. The insertion loss measured from the end of the Launch Reel through the mated connector pair into the pigtail then through the mechanical splice into the bare fiber end of the fiber optic cable span shall not exceed 1.0dB. The sheath footage shall be verified by comparison to the optical footage of the OTDR trace. All loose tube cable sheath footage shall be between 1% and 3% shorter than the corresponding optical footage measured on an OTDR. Contractor shall be immediately notified of any variance in length (other than the normal 3% variance) or events discovered along the fiber optic cable span.

Care shall be taken at all times to avoid scraping, denting, twisting, or otherwise damaging the fiber optic cable before, during and after installation. Damaged fiber optic cable shall be replaced by the Contractor without additional compensation. Any visual deformation of the fiber optic cable jacket shall be considered to be damaged fiber optic cable. Fiber optic cable damage does not necessarily equal optical fiber strand damage and optical fiber strand test results need not to point towards fiber optic cable damage as proof of damaged fiber optic cable.

Fiber optic cable shall be installed in conduit or duct in the field in accordance with the contract drawings. All existing or suspected dirt and debris within the conduit shall be cleaned with compressed air before installing fiber optic cable. A manufacturer recommended lubricant shall be applied to the fiber optic cable to reduce friction between the fiber optic cable and duct or conduit.

Fiber optic cable shall be measured by the linear foot for the main (backbone), lateral and branch cables, and shall include all labor and materials required to install the main, lateral, branch, and start fiber optic cables through conduits to all pull boxes, cabinets and closures specified in the plans

Subsection 614.14 shall include the following:

Fiber optic cable for the main (backbone), lateral and branch cables shall not be measured separately, but shall be included in the item Telemetry (Field) and shall include all labor and materials required to install the backbone and lateral cables through conduit to all hand holes, traffic signal cabinets, and into splice enclosures as specified in the plans.

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**REVISION OF SECTION 614
FIBER OPTIC CABLE – GENERAL**

Installation of all internal field cabinet telemetry, splicing, and terminations of fiber optic cable at individual traffic signal cabinets is described and paid for under Telemetry (Field).

Subsection 614.14 shall include the following:

No separate measurement or payment will be made for fiber optic cable. All fiber optic cable shall be considered incidental to the Telemetry (Field) pay item.

REVISION OF SECTION 614 LOOSE TUBE FIBER OPTIC CABLE

Section 614 of the Standard Specifications is hereby revised as follows:

Notice:

Every effort has been made to ensure that the information contained in this specification is complete and accurate at the time of publication; however, information contained herein is subject to change.

Trademarks:

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1. Scope

This specification covers the general design requirements and performance standards for fiber optic cables intended primarily for use in the outside plant environment. The purpose of this document is to provide the essential requirements for All-Dielectric Single Jacket Loose Tube Fiber Optic cable to be used in the City and County of Denver Network Management DAFNE Fiber Infrastructure.

The product requirements and features described in this specification are those considered useful for ensuring proper selection and manufacturing of fiber optic outside plant cables.

In this specification, all observed or calculated values are rounded off "to the nearest unit" in the last right-hand place of figures used in expressing the limiting value. The round-off method of ASTM E 29 is used.

These cables must comply with applicable industry standards, such as: Telcordia Technologies GR-20 (formerly Bellcore), Electronic Industries Association (EIA), Telecommunications Industry Association (TIA), International Telecommunications Union (ITU), International Electrotechnical Commission (IEC), and American Society for Testing and Materials (ASTM).

Optical Fiber Characteristics

High quality optical fibers should be made with pure silica-based glass to have very low loss for infrared wavelengths and to be used to carry large amounts of information for very long distances in optical communication systems.

Details of the optical fibers are not covered in this specification, but the proposed cable should contain AllWave® or TrueWave® fibers for Single-Mode applications, or Multimode fibers that comply with the specific fiber requirements supplied by the City and County of Denver and meets or exceeds these specifications.

Cable Core Characteristics

Color Code

The individual colors for fibers and buffer tubes in loose tube cable cores must comply with EIA/TIA-598 as given in the following table.

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**REVISION OF SECTION 614
LOOSE TUBE FIBER OPTIC CABLE**

Table 1 – Fiber and Tube Color Code

<i>Fiber or Tube No.</i>	Color	<i>Tube No.</i>	Color
1	Blue (BL)	13	Blue-Dash (BL-DS)
2	Orange (OR)	14	Orange-Dash (OR-DS)
3	Green (GR)	15	Green-Dash (GR-DS)
4	Brown (BR)	16	Brown-Dash (BR-DS)
5	Slate (SL)	17	Slate-Dash (SL-DS)
6	White (WH)	18	White-Dash (WH-DS)
7	Red (RD)	19	Red-Dash (RD-DS)
8	Black (BK)	20	Black-Dash (BK-DS)
9	Yellow (YL)	21	Yellow-Dash (YL-DS)
10	Violet (VI)	22	Violet-Dash (VI-DS)
11	Rose (RS)	23	Rose-Dash (RS-DS)
12	Aqua (AQ)	24	Aqua-Dash (AQ-DS)

Central Strength Member

The central member functions as an anti-buckling element and should be a glass/epoxy composite dielectric rod. A polyethylene overcoat may be applied to the central member to provide the proper spacing between buffer tubes during stranding.

Loose Tube Cable Buffer Tubes

Optical fibers shall be enclosed within buffer tubes that have a diameter several times larger than the diameter of the fibers. The optical fibers shall be loose within the buffer tubes allowing the fibers to move freely. The loose buffer tubes should have a 2.5 mm diameter, with a nominal wall thickness of 0.4 mm. For composite or hybrid cable designs (i.e. when both single-mode and multi-mode fibers are contained within the same cable), the single-mode fibers shall be contained in the first buffer tubes. The multi-mode fibers shall be contained in the sequenced buffer tubes following the multi-mode buffer tubes.

Table 2 – Buffer Tubes

Fiber Count	Buffer Tube OD (mm)	Fibers per Tube
1-288	2.5	12

The buffer tubes (and filler rods, if necessary) must be stranded in a reverse oscillation lay (ROL) technique around the central member to allow for easy mid-span access. The core of buffer tubes must be wrapped with two counter helically applied threads to bind together the cable core.

Filler Rods

In order to create a round cable, filler rods of the same diameter as the buffer tubes may be used to fill empty positions. Filler rods shall be made out of HDPE and shall be natural in color.

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REVISION OF SECTION 614 LOOSE TUBE FIBER OPTIC CABLE

Water Blocking System

Water blocking of the core outside and around the buffer tubes must be accomplished via “dry” elements. In addition, water-blocking inside the buffer tubes must be accomplished via “dry” elements as well.

These “dry” water blocking elements form a gel compound when in contact with water. The gel should effectively fill the interstices of the core and the inside of the tubes to prevent water penetration along the length of the cable.

“Dry” water blocking elements must be in the form of binders, tapes, or yarns depending on where they are being applied.

Cable Sheath Characteristics

The sheaths described in this section are:

- All-Dielectric Single Jacket: one polyethylene jacket, no metallic elements (SJ)

Strength Elements

Sheath strength elements shall be applied over the cable core to provide the cable with the required tensile strength. These elements shall be made of fiberglass (Aramid yarns may be used as well).

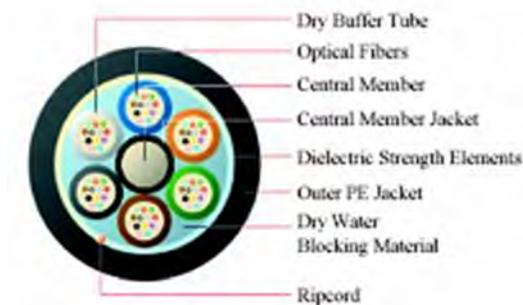
Outer Jacket

An outer polyethylene jacket is applied over the cable to provide overall mechanical protection. This jacket is made of MDPE (or HDPE upon request) and is usually black. If required, the jacket could have two co-extruded colored tracer stripes located 180 degrees apart to aid in cable identification. The jacket shall be continuous, free from pinholes, splits, blisters, or other imperfections.

Ripcords

For ease of jacket removal, one clearly identifiable polyester ripcord is provided under the outer jacket for SJ designs. SJ/SA designs shall have two under armor ripcords placed 180 degrees apart. SJ/SA designs shall have one ripcord under both the inner jacket and steel armor.

Cable Cross-Sections: Single Jacket (JC) - Figure 1 – Single Jacket



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**REVISION OF SECTION 614
LOOSE TUBE FIBER OPTIC CABLE**

Table 3 – Target Cable Outer Diameters

NUMBER OF FIBERS								
	2 - 60 (5 Pos.)	2 - 72 (6 Pos.)	73 - 96 (8 Pos.)	97 - 120 (10 Pos.)	121- 44 (12 Pos.)	145-216 (18 Pos.)	217-240 (20 Pos.)	241-288 (24 Pos.)
SHEATH TYPE	Cable OD in. (mm)	Cable OD in. (mm)	Cable OD in. (mm)	Cable OD in. (mm)	Cable OD in. (mm)	Cable OD in. (mm)	Cable OD in. (mm)	Cable OD in. (mm)
SJ	0.42 (10.6)	0.43 (11.0)	0.50 (12.8)	0.57 (14.4)	0.64 (16.2)	0.66 (16.7)	0.69 (17.4)	0.76 (19.2)

Mechanical, Environmental and Electrical Requirements

These cables must meet the requirements of Telcordia GR-20-CORE with all testing performed based on EIA/TIA-455 standards. The manufacturing company must provide proof of their quality control standards with ISO 9001 and TL9000 certifications. The cables must comply with the following temperature ranges:

Operation: -40°C to 70°C (-40°F to 158°F)
Installation: -30°C to 60°C (-22°F to 140°F)
Storage/Shipping: -40°C to 75°C (-40°F to 167°F)

Single-Mode Fibers

Per Telcordia GR-20-CORE, the magnitude of the attenuation change shall be less than or equal to 0.05 dB for 90% of the test fibers and less than or equal to 0.15 dB for the remaining 10% of test fibers. Cable aging allows for 0.10 dB/km average attenuation change with a magnitude of the maximum attenuation change for each individual fiber to be less than 0.25 dB/km. These attenuation values include a 0.05 dB allowance for measurement repeatability.

During mechanical and environmental testing evidence of cracking, splitting or other failure of the sheath components when examined under 5X magnification would result in failure of the proposed test requirements. In addition, no fiber shall lose optical continuity because of the test.

Table 4 – Testing for Signal Mode Fibers

Cable Test	Test Method	Requirement
Tensile Loading and Bending	EIA/TIA-455-33 IEC 794-1-E1	90%<0.05 dB Max Added Loss 100%<0.15 dB Max Added Loss
Cyclic Flexing	TIA/EIA-455-104 IEC 794-1-E6	90%<0.05 dB Max Added Loss 100%<0.15 dB Max Added Loss
Cyclic Impact	EIA/TIA-455-25 IEC 794-1-E4	90%<0.05 dB Max Added Loss 100%<0.15 dB Max Added Loss
Compressive Loading	TIA/EIA-455-41 IEC 794-1-E3	90%<0.05 dB Max Added Loss 100%<0.15 dB Max Added Loss

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**REVISION OF SECTION 614
LOOSE TUBE FIBER OPTIC CABLE**

Table 4 – Testing for Signal Mode Fibers (Continue)

Cable Test	Test Method	Requirement
Twist	EIA/TIA-455-85	90%<0.05 dB Max Added Loss
	IEC 794-1-E7	100%<0.15 dB Max Added Loss
Low and High Temperature Bend	EIA/TIA-455-37	90%<0.05 dB Max Added Loss
	IEC 794-1-E11	100%<0.15 dB Max Added Loss
External Freezing	EIA/TIA-455-98	<0.05 dB Max Added Loss
	IEC 794-1-F6	<0.15 dB Max Added Loss
Temperature Cycling	EIA/TIA-455-3	□ 0.05 dB/km Mean Added Loss
	IEC 794-1-F1	□ 0.15 dB/km Max Loss
Cable Aging	EIA/TIA-455-3	□ 0.10 dB/km Mean Loss
	IEC 794-1-F1	□ 0.25 dB/km Max Loss
Water Penetration	EIA/TIA-455-85	No flow after 24 hours from one-meter length
	IEC 794-1-F5	of cable

Multimode Fibers

Per Telcordia GR-20-CORE, the allowable attenuation increase during the mechanical and environmental testing is 0.20 dB. Cable aging allows for the maximum attenuation change for each individual fiber to be less than 0.40 dB/km.

During mechanical and environmental testing evidence of cracking, splitting or other failure of the sheath components when examined under 5X magnification would result in failure of the proposed test requirements. In addition, no fiber shall lose optical continuity because of the test.

Table 5 – Testing for Multi-Mode Fibers

Cable Test	Test Method	Requirement
Tensile Loading and Bending	EIA/TIA-455-33	0.20 dB Max. Mean Added Loss
	IEC 794-1-E1	
Cyclic Flexing	TIA/EIA-455-104	0.20 dB Max. Mean Added Loss
	IEC 794-1-E6	
Cyclic Impact	EIA/TIA-455-25	0.40 dB Max. Mean Added Loss
	IEC 794-1-E4	
Compressive Loading	TIA/EIA-455-41	0.20 dB Max. Mean Added Loss
	IEC 794-1-E3	
Twist	TIA/EIA-455-85	0.20 dB Max. Mean Added Loss
	IEC 794-1-E7	
Low and High Temperature Bend	EIA/TIA-455-37	0.40 dB Max. Mean Added Loss
	IEC 794-1-E11	
External Freezing	EIA/TIA-455-98	0.20 dB Max. Mean Added Loss
	IEC 794-1-F6	
Temperature Cycling	EIA/TIA-455-3	□ 0.5 dB/km Max Added Loss 80 % □ 0.25 dB/km Added Loss
	IEC 794-1-F1	
Cable Aging	EIA/TIA-455-3	□ 1.0 dB/km Max Added Loss 80 % □ 0.5 dB/km Added Loss
	IEC 794-1-F1	
Water Penetration	EIA/TIA-455-82 IEC 794-1-F5	No flow after one hour from one-meter length of cable

Note: The tensile rating for all of the cables described should be 2.7 kN (600 lbf), with a compression rating of at least 220 N/cm under GR-20 requirements.

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REVISION OF SECTION 614 LOOSE TUBE FIBER OPTIC CABLE

Cable Marking

Printed Characters

For standard outer jackets, printed characters shall be indent printed with white characters for black jackets, black characters for non-black jackets, or as otherwise specified.

For standard striped outer jackets, printed characters shall be indent printed with white characters for red, green, orange, yellow, blue striped cables, light-blue characters for white striped cables, or as otherwise specified by the customer.

The characters shall be of proper height and space to produce good legibility. Character heights of 2 mm should facilitate adequate readability. An occasional illegible marking is permitted if there is a legible marking on either side.

Markings

The cable shall be sequentially marked at one meter, or two-foot intervals depending on specific requirements issued by the City and County of Denver. The length marks shall not be reset to zero on any length of the cable. The actual length of cable shall be within +1, -0% of the marked length.

Each length of cable shall be marked with the following legend:

"(Manufacturer Name) OPTICAL CABLE, (Product Part Number), (Month and Year of Manufacture, [MM-YY]), (Fiber Count [XXX F], where XXX is the number of optical fibers in the cable), and (Manufacturers' Serial Number)"

Re-Markings

Only one remarking is permitted. If required, either of the following methods for remarking shall be used:

- Method A: Completely remove the defective marking and remark the characters with the original color.
- Method B: Leave the defective marking on the jacket and remark on a different portion of the cable jacket with yellow character print. The new number sequence shall differ from any other existing marking by at least 5000.

Any cable that contains two sets of markings shall be labeled to indicate the color and sequential numbers to be used. The labeling shall also be applied to the reel tag.

Cable Packaging:

Reels:

The manufacturer shall supply the product using their standard reel sizes, methods, apparatus, and reel wood lagging, but stenciled according to these specifications.

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REVISION OF SECTION 614 LOOSE TUBE FIBER OPTIC CABLE

The specifications outlined here are guidelines on what is expected with respect to packaging.

Reels are assumed to be in good working condition, firm, and be able to support the product through shipping and final installation. Reels shall be clean, dry and free of excessive dirt. All reels shall be checked for high nails, stave fit and proper stenciling.

Reel Labels:

Each wooden reel shall be permanently marked with the following information:

- “(Manufacturer’s name)” (red paint)
- “OPTICAL CABLE” (black paint)
- An arrow and the wording “cable end” to indicate the position of the outside cable end. (red paint)
- An arrow and the wording “ROLL THIS WAY” to indicate the direction the reel should be rolled to prevent loosening of the cable. (black paint)
- Reel Number (red paint)

Cable handling stickers/cards must be attached to both flanges of every reel. Each sticker must be stapled to the flange. See Figure 4 for illustrations of the stickers to be used.



Figure 4 – Reel Stickers

Reel Lagging:

Thermal Protection

Outer layers of the reel shall be covered with a protective wrap to limit the solar heating of the cable. This helps limit the cable surface temperature so that it will not exceed 10 C (18 F) above ambient temperature under maximum solar radiation according to Telcordia GR-20-CORE requirements. All foil wrap shall be securely fastened to the cable by at least 2 pieces of strapping tape.

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**REVISION OF SECTION 614
LOOSE TUBE FIBER OPTIC CABLE**

Composite & Wood Lagging:

Reels shipping domestically shall be lagged with a suitable protective wrap (can be the same thermal protection wrap) and banded with steel straps. This wrap shall cover the cable from flange to flange and provide some mechanical protection to the outer layers of cable as well as weather resistance. Reels shipping for export shall be lagged with wooden boards nailed to each flange and banded with steel straps in addition to the protective wrap around the outer layers of cable.

Cable Ends:

Each end of the cable shall have end seals, either end caps or KELLEMS® pulling grips, in order to prevent moisture ingress into the cable during shipping, storage, or installation.

The top end of the cable shall be securely fastened to the inside of the reel flange to prevent the cable from becoming loose in transit or during handling. The bottom end, “test tail”, shall be approximately three meters in length and easily accessible. The end shall be protected within a cable slot and be securely fastened to the outside of the reel flange with wire ties or walkout straps. Staples, nails or yarn attached to the reel during manufacturing shall be removed.

The cable slot can be partially protected to prevent the cable tail from moving outside the cable slot; however, for export orders the cable slot must be completely sealed by metallic protection rings, plywood covers, or other.

Cable Length Tolerance:

Cables ordered to standard factory lengths shall have an actual length within -0% and +5% of the length ordered unless otherwise specified by the customer.

Certified Test Data:

Each cable shall have certified test data securely fastened to the reel in a waterproof wrapping. The certified test data sheet shall include the following information:

- Cable Number
- Date
- Customer Name
- Ordered Length
- Customer Order Number
- Ship Length
- Customer Cable Code
- Customer Reel Number
- Customer’s Attenuation Specification(s)
- Number of Fibers

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**REVISION OF SECTION 614
LOOSE TUBE FIBER OPTIC CABLE**

- Cable Construction
- Fiber Transmission Data
- Bandwidth Data – only applies to Multi-Mode Fibers
- Authorized Signature

Reel Tag:

Each cable shall have a reel tag securely fastened to the reel in a waterproof wrapping. The Reel Tag (Cut Length Data Sheet) shall include the following information:

- Cable Number
- Date
- Customer Name
- Ordered Length
- Customer Order Number
- Ship Length
- Customer Cable Code
- Customer Reel Number
- Customer's Attenuation Specification(s)
- Number of Fibers
- Beginning and Ending Sequential Length Markings
- Gross Weight
- Net Weight
- Inspected by Signature

REVISION OF SECTION 614 TEST FIBER OPTIC CABLE

Section 614 of the Standard Specifications is hereby revised as follows:

Subsection 614.08 shall include the following:

This work consists of testing fiber optic cable. Testing shall include both new cable and existing cable. The test procedures involve an OTDR test and an Optical Power Meter Test.

The guidelines for fiber optic cable testing include:

Test jumpers and patch cords must be of the same fiber core size and connector type as the cable system.

The light source and OTDR must operate with the range of 1310±10 nm or 1550±20 nm for testing in accordance with ANSI/EIA/TIA-526-7.

The power meter and the light source must be set to the same wavelength during testing.

The power meter must be calibrated and traceable to the National Institute of Standards and Technology (NIST).

All system connectors, adapters and jumpers must be cleaned as per manufacturer's instructions before measurements are taken.

MATERIALS

The following items are required to perform fiber optic cable tests:

- an OTDR;
- a test reel, if necessary;
- a light source at the appropriate wavelength;
- Optical Power Measurement Equipment; and
- Test Jumpers as specified below.

(a) CPR Test Jumper-1 and Test Jumper-2 shall be 1-5 meters long with connectors compatible with the light source and power meter and have the same fiber construction as the link segment being tested.

OPTICAL FIBER CABLE TESTING WITH O.T.D.R

The Contractor shall perform an OTDR test of all fibers in all tubes on the reel prior to installation of the fiber. The test results shall be supplied to the Engineer prior to installation of the cable.

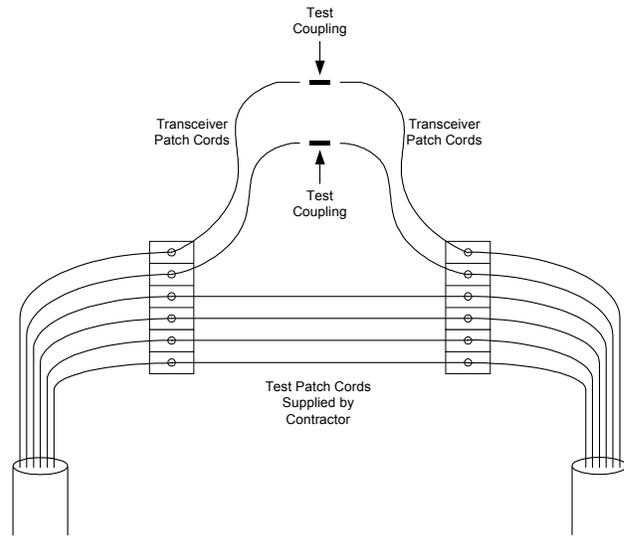
If the fiber is specified as "Install Only", the Contractor shall test the fiber on the reel and provide the test results to the Engineer prior to accepting the cable. After installation, if there are unused portions of cable remaining on the reel, the Engineer may request the Contractor or other qualified technician to perform a reel test. The Contractor shall provide the Engineer the test results prior to delivering the cable to the Engineer. Any cable damaged while in the Contractor's possession shall be replaced at the Contractor's expense.

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REVISION OF SECTION 614 TEST FIBER OPTIC CABLE

All fiber testing shall be performed on all fibers in the completed end-to-end system. Testing shall consist of a bi-directional end-to-end OTDR trace performed per TIA/EIA-455-61.

The system margin loss measurements shall be provided at 1310 and 1550nm. If the Plans require installation of a fiber optic patch panel, the Contractor shall supply patch cords to patch all terminated fibers through the panel for all fiber testing. If patch cords are specified in the Plans for final equipment installation, these patch cords shall be connected using a test coupling for the end-to-end test.



OTDR readings will be used to ensure proper installation and to troubleshoot faults. OTDR signature traces will be used for documentation and maintenance. An OTDR provides an indirect estimate of the loss of the cable plant, generally, more accurate or reliable values will be obtained by using an Optical Power Meter. For fibers that are identified in the Plans to be left not terminated, an OTDR shall be used to test end-to-end attenuation.

Loss numbers for the installed link shall be calculated by taking the sum of the bi-directional measurements and dividing that sum by two.

The Contractor shall use an OTDR that is capable of storing traces electronically and shall save each final trace.

To ensure the traces identify the end points of the fiber under test and the fiber designation, the Contractor shall use a test reel, if required, to eliminate the “dead zone” at the start of the trace so that the start of the fiber under test can be identified on the trace. Indicate the length of the test reel for all test results. If the fiber designation is not indicated on the trace itself, the Contractor shall provide a cross reference table between the stored trace file name and the fiber designation.

In compliance with EIA/TIA-455-61 “Measurement of Fiber or Cable Attenuation Using an OTDR” the Contractor shall record the following information during the test procedure:

- Names of personnel conducting the test.
- Type of test equipment used (manufacturer, model, serial number, calibration date).
- Date test is being performed.
- Optical source wavelength and spectral width.
- Fiber identification.
- End point locations.
- Launch conditions.
- Method of calculation for the attenuation or attenuation coefficient.
- Acceptable link attenuation.

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REVISION OF SECTION 614 TEST FIBER OPTIC CABLE

OPTIC FIBER CABLE TESTING WITH OPTICAL POWER METER

The Contractor shall conduct an Optical Power Meter Test for each fiber installed.

Fiber optic cable segments shall be tested in one direction at both the 1310 nm and 1550 nm wavelength.

In compliance with TIA/EIA-526-7 "Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant," the following information shall be recorded during the test procedure:

- Names of personnel conducting the test.
- Type of test equipment used (manufacturer, model, serial number, calibration date).
- Date test is being performed.
- Optical source wavelength and spectral width.
- Fiber identification.
- End point locations.
- Test direction.
- Reference power measurement (when not using a power meter with a Relative Power Measurement Mode).
- Measured attenuation of the link segment.
- Acceptable link attenuation.

The minor attenuation differences due to test direction are on par with the accuracy and repeatability of the test method. Lateral segments within a building are limited to 90 meters. Therefore, attenuation differences caused by wavelength are insignificant, and as a result, single wavelength testing is sufficient.

ACCEPTABLE ATTENUATION VALUES

Acceptable attenuation values shall be calculated for each fiber tested. These values represent the maximum acceptable test values.

A connection is defined as the joint made by mating two fibers terminated with re-matchable connectors (e.g. ST, SC, LC).

MM FIBER: The general attenuation equation for any MM link segment is as follows: Acceptable Link

Attenuation = Cable Attenuation + Connection Attenuation + Splice Attenuation + Coupled Power Ratio (CPR) Adj.

62.5 nm MM Attenuation Coefficients:

- Cable Attenuation = Cable Length (km) x (3.40 dB/km@850nm or 1.00 dB/km@1300nm)
- Connection Attenuation (ST or SC connectors) = (# of Connections x 0.39 dB) + 0.42 dB
- Connection Attenuation (LC connectors) = (# of Connections x 0.14 dB) + 0.24 dB
- Splice Attenuation (Mechanical or Fusion) = Splices x 0.30 dB
- CPR Adjustment = See table below

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**REVISION OF SECTION 614
TEST FIBER OPTIC CABLE**

MM Light Source CPR Adjustment					
	<i>Cat. 1 Overfilled</i>	<i>Cat. 2</i>	<i>Cat. 3</i>	<i>Cat. 4</i>	<i>Cat. 5 Underfilled</i>
Links with ST or SC Connections	+0.50	0.00	-0.25	-0.50	-0.75
Links with LC Connections	+0.25	0.00	-0.10	-0.20	-0.30

The Coupled Power Ratio of a light source is a measure of the modal power distribution launched into a multimode fiber. A light source that launches a higher percentage of its power into the higher order modes of a multimode fiber produces a more over-filled condition and is classified as a lower category than a light source that launches more of its power into just the lower order modes producing an under-filled condition. Under-filled conditions result in lower link attenuation, while over-filled conditions produce higher attenuation. Therefore, adjusting the acceptable link attenuation equation to compensate for a light source's launch characteristics increases the accuracy of the test procedure.

SM FIBER: The general attenuation equation for any SM link segment is as follows:

Acceptable Link Attenuation = Cable Attenuation + Connector Attenuation + Splice Attenuation

8.3 nm Single-Mode Attenuation Coefficients:

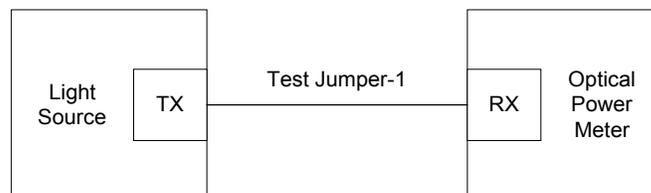
- Cable Attenuation = Cable Length (km) x (0.34 dB/km@1310nm or 0.25 dB/km@1550nm)
- Connection Attenuation (ST or SC connectors) = (# of Connections x 0.39 dB)+0.42 dB.
No more than 0.75 dB per connector.
- Connection Attenuation (LC connectors) = (# of Connections x 0.14 dB)+0.24 dB.
- Splice Attenuation (Mechanical or Fusion) = Splices x 0.20 dB

TEST PROCEDURES

All fiber testing shall be performed on all fibers in the completed end-to-end system.

MM FIBER: The MM fiber cable test shall be conducted as follows:

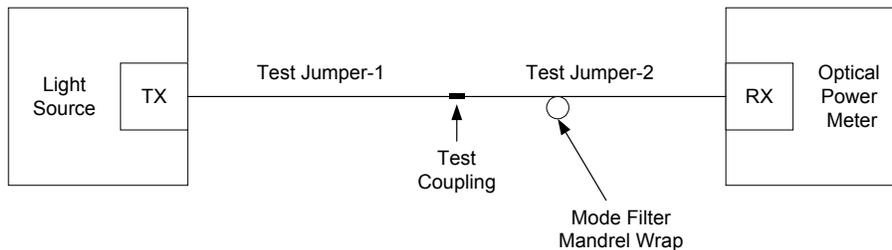
- Clean test jumper connectors and test coupling per manufacturer's instructions.
- Follow the test equipment manufacturer's initial adjustment instructions.
- Connect Test Jumper-1 between the light source and the power meter. Avoid placing bends in the jumper that are less than 100mm (4 inches) in diameter.



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REVISION OF SECTION 614 TEST FIBER OPTIC CABLE

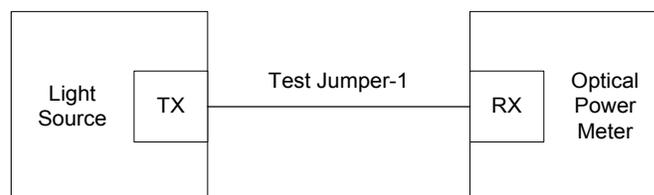
- If meter has Relative Power Measurement (PM) Mode, use it. If not, reduce the Reference PM (Pref). If meter can display power levels in dBm, select this unit to simplify calculations.
- Disconnect Test Jumper-1 from power meter. Do NOT disconnect test jumper from light source.
- Connect Test Jumper-2 between power meter and Test Jumper-1 using test coupling. Test Jumper-2 should include a high order mode filter. This is done by wrapping jumper 3 times around 30mm (1.2") diameter mandrel.



- Record PM (Psum). If power meter is in Relative PM Mode, reading represents CPR value. If meter does not have Relative PM Mode, perform the following calculation:
 - If Psum and Pref are in the same logarithmic units: $CPR (dB) = Psum - Pref$
 - If Psum and Pref are in watts: $CPR (dB) = 10 \times \log_{10} [Psum/Pref]$

SM FIBER: The SM Optical Power Meter fiber test shall be conducted as follows:

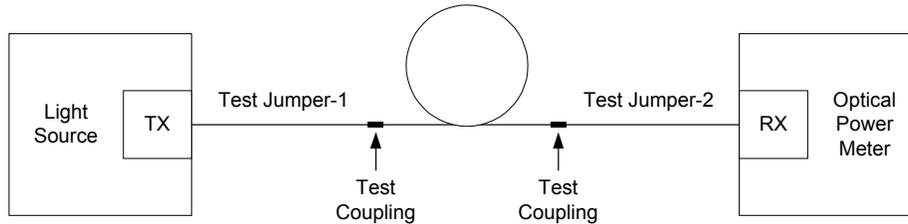
- Clean the test jumper connectors and test coupling per manufacturer's instructions.
- Follow the test equipment manufacturer's initial adjustment instructions.
- Connect Test Jumper-1 between the light source and the power meter. Avoid placing bends in the jumper that are less than 100mm (4 inches) in diameter.



- If the power meter has a Relative Power Measurement Mode, select it. If it does not, reduce the Reference Power Measurement (Pref). If the meter can display power levels in dBm, select this unit to simplify subsequent calculations.
- Disconnect Test Jumper-1 from power meter. Do NOT disconnect test jumper from light source.
- Attach Test Jumper-1 to one end of the cable plant to be measured and attach Test Jumper-2 to the other end.

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REVISION OF SECTION 614 TEST FIBER OPTIC CABLE



- Record the PM (Psum). If the power meter is in Relative PM Mode, the meter reading represents the true value. If the meter does not have a Relative PM Mode, perform the following calculation:
 - If Psum and Pref are in the same logarithmic units: $CPR (dB) = Psum - Pref$
 - If Psum and Pref are in watts: $CPR (dB) = 10 \times \log_{10} [Osum/Pref]$

TEST ACCEPTANCE

The Contractor shall demonstrate that each Optical Power Test results in acceptable attenuation values.

The Contractor, solely at the Contractor's cost, shall remake any fusion splices and/or connectors that have test results exceeding acceptable attenuation values.

The Contractor, solely at the Contractor's cost, shall retest any fiber links that have been re-spliced.

The Contractor, solely at the Contractor's cost, shall bring any link not meeting the requirements of this specification into compliance.

SUBMITTALS

The Contractor shall submit test results documentation as both a hard copy and electronic copy.

After each reel test, the Contractor shall submit two (2) hard copies of the OTDR trace for every fiber on the reel. After installation, the Contractor shall submit two (2) hard copies of the OTDR trace for every spliced fiber. Hard copy traces shall be organized and bound in logical order in an 8-½" x 11" 3 ring hard cover binder in addition to other documentation listed in this Special Provision and other splicing documentation listed in the project Special Provision package.

The Contractor shall submit, after approval of the hard copy traces, electronic copies of all traces and appropriate software to allow reading the traces.

The Contractor shall submit two (2) copies of all Optical Power Test results.

The Contractor shall submit two (2) copies of the contract plans, including additional drawings issued as part of any change orders, with any deviations clearly marked in color. Deviations to be noted shall include but not be limited to the following:

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**REVISION OF SECTION 614
TEST FIBER OPTIC CABLE**

- Fiber splice location;
- Fiber splice configuration; and
- Termination layout.

Subsection 614.13 shall include the following:

The complete end-to-end OTDR test on one fiber, including document submission, represents one OTDR test.

The complete end-to-end optical power meter test on one fiber, including document submission, represents one optical power meter test.

Subsection 614.14 shall include the following:

No separate measurement or payment will be made for fiber optic cable testing. All cable (system) testing shall be considered incidental to the Telemetry (Field) pay item.

**REVISION OF SECTION 614
CLOSED CIRCUIT TELEVISION CAMERA (TRAFFIC SURVEILLANCE)**

Section 614 of the Standard Specifications is hereby revised as follows:

Subsection 614.01 shall include the following:

This work consists of the installation of a closed-circuit television camera at the locations shown on the plans.

Subsection 614.08 shall include the following:

(m) Closed Circuit Television Camera (Traffic Surveillance)

Closed circuit television camera shall be the Panasonic WV-X6531N.

The following accessories shall be provided for each IP camera:

Panasonic PAPM4 Pole Mount Bracket

Panasonic PWM20G Gooseneck Black

Transformer Altronix T2428100 24 VAC.

Veracity VOR-OS Outsource Midspan 15/20W POE 802.3AF Injector – 1 port

Subsection 614.10 shall include the following:

The closed-circuit television camera shall be installed in accordance with the details shown in the plans and in accordance with manufacturer’s recommendations. The Contractor shall deliver the camera and accessories to the City and County of Denver’s Transportation Operations at 5440 Roslyn, Building E, Tech Shop, Denver, Colorado 80216 at least 4 weeks prior to installation for the camera calibration and set up. The Contractor shall pick up the camera and shall install it at the proper location. The Contractor shall make arrangements for a City and County of Denver Transportation Operations’ representative to be on-site to ensure proper installation.

Subsection 614.13 shall include the following:

Closed circuit television cameras will be measured by the actual number of closed circuit television cameras that are installed and accepted. All accessories shall not be measured separately.

Subsection 614.14 shall include the following:

Pay Item

Closed Circuit Television

Pay Unit

Each

Payment will be full compensation for all labor, materials, accessories, and equipment required to complete the work.

REVISION OF SECTION 625 CONSTRUCTION SURVEYING

Section 625 of the Standard Specifications is hereby revised as follows:

Delete section 625 and replace with the following:

DESCRIPTION

625.01 This work consists of the construction surveying, calculating, and staking, including ROW limits, necessary for the construction of all elements of the project. The work shall be done under the supervision of a Professional Land Surveyor (PLS) who is licensed in the State of Colorado. Locating, preserving, referencing, installing and restoring land monuments such as Primary Control monuments from which the Right of Way or any land boundary will be calculated, described or monumented, Public Land Survey System (PLSS) monuments, General Land Office (GLO) monuments, Bureau of Land Management (BLM) monuments, Mineral Survey (MS) monuments, Right of Way (ROW) monuments, property boundary monuments and offsets, Range Points, benchmarks, easement monuments, and other monuments that are required by law or regulation to be established by a PLS, and the determination of any land boundary, shall be done under the supervision of a Professional Land Surveyor (PLS) who is licensed in the State of Colorado.

MATERIALS AND EQUIPMENT

625.02 The Contractor shall furnish all personnel, survey equipment, safety equipment, materials, and traffic control necessary to perform the required construction surveying and staking. All surveying equipment, including Electronic Distance Meters (EDM), total stations, theodolites, levels, rods, tapes, tripods, tribrachs, and Global Positioning System (GPS) receivers and equipment.

If any survey equipment is found to be functioning outside the manufacturer's specified tolerance, certification from an approved repair facility showing that the instruments have been repaired, properly adjusted, or both if necessary shall be included in the survey records and submitted to the City Surveyor's Office before being used.

CONSTRUCTION REQUIREMENTS

625.03 General. The Contractor shall check and verify all established Primary horizontal and vertical control points.

All survey records generated shall be the property of the City and shall be available to the City Surveyor's Office for inspection or reproduction at all times. All survey records shall be transmitted to the City Surveyor's Office for inclusion into the project records before final project acceptance.

Electronic formats may be acceptable, please coordinate with the City Surveyor's Office. Copies of any new Monument Records filed by the PLS with the State Board of Registration shall be submitted to the City Surveyor prior to filing.

625.04 Contractor Surveying. The Contractor's PLS shall perform all construction surveying and staking that is necessary for construction of the project.

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REVISION OF SECTION 625 CONSTRUCTION SURVEYING

625.05 Staking. It is the responsibility of the Contractor's PLS to adhere to industry standards and acceptable practices in regard to staking. Any restaking will be the responsibility of the Contractor's PLS at no cost to the City.

625.06 Accuracy and Tolerances. It is the responsibility of the Contractor's PLS to adhere to industry standards and applicable standards with regard to horizontal and vertical accuracy tolerances.

625.07 Responsibility and Inspection. Supervision and coordination of construction surveying and staking is the Contractor's responsibility. The City Surveyor's Office or Engineer may inspect the Contractor's surveying; however, such inspection will not relieve the Contractor of any responsibility for accuracy or completeness of work. All Contractor surveying inaccuracies, errors, or omissions shall be corrected at the Contractor's expense.

625.08 Reset Monuments and Stakes. Survey monuments, benchmarks, and other significant stakes that are damaged, destroyed, or made inaccessible by the progress of construction shall be replaced, transferred or reestablished at the Contractor's expense.

Locating, preserving, referencing, installing and restoring land monuments as described in 625.01, shall be done in accordance with Section 629, under the supervision of a PLS who is experienced and competent in Right of Way and boundary surveying and licensed in the State of Colorado.

629.09 Changes. All changes in lines and grades required by field conditions and all discrepancies in grades, alignment, location or dimensions detected by the Contractor shall be immediately submitted to the Engineer in writing. No changes in given data or plans will be allowed unless approved by the Engineer in writing. All changes shall be documented by the contractor.

629.10 Pay Quantities Measurements. The Engineer will perform all interim and final measurements deemed necessary by the City to determine contract pay quantities. The Contractor shall establish and maintain Control points and stationing as required for these measurements.

629.11 Survey Records. Survey records shall be completed as the work is done. Field survey notes for construction surveying and checking by the Contractor shall be recorded in survey records in conformance with industry standards and acceptable practices.

All survey records generated shall be the property of the City and shall be available to the City Surveyor's Office or the Engineer for inspection or reproduction at all times. All survey records shall be transmitted to the City Surveyor's Office for inclusion into the project records before final project acceptance. All survey records shall be stamped with the seal of, and signed by, the responsible PLS.

Electronic submittal of survey records may be acceptable, please coordinate with the City Surveyor's Office.

METHOD OF MEASUREMENT

625.12 Construction surveying will not be measured but will be paid for on a lump sum basis.

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**REVISION OF SECTION 625
CONSTRUCTION SURVEYING**

BASIS OF PAYMENT

625.13 Payment for construction surveying will be the lump sum bid and will be full compensation for all surveying work necessary to complete the project to include all resetting of stakes and marks and preparing survey documentation as required.

Installing and restoring existing survey monuments will be measured and paid for separately in accordance with Section 629 under the pay item Survey Monument, Each.

Partial payment for construction surveying, as determined by the Engineer, will be made as the work progresses.

Payment will be made under:

Pay Item

Construction Surveying

Pay Unit

Lump Sum

Traffic control for construction surveying will be measured and paid for in accordance with Section 630.

**REVISION OF SECTION 626
MOBILIZATION**

Section 626 of the Standard Specifications is hereby revised as follows:

Subsection 626.01 is hereby revised to include:

This item also includes demobilization of equipment and supplies from this project site.

Subsection 626.02 is hereby deleted and replaced by the following:

Two payments will be made for the mobilization item. 50% of the amount bid for mobilization will be paid at the completion of mobilization. The remaining 50% of the amount bid for mobilization will be paid at the completion of the project when the equipment has been demobilized.

Pay Item
Mobilization

Pay Unit
Lump Sum

**REVISION OF SECTION 627
PAVEMENT MARKING**

Section 627 of the Standard Specifications is hereby revised as follows:

Subsection 627.01 is revised to include the following:

The Contractor is responsible for installation and removal of temporary pavement marking. The Contractor shall coordinate the work of the striping, including traffic control devices and flaggers.

Subsection 627.03 is revised to include the following:

The Contractor shall replace permanent pavement markings damaged or removed as a result of the work. Pavement marking material shall be new material of the same type which existed prior to the work commencing.

Subsection 627.11 is revised as follows:

Installation and removal of temporary pavement marking will not be measured and paid for separately, but shall be included in the cost of the associated 627 Pavement Marking pay item(s).

**REVISION OF SECTIONS 627 and 713
PERFORMED THERMOPLASTIC PAVEMENT MARKING**

Section 627 of the Standard Specifications is hereby revised for this project as follows:

CONSTRUCTION REQUIREMENTS

In subsection 627.09, first paragraph, delete the first sentence and replace with the following:

The markings shall consist of a resilient white, yellow, or other color thermoplastic product with glass beads and anti-skid elements uniformly distributed throughout the entire cross-sectional area to ensure that skid resistance and retroreflectivity are maximized.

Section 627 of the Standard Specifications is hereby revised for this project to include the following:

Subsection 627.09 (c) is hereby added to the Standard Specifications for this project as follows:

(c) Inlaid (Word-Symbol) (X-walk/Stop-bar) (Shield)

All Preformed Thermoplastic Pavement Marking surfaces shall be ground before placement of proposed marking. Depth of grinding shall be such as to completely remove any existing pavement markings and to have a nominal depth of 125 milliinches (mils) +/- 10 mils. The inlaid area for the new Preformed Thermoplastic Pavement Marking shall be in the same shape or pattern as the Preformed Thermoplastic Pavement Marking that is being installed. Grinding of existing preformed thermoplastic pavement marking and existing asphalt shall not be measured and paid for separately, but shall be included in the work.

Colorado epoxy glass beads and anti-skid elements applied to the surface of the material to ensure the required skid resistance and retroreflectivity will not be measured and paid for separately, but shall be included in the work.

Surface shall be dry and free of dirt, dust, chemicals, and significant oily substances. Existing pavement markings shall be removed prior to installation of Preformed Thermoplastic Pavement Marking in areas where markings overlap. Application procedures for Portland concrete pavement shall be as described above except a compatible primer sealer shall be applied before application of marking to ensure proper adhesion.

The Contractor shall require the stencil manufacturer to provide on-site training prior to installation of the first stencil. All crew members on the work site shall be certified by the stencil manufacturer. The training shall include surface preparation and stencil installation for both hot bituminous pavement and concrete pavement. The training shall be coordinated with and attended by Colorado Department of Transportation (CDOT) project engineers and inspectors. Training shall be incidental to the work.

1. The Contractor shall use a durable, high skid resistant, retroreflective pavement marking material suitable for use as interstate shields; route shields; and bike path, roadway, intersection, airport, commercial, or private pavement delineation and markings.
 - A. The markings shall be a resilient white, yellow, or other color thermoplastic product, the surface of which shall contain glass beads and abrasives in an alternating pattern. The markings shall be resistant to the detrimental effects of motor fuels, lubricants, hydraulic fluids, etc. Lines, legends, and symbols shall be capable of being affixed to bituminous or Portland cement concrete pavements by the use of the normal heat of a propane torch.

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**REVISION OF SECTIONS 627 and 713
PREFORMED THERMOPLASTIC PAVEMENT MARKING**

- B. The markings shall be capable of conforming to pavement contours, breaks, and faults through the action of traffic at normal pavement temperatures. The markings shall have resealing characteristics, such that it is capable of fusing with itself and previously applied thermoplastic when heated with the torch.
- C. The markings shall not have minimum ambient and road temperature requirements for application, without any preheating of the pavement or special storage, handling, preheating, or treatment of the material before application.
2. Manufacturing Location, Control and International Standards Organization (ISO) Certification: The marking material must be produced in the United States, and the manufacturer must be ISO 9001:2015 certified for design, development, and manufacturing of preformed thermoplastic pavement markings, and provide proof of current certification.
3. Material: The marking material shall be composed of an ester modified rosin resistant to degradation by motor fuels, lubricants, etc. in conjunction with aggregates, pigments, binders, abrasives, and glass beads which have been factory produced as a finished product. The marking material shall meet the requirements of the current edition of the Manual on Uniform Traffic Control Devices for Streets and Highways. The thermoplastic material shall conform to American Association of State Highway and Transportation Officials (AASHTO) designation M249, with the exception of the relevant differences due to the material being supplied in a preformed state.
- A. Graded Glass Beads
- (1) The material shall contain a minimum of 30 percent intermixed graded glass beads by weight. The intermixed beads shall conform to AASHTO designation M247, with minimum 80 percent true spheres and minimum refractive index of 1.50.
 - (2) The material shall have factory applied coated surface beads and abrasives at a rate of 1/2 pound (0.23 kilogram) [\pm 20 percent] per 11 square feet (1 square meter) each in addition to the intermixed beads. The surface beads and abrasives shall be applied evenly across the surface of the material so that the surface is covered completely with glass beads and abrasive materials. The abrasive material shall have a minimum hardness of 9 (Mohs scale). The factory applied coated surface beads shall have a minimum of 80 percent true spheres, have a minimum refractive index of 1.50, and meet the following gradation:

Size Gradation		Retained, %	Passing, %
US Mesh	Um		
12	1700	0 - 2%	98 - 100%
14	1400	0 - 6%	94 - 100%
16	1180	1 - 21%	79 - 99%
18	1000	28 - 62%	38 - 72%
20	850	62 - 71%	29 - 38%
30	600	67 - 77%	23 - 33%
50	300	86 - 95%	5 - 14%
80	200	97-100%	0 - 3%

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**REVISION OF SECTIONS 627 and 713
PREFORMED THERMOPLASTIC PAVEMENT MARKING**

- B. Pigments
- (1) White: The material shall be manufactured with sufficient titanium dioxide pigment to meet Federal Highway Administration (FHWA) Docket No. FHWA-99-6190 Table 5 and Table 6 as revised and corrected.
 - (2) Red, Blue, and Yellow: The material shall be manufactured with sufficient pigment to meet FHWA Docket No. FHWA-99-6190 Table 5 and Table 6 as revised and corrected. The yellow pigments shall be organic and shall be heavy-metal-free.
 - (3) Other Colors: The pigments shall be heavy-metal-free.
- C. Heating indicators: The top surface of the material (same side as the factory applied surface beads/abrasives) shall have regularly spaced indents. The closing of these indents during application shall act as a visual cue that the material has reached a molten state allowing for satisfactory adhesion and proper bead embedment, and as a post-application visual cue that the application procedures have been followed.
- D. Skid Resistance: The surface of the preformed thermoplastic (anti-skid material) items shall contain factory applied anti-skid material with a minimum hardness of 9 (Mohs scale). Upon application the material shall provide a minimum skid resistance value of 60 British Pendulum Number (BPN) when tested according to American Society for Testing and Materials (ASTM) E303. The surface beads and abrasives shall be applied evenly across the surface of the material so that the surface is covered completely with glass beads and abrasive materials.
- E. Thickness: The material shall be supplied at a minimum thickness of 125 mils (3.15 millimeters (mm)).
- F. Retroreflectivity: The material, when applied in accordance with manufacturer's guidelines, shall demonstrate a uniform level of sufficient nighttime retroreflection when tested in accordance to ASTM E1710. The applied material shall have an initial minimum intensity reading of 275 millicandelas per square meter per lux ($\text{mcd} \cdot \text{m}^{-2} \cdot \text{lx}^{-1}$) for white, as measured with a pavement marking retroreflectometer.
- G. Environmental Resistance: The material shall be resistant to deterioration due to exposure to sunlight, water, salt, or adverse weather conditions and impervious to oil and gasoline.

Only Preformed Thermoplastic Pavement Marking material listed on the Department's approved products list may be used.

Subsection 627.13 shall include the following:

Payment will be made under:

Pay item

Preformed Thermoplastic Pavement Marking (Type I) (Inlaid)

Pay unit

SF

REVISION OF SECTION 629 SURVEY MONUMENTATION

Section 629 of the Standard Specifications is hereby deleted and replaced with the following:

DESCRIPTION

629.01 This work consists of locating, preserving, referencing, installing and restoring the following types of land monuments by a Colorado-licensed Professional Land Surveyor (PLS). The following types of monuments, if required, shall be considered included: Primary Control monuments from which Right of Way (ROW) or any land boundary will be calculated, described or monumented; Public Land Survey System (PLSS) monuments; General Land Office (GLO) monuments; Bureau of Land Management (BLM) monuments; Mineral Survey (MS) monuments; ROW monuments; property boundary monuments; and offsets, City of Denver range points, benchmarks, easement monuments, and other monuments that are required by law or regulation to be established by a PLS. The monuments include, but are not limited to, those monuments identified on the Survey Control Perpetuation Diagram.

The production of additional documentation may be required by the City Surveyor's Office. All such work included in this section shall be performed under the supervision of a Colorado- licensed PLS.

MATERIALS AND EQUIPMENT

629.02 The Contractor shall furnish all personnel, survey equipment, safety equipment, materials and traffic control necessary to perform the required Monumentation and related surveying.

CONSTRUCTION REQUIREMENTS

629.03 A construction survey conference shall be held with the City Surveyor's Office prior to performing any surveying work under this section. The Contractor's Surveyor (PLS) and party Chief shall attend. A construction survey checklist shall be completed and signed by the City Surveyor's Office and the Contractor.

The Contractor shall check and verify all established primary horizontal and vertical control points.

All survey records generated shall be the property of the City & County of Denver and shall be available to the City Surveyor's Office for inspection or reproduction at all times. All survey records shall be transmitted to the City Surveyor's Office for inclusion into the project records before final project acceptance.

Electronic formats may be acceptable; please coordinate with the City Surveyor's Office.

Copies of any new Monument Records filed by the PLS with the State Board of Registration shall be submitted to the City Surveyor prior to filing.

629.04 Locating Monuments – This work consists of field locating all survey Monumentation as discussed in 629.01 which is in place within the project limits. A diligent search of construction zones and project limits shall be performed by the PLS.

629.05 Preserving and Referencing Monuments – All monuments as described in 629.01 shall be preserved, referenced and reset by a PLS within the project limits or as identified on the Survey Control Perpetuation Diagram.

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**REVISION OF SECTION 629
SURVEY MONUMENTATION**

629.05 Installing Monuments – All monuments described in 629.01 shall be preserved throughout construction. If any monuments as described in 629.01 are to be disturbed or removed during construction, it will be the responsibility of the Contractor’s PLS to reset all monuments to current City & County of Denver standards. Appropriate documentation will be required for all reset monuments.

METHOD OF MEASUREMENT

Survey monuments will be measured by the actual number of the various types installed and accepted by the Engineer. Measurement for locating survey monuments, preserving and referencing monuments will not be measured and paid for separately.

BASIS OF PAYMENT

629.09 - The accepted items and quantities will be paid for at the contract unit price per each. Approval of the Engineer is required prior to undertaking any work identified as part of this Section.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Survey Monument	Each

Prior to payment, all survey records and documentation must be submitted and accepted by the City Surveyor’s Office.

The construction survey checklist, equipment calibrations and survey records will not be paid for separately but shall be included in the work. The locating of monuments, and preserving and referencing monuments will not be paid for separately but shall be included in the work.

**REVISION OF SECTION 630
UNIFORMED TRAFFIC CONTROL**

Section 630 of the Standard Specifications is hereby revised as follows:

Subsection 630.09 shall include the following:

Uniformed Officers - The Contractor shall employ off-duty police officers to provide traffic control and traffic enforcement throughout the project as required by the Project Manager. Authorization must be made by the Project Manager in advance of working arrangements for Uniformed Traffic Control. Arrangements for officers shall be made at least 2 weeks in advance by contacting the following police agency:

Denver Police Department Office of Secondary Employment

Phone Number: (720) 337-0775; Email: Analisa.ortiz@denvergov.org

The Denver Police Department Office of Secondary Employment will require 48 hours notice.

Subsection 630.17 shall include the following:

The quantity to be measured for Uniformed Traffic Control will be the total number of hours that Uniformed Traffic Control is actually used as authorized.

Subsection 630.18 shall include the following:

The accepted number of hours of Uniformed Traffic Control will be paid for at the contract unit price per hour.

Payment will be made under:

Pay Item

Uniformed Traffic Control

Pay Unit

Hour

**REVISION OF SECTION 630
CONSTRUCTION ZONE TRAFFIC CONTROL**

Section 630 of the Standard Specifications is hereby revised as follows:

Subsection 630.01 shall be revised to include the following:

The Contractor shall submit, in writing, the proposed Method of Handling Traffic (MHT) for review and approval of the Project Engineer. The MHT shall be developed according to this section and the construction plans.

Subsection 630.05 Traffic Cones shall include the following:

Steel drum channelizing devices shall not be used for traffic control

Subsection 630.06 Channelizing Devise (fixed) shall include the following:

Non-metallic drums or tubular markers may be substituted for vertical panel channelizing devices.

Subsection 630.09 General shall include the following:

The flagger's STOP/SLOW sign paddle shall be 18 inches with letters six inches high.

Subsection 630.10(a), shall include the following:

When a different MHT is required for a subsequent construction phase, it must be submitted at least two weeks prior to starting that phase. All proposed methods of handling traffic shall be approved, in writing, by the Project Engineer following approval of the Traffic Engineering Services Department.

Approval of the proposed MHT does not relieve the Contractor of liability specifically assigned to him under the contract. The Contractor shall erect and maintain warning lights, signs, barricades, and sufficient safeguards around all excavations, embankments, and obstructions.

The contractor shall notify the Project Engineer by Thursday at 3:00 P.M. which streets they intend to work on the following week. This notification will be made for all phases of construction.

Subsection 630.10(a)(1) shall be added as follows:

The key elements of the Contractor's method of handling traffic (MHT) are outlined in subsection 630.10(a).

The components of the Traffic Control Plan (TCP) for this project are included in the following:

- Subsection 104.04 and Section 630 of the Standard Specifications.
- Tabulation of Traffic Control Items included in the plans for this project.
- Latest revised Standard Plan S-630-1, Traffic Controls for Highway Construction and Standard Plan S-630-2.

Special Traffic Control Plan requirements for this project are as follows:

1. During the construction of this project, traffic shall use the present traveled roadway.

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**REVISION OF SECTION 630
CONSTRUCTION ZONE TRAFFIC CONTROL**

2. Work that interferes with traffic on will only be permitted during the following hours:
 - The Contractor shall perform all the work on the roadway between the hours of 8:30 AM and 3:30 PM or as approved by the Project Engineer. Weekend and nighttime work will be allowed with the prior written approval of the Project Engineer. During this time, only one lane can be closed on each approach.
 - Work will not be permitted that directly or indirectly interferes with the flow of traffic between the hours of 5:30 AM and 8:30 AM Monday through Friday; between the hours of 3:30 PM to 6:30 PM Monday through Thursday; and after 2:00 PM on Fridays unless otherwise authorized by the Project Engineer.
 - No work on Holidays
 - Contractor shall not close lanes during special events.
 - Contractor shall coordinate lane closures with adjacent projects.
 - Contractor shall maintain business access during business hours.
 - The Contractor shall coordinate all of the work on the roadway during any special event with the City and County of Denver.
3. The Contractor shall install construction traffic control devices where they do not block or impede other existing traffic control devices or sidewalks for pedestrians, disabled persons or bicyclists. The Contractor is restricted from storing any materials, construction traffic control devices, signs, etc. in any median area or park area.
4. Vertical cuts or fills greater than 1 inch resulting from construction operations adjacent to traffic lanes, or within the clear zone shall be temporarily sloped at a 6:1 or flatter slope, and delineated at 35 foot intervals immediately after removal operations to safeguard the traveling public.
5. Construction equipment used on this project shall meet the same minimum exhaust requirements as those specified by the manufacturer of the equipment.
6. The Contractor and subcontractors shall equip their construction vehicles with flashing amber lights. Equipment to be used at night shall also be equipped with flashing amber lights. Flashing amber lights on vehicles and equipment shall be visible from all directions.
7. The Contractor shall maintain access to all roadways, side streets, walkways, alleyways, driveways, and hike/bike paths at all times unless otherwise directed by the Engineer. Parking areas temporarily disturbed by construction activities shall be restored to a useable condition during non-working hours. Such temporary parking shall utilize an all weather surface. The Contractor shall develop an Access Maintenance Plan in coordination with, and based on the requirements of, the affected property owners and tenants, and submit it to the Engineer for approval prior to commencement of work. This plan shall detail all barricades, ramps, signs, and temporary means of access required by the property owners or tenants. Prior to commencing any work which affects access to a property, the Access Maintenance Plan for that property must be submitted and approved by the Engineer.
8. The Access Maintenance Plan shall be coordinated with all affected owners and tenants. The Access Maintenance Plan shall include documentation of this coordination, including the approval signature of each affected owner or tenant.

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**REVISION OF SECTION 630
CONSTRUCTION ZONE TRAFFIC CONTROL**

Should the Contractor be unable to obtain approval and signatures, documentation of the efforts made to obtain said approval and signatures must be submitted.

All access shall be maintained on surfaces equal to or better than those existing at the time the access is first disturbed. For short periods of time only as allowed by the Engineer, access may be maintained on an aggregate base course surfaces.

9. The Contractor shall maintain continuous access throughout the project for pedestrians, bicyclists, and disabled persons. When the existing access route is disturbed by construction, a temporary all-weather access shall be provided. All temporary access shall be a minimum of 5 feet wide and meet Americans with Disabilities Act (ADA) requirements. Acceptable all weather surfacing shall be concrete or asphalt surface, or as approved by the Engineer. Delineation of pedestrian access through the work area shall be accomplished using temporary plastic fencing.
10. The costs of maintaining access will not be paid for separately, unless otherwise provided, but shall be included in the work. Utilization of materials to be incorporated into the work may be permitted. However, any degradation or other contamination or destruction shall be corrected at the Contractor's expense prior to acceptance.
11. During non-construction periods (evenings, weekends, holidays, etc.) all work shall be adequately protected to insure the safety of vehicular and pedestrian traffic, as detailed in the Contractor's MHT. Excavations or holes shall be filled in or fenced when unattended.
12. Whenever the Contractor removes, obliterates, or overlays any pavement markings, he /she shall replace them on a daily basis prior to opening the affected areas to traffic. All temporary pavement markings shall fully comply with the Standard Specifications and Special Provisions.
13. The Contractor shall not have construction equipment or materials in the lanes open to traffic any time unless directed by the Engineer.
14. All personal vehicle and construction equipment parking is prohibited where it conflicts with safety, access, or the flow of traffic. Landscaped areas, public park areas, and roadway shoulders shall be kept clear of parking and storage of all personal and construction equipment except where approved by the Engineer.
15. The Contractor shall not place tack coat on any surface to be paved where traffic will be forced to travel upon fresh bituminous materials.
16. The Contractor shall be required to make arrangements with the Regional Transportation district (RTD) prior to closing any existing bus stops within the project limits. Temporary stops will be required as directed by the Engineer and as required by RTD. For bus stop/route conflicts Regional Transportation District, RTD / 1560 Broadway, Suite 700, Denver, CO 80202 shall be contacted two (2) business days prior to start of construction.

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**REVISION OF SECTION 630
CONSTRUCTION ZONE TRAFFIC CONTROL**

17. The Contractor shall be required to maintain temporary drives at any existing establishment that has singular access off of the roadways, unless otherwise approved in writing by the property owner.
18. No work that interferes with traffic will be allowed on holidays or any day of a three-day or four-day weekend that includes a holiday. Holidays on which this restriction applies consist of those holidays recognized by the State of Colorado as listed in subsection 101.36
19. All lane closures shall be subject to the approval of the Engineer. Request for each closure shall be made at least 24 hours in advance of the time the lane closure is to be implemented. Lane closures will not be allowed to remain unless being utilized in continuum for the intended purpose for which they were set up.
20. During no-working hours, the roadways shall be restored to a safe travel conditions for the free flow of traffic. Any maintenance required restoring the roadways to this condition, including the pavement patching and grading, shall be done prior to opening the areas to traffic or completing work for the day.
21. The Contractor shall clean the roadway of all construction debris before opening it to traffic.
22. All flagging stations used at night shall be illuminated with floodlights. Street, highway lights and "high mast lighting" may be used for flagging station illumination when approved by the Engineer. Floodlights shall be located and directed so as not to interfere with the sight of any motorists, and the cost to be included in the work.
23. Prior to removal and resetting of any sign the Contractor and Engineer shall prepare an inventory. Any signs damaged due to the Contractor's operations shall be replaced in kind or repaired by the Contractor at no additional cost to the project.
24. Unless noted otherwise, all costs incidental to the foregoing requirements shall be included in the original contract prices for the project, including any additional traffic control items required for haul routes into the project.

Subsection 630.10 (10) shall be added as follows:

Number of hours for uniformed traffic control shall be tabulated for submittal.

Subsection 630.10 (11) shall be added as follows:

Contractor shall obtain all required access and construction permits from the City & County of Denver prior to initiating work along City Right of Way.

All lane closures require an arrow board to be installed.

All streets that will be reduced in the number of travel lanes should have variable message boards installed for a minimum of three (3) days after the striping change to inform drivers of the lane reduction.

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**REVISION OF SECTION 630
CONSTRUCTION ZONE TRAFFIC CONTROL**

Subsection 630.15 is hereby deleted and replaced with the following:

The Contractor shall furnish all other personnel – including flaggers, traffic control inspector, and traffic control supervisor - and other materials necessary to perform the Construction Zone Traffic Control as required and these quantities will not be measured but will be included in the cost of Traffic Control Management.

Temporary pavement markings for traffic control will not be measured and paid for separately, but shall be included in the work.

Subsection 630.16 is hereby deleted and replaced with the following:

All traffic control shall comply with the requirements of the FHWA MUTCD Part 6 (2011 edition) – Temporary Traffic Control.

Subsection 630.18 shall include the following:

Payment will be made under:

All costs incidental to maintenance of access will not be paid for separately but shall be included in the work.

All costs incidental to the foregoing requirements shall be included in the original contract prices for the project.

<u>Pay Item</u>	<u>Pay Unit</u>
Flagging	Hour
Traffic Control Inspection	Day
Traffic Control Management	Day
Barricade (Type 3 M-A) (Temporary)	Each
Construction Traffic Sign (Panel Size A)	Each
Construction Traffic Sign (Panel Size B)	Each
Portable Message Sign Panel	Each
Advance Warning Flashing or Sequence Arrow Panel (A Type)	Each
Drum Channelizing Device (With Light) (Flashing)	Each
Traffic Cone	Each
Mobile Attenuator	Day

Payment for construction zone traffic control will be measured and paid for by the days and the type of traffic control – Local or Arterial/Collector. Payment will be full compensation for all traffic control work necessary to complete the project including the installation and removal of temporary striping.

FORCE ACCOUNT ITEMS

DESCRIPTION

This Special Provision contains the City and County of Denver's estimate for Force Account Items included in the Contract. The estimated amounts will be added to the total bid to determine the amount of the performance and payment bonds. Force Account work shall be performed as directed by the Engineer.

BASIS OF PAYMENT

Payment will be made in accordance with Subsection 109.04. Payment will constitute full compensation for all work necessary to complete the item.

Force Account work valued at \$5,000 or less that must be performed by a licensed journeyman in order to comply with federal, state, or local codes, may be paid for after receipt of an itemized statement endorsed by the Contractor.

<u>Item No.</u>	<u>Force Account Items</u>	<u>Quantity</u>	<u>Estimated Amount</u>
F/A 01	Minor Contract Revision	F/A	\$15,000
F/A 02	Furnish & Install Electrical Service	F/A	\$50,000
F/A 03	Landscaping	F/A	\$5,000
F/A 04	Erosion Control	F/A	\$5,000
F/A 05	Environmental Health & Safety Management	F/A	\$2,500

Force Account descriptions include:

- F/A 01 Minor Contract Revisions – This work consists of minor work authorized and approved by the Engineer, which is not included in the contract plans or specifications and is necessary to accomplish the scope of work of this contract.
- F/A 02 Furnish & Install Electrical Service – This force account is for all cost charges from the power service provider, and all necessary materials, labor and coordination required to maintain existing or establish new power sources required for permanent operation of equipment as shown in the plans, including the installation of new transformers.
- F/A 03 Landscaping– This work is for restoring existing landscape, including topsoil, sod, and irrigation systems back to preconstruction condition.
- F/A 04 Erosion Control – This work consists of stormwater BMPs authorized and approved by the Engineer. This Force Account is to pay for all necessary work and materials for erosion control items not identified in the plans and at the Engineer's direction. Payment will be made based on time and materials used to perform the work. All items shall be pre-approved by the engineer prior to installation or they will be at no cost to the project.
- F/A 05 Environmental Health & Safety Management – This work is described in Section 250 - Environmental, Health, and Safety Management of the Standard Specifications.

**DENVER (ONLY) NOISE ORDINANCE – PERMIT
VARIANCE APPLICATION TEMPLATE**

Date

Subject: **Request for Variance to Noise Ordinance**

[location where work is to be performed]

Dear Ms. VanDerLoop,

- Name of company/organization seeking the variance
- What is being proposed, where it will occur, expected duration of project
- Brief history regarding proposed project
- Description of the community in the vicinity of the proposed project area

6 (a) Type and Timing of Claim:

- Specific description of proposed project (figures are helpful)
- Why does work need to be conducted at night? (CDOT can provide details to contractor)
- Are there limiting factors preventing this work from being conducted during the day? (CDOT can provide details to contractor)
- Requested variance duration; start and end dates
- Proposed work hours
- Types/categories of equipment being used for the project (if known, a detailed list should be provided as an appendix)
- Is this variance request contingent on other regulatory approvals/permits? (construction, demo, remediation)

6 (b) Date of Payment:

- [The Company's] date of payment is the date shown of this letter/request.

6 (c) Objections to Manager's Determinations:

- Specific items applicant may be in disagreement with concerning Department's recommendations or requirements

6 (d) (1) Hardship if Variance is Not Granted:

- Public safety concerns (CDOT can provide details to contractor)
- Logistical concerns
- Time constraints with a detailed explanation as to why they are necessary
- Cost considerations (specifics desirable)
- Document and evaluate possible alternatives

6 (d) (2) No Adverse Affects to Public Health:

- List expected noise levels to be generated (1) at the site where work is being performed, and (2) at the nearest sensitive receptor (CDOT can provide details to contractor from Roadway Construction Noise Model)
- Detail existing ambient sound levels (L90, Leq, Lmax) for the same areas (at least 1 night of pre-work monitoring; 9 p.m. to 7 a.m.; two nights (one weekday, one weekend) if work will occur on weekdays and weekends)
- How do the proposed levels compare with existing EPA or other guidance? (CDOT can provide details to contractor)
- Are there adverse health effects other than noise to be concerned with as a result of the proposed work? (CDOT can provide details to contractor)

6(d) (3) Maintain Harmony with the Spirit and Purpose of the Ordinance:

(CDOT can provide details to contractor for sec 6(d) (3))

- Is the scope of work considerate of present and future community concerns?
- How does the scope of work seek to minimize impacts to the community?
- Have noise mitigation techniques been included and/or considered?
- Has a noise monitoring plan been considered or proposed?
- How will community outreach be conducted prior to the start of work?
- Has a community response plan been developed to deal with any future complaints?
(contact name and number of on-site representative)

6 (e) Project Location and Haul Routes:

- Figures are preferable (CDOT can provide details to contractor)

6 (f) Petitioner Information

[Company Name and Address]

[Contact Person/Project Manager info]

6 (g) Petitioner's Signature

Sincerely,

[Name and Title]

Note: In addition to this template, CDOT can provide an example of a previously written (City and County of Denver) variance application at the contractor's request.

The following field work summary of requirements will be the sole responsibility of the contractor for maintaining compliance with the Denver (only) Permit Variance agreements once granted by the Department of Environmental Health.

- 1) **Construction Activity Allowable Noise Levels:** Unless the accommodations described in below are provided, construction noise levels shall not exceed:
 - a. an hourly Leq of 75 dBA, or 5 dBA greater than an ambient hourly Leq measuring more than 75 dBA, or
 - b. an Lmax of 86 dBA during the hours of 9:00 p.m. to 7:00 a.m. (Nighttime Hours)
- 2) **Hotel accommodations within eligibility zones:** (Contractor) shall make hotel accommodations available for persons residing within eligibility zones where Nighttime construction noise levels exceed allowable noise levels. The eligibility zone shall be determined by a sound study conducted by the (contractor) and approved by DEH prior to a seven-day notification period. During nighttime construction, (contractor) shall conduct noise monitoring to verify the sound study results and shall expand and may restrict the eligibility zone to the areas where the actual noise levels exceed an hourly Leq of 75 dB(A) or an Lmax of 86 dB(A). (Contractor) shall consider any special circumstances brought to their attention regarding individuals in the eligibility zone who cannot utilize hotel vouchers and who may be at risk during this period of time, e.g., residents of 24-hour health care facilities. (Contractor) shall make their best effort to accommodate the needs of such individuals during Construction Activity.

- 3) **Notifications:** Not less than seven days prior to commencement of construction during Nighttime Hours, (contractor) shall notify individual households located within a 1000 foot radius of the construction, as well as representatives of each affected Registered Neighborhood Organizations. Notice shall be in writing or by direct personal contact from (contractor) representative, and shall include the expected start time, expected duration, character of work activity planned, names and telephone numbers of available contact persons (for additional information or questions), contact numbers for complaints, and any other relevant parameters or programs. Households within the eligibility zone shall receive notice regarding their eligibility for hotel vouchers at the same time or earlier.
- 4) **Mitigation Requirements/Activity Restraints:** When construction is conducted during Nighttime Hours and such activity emits noise levels that exceed ambient noise levels at residential properties, (contractor) shall utilize best reasonable management practices to mitigate construction noise impacts to the adjacent property owners. Best reasonable management practices include the following:
- a. Using reasonable best efforts to complete the construction as quickly as possible.
 - b. Minimizing nighttime construction duration near residential areas whenever possible.
 - c. Re-routing of truck traffic away from residential streets when possible.
 - d. Conducting truck loading, unloading and hauling operations so that noise levels are kept to a minimum
 - e. Configuring equipment on the site to minimize back-up alarm noise, where practical and feasible (for example, by using circular movement of trucks).
 - f. Shielding jackhammers, saws, and pavement breakers through use of an existing sound barrier wall or temporary barrier where practicable
 - g. Maintaining all equipment to meet manufacturer's specifications.
 - h. Informing employees, contractors and subcontractors performing construction of the general requirements of this variance and exercising best efforts to ensure that such employees, contractors and subcontractors follow best management practices in mitigating construction noise.
- 5) **Monitoring:** (Contractor) shall perform monitoring sufficient to demonstrate compliance with the requirements of the noise variance and to demonstrate to the community the noise levels that are present.
- a. Noise measurements shall be collected using ANSI guidelines for community noise monitoring
 - i. Manufacturer's specifications for appropriate meter use shall be followed.
 - ii. All noise measurements shall be made using the A-weighted scale (dB(A)) and a slow response. Fast response measurements may be used to measure impact noise levels.
 - iii. Noise measurements shall be made at the nearest residential property line, unless physically impractical.
 - b. All nighttime construction activity shall be initially monitored. Monitoring shall include spot measurements, as appropriate and hourly Leq. Monitoring shall be required for the following activity groups, but not be limited to:
 - i. Joint Repair
 - ii. Milling Operations
 - iii. Rubble load-out
 - iv. Paving operations

- c. Monitoring shall meet the following requirements:
 - i. Each construction activity shall be monitored a minimum of two days for Lmax and hourly Leq levels to establish an activity baseline for each activity when initially undertaken, and to establish the expected worst case situation (outside lane).
 - ii. Noise monitoring shall be provided in response to all noise complaints.
 - iii. All noise monitoring data and documentation shall be provided to DEH at least weekly when applicable, and such data shall be available to the public from DEH. DEH and their designated representatives may inspect collected data more frequently.

- d. The following documentation, in a manner and form mutually agreed upon by CDOT, (contractor) and DEH, shall be provided for noise monitoring that is conducted:
 - i. Manufacturer names, model numbers, and serial numbers of each SLM and acoustical calibrator used.
 - ii. Software manufacturer, program and version.
 - iii. Dates of annual certified calibration of SLM, microphone and acoustical calibrator.
 - iv. Pre- and post- monitoring calibration data for the Sound Level Meter.
 - v. Date and specific location (address if appropriate) of monitoring.
 - vi. Start time and end time of monitoring
 - vii. Ambient weather conditions including temperature, relative humidity, wind speed and cloud cover.
 - viii. Signature of technician collecting the data
 - ix. List of each hourly Leq for the monitoring period, with associated Lmax levels.
 - x. All measurements associated with any unusual noise events that occurred, cause of such event if known, correction of such event (if any), and adjusted and unadjusted measurements.

- 6) **Complaint Notification and Response:** (Contractor) shall ensure that methods are available to receive, address, and respond to concerns raised by people in the community, through:
 - a. Assuring that a field representative is available to respond to complaints regarding construction noise levels and provide monitoring. The field representative shall be empowered to shut down construction activity, authorize correction or remediation of sources of excess noise, and authorize resumption of construction activity as necessary to maintain compliance with allowable noise levels.
 - b. Providing telephone access to a field representative during hours of project activities to receive complaints or comments from the public for the duration of the project. All complaints immediately shall be recorded, investigated and addressed as appropriate by the field representative and reported to DEH in a manner mutually agreed by DEH, CDOT and (contractor). A response, in a reasonable form requested by the caller, summarizing the investigation and any corrective actions taken by CDOT and (contractor) shall be provided to the caller. Written copies of complaints received and responses by (contractor) shall be provided weekly to DEH and CDOT.

All application requirements and chapter 36 ordinance requirements regarding night time construction noise activities must be coordinated by the contractor with the City/County Denver. The contractor is fully responsible for the timely submittal of the variance application and fulfilling the requirements set forth by the City/County of Denver to allow construction activities during p.m. hours under the granted variance.

UTILITIES

The known utilities within the limits of this project are:

UTILITY	CONTACT/EMAIL	PHONE/FAX
CDOT Fiber Optic Backbone 425 C Corporate Circle Golden, CO 80401	Jill Scott Jill.scott@state.co.us	303-512-5805
CenturyLink 5325 Zuni Street, Suite 728 Denver, CO 80221	Alan Smith Alan.i.smith@centurylink.com	918-547-0050
Comcast 1617 S. Acoma Street Denver, CO 80223	Field: Butch Buster Butch_Buster@comcast.com Kip West Kip_West@comcast.com	720-951-5002 303-603-2832
Denver Department of Transportation & Infrastructure 201 West Colfax Ave, Dept. 508 Denver, CO 80202	Alex Kouprievitch Alex.kouprievitch@denvergov.org	720-913-0803
Denver Water 1600 W. 12 th Avenue Denver, CO 80204-3412	Paul Peloquin Paul.peloquin@denverwater.org	303-628-6620
Greenwood Village Public Works 10001 East Costilla Avenue Greenwood Village, CO 80112	Zeke Lynch ZLynch@greenwoodvillage.com	303-708-6149
Metro Wastewater Reclamation District 6450 York Street Denver, CO 80229	Troy Gottschalk TGottschalk@mwr.dst.co.us	303-286-3331
Verizon (MCI) 2553 S Colorado Boulevard Denver, CO 80222	Lane Grady Lane.grady@verizon.com	303-827-9756
Xcel Energy – Electric and Gas 5460 W. 60 th Avenue Arvada, CO 80003	Field: Marissa Montoya Marisa.l.montoya@xcelenergy.com Mapping: Gary Mostinger Gary.d.mostinger@xcelenergy.com	303-571-3720 303-571-3186

-2-
UTILITIES

The work described in these plans and specifications requires full cooperation between the Contractor and the utility owners in accordance with Subsection 105.11 in conducting their respective operations, to complete the utility work with minimum delay to the project.

PART 1 CONTRACTOR SHALL PERFORM THE WORK LISTED BELOW:

Coordinate project construction with the performance by the utility owner of each utility work element listed in Part 2 below. Perform preparatory work specified in Part 2 for each utility work element. Provide an accurate construction schedule that includes all utility work elements to the owner of each impacted utility.

Provide each utility owner with weekly updates to the schedule. Conduct detailed utility coordination meetings prior to each construction phase to coordinate all requirements and schedules, and provide other necessary accommodations as directed by the Engineer. Notify each utility owner in writing, with a copy to the Engineer, prior to the time each utility work element is to be performed by the utility owner. Provide the notice with the number of days specified in Part 2 immediately prior to the time the utility work must be begun to meet the project schedule.

Provide traffic control, as directed by the Engineer, for any utility work by the utility owner expected to be coordinated with construction. However, traffic control for utility work outside of typical project work hours shall be the responsibility of the utility owner.

Perform each utility work element for every utility owner listed here in Part 1. Notify each utility owner in advance of any work being done by the Contractor to its facility, so that the utility owner can coordinate its inspections for final acceptance of the work with the Engineer.

Project Limits – All Utility Owners

Prior to excavating, the Contractor shall positively locate (through potholing) all potential conflicts with existing underground utilities and proposed construction, as determined by the Contractor according to proposed methods and schedule of construction. The Contractor shall modify construction plans to avoid existing underground facilities as needed, and as approved by the Engineer. Please note that UNCC marks only its members' facilities – Other facilities, such as ditches and drainage pipes may exist, and it is the Contractor's responsibility to investigate, locate and avoid such facilities.

Xcel Energy – Electric Distribution

At the pre-construction meeting, notify the Engineer of schedule requirements for completion of utility work as specified in Part 2. Based upon scheduling needs, the City and County of Denver will send a Work Request to Xcel Energy per the Franchise Agreement between the City and County of Denver and Public Service Company of Colorado, and the related Operating Agreement and Street Lighting Agreement (collectively known as the "Franchise Agreements"). Typically, this work request would have been sent to Xcel Energy during the design phase of the project. Referring to Relocation of Xcel Energy Facilities, Section 5.7 of the Franchise Agreement states that "The relocations set forth in Section 5.7.A of the franchise shall be completed within a reasonable time, not to exceed ninety (90) days from the date on which the Executive Director of Public Works requests, in writing, that the relocation commences."

-3-
UTILITIES

In reference to new/modified service to City facilities (i.e., power supply, removal or installation of poles, etc.), Section 5.3 of the Operating Agreement states: “The company (Xcel Energy) shall complete each project requested by the City within a reasonable time. The Parties agree that for Traffic Facilities, a reasonable time shall not exceed one hundred twenty (120) days from the date upon which the Executive Director of Public Works makes a Work Request and for all other City Facilities a reasonable time shall not exceed one hundred eighty (180) days from the date upon which the Executive Director of Public Works makes a Work Request.” When requesting that the City initiate a Work Request to Xcel Energy, the Contractor should consider the time limits contained in the Franchise Agreements.

Denver ITS

Coordinate with Chad Tavelli with Denver ITS for Denver fiber installation and splicing to be completed by the contractor.

PART 2 UTILITY OWNERS SHALL PERFORM THE WORK LISTED BELOW:

The City and County of Denver Contractor shall provide traffic control for any utility work expected to be coordinated with construction, as directed by the City and County of Denver Engineer. However, traffic control for utility work outside of typical project work hours shall be the responsibility of the utility owner. The utility owner shall prepare and submit to the City and County of Denver a Method of Handling Traffic for utility work to be performed outside typical project work hours. The utility owner shall obtain approval of the Method of Handling traffic from the City and County of Denver Engineer prior to beginning the utility work to be performed outside typical project work hours.

Xcel Energy – Electrical Distribution:

The Contractor shall be responsible for the coordination of removal work to be performed by Xcel Energy. The Contractor shall contact the Xcel Energy Builder’s Call Line at 1-800-628-2121 to request, and process to completion, required coordination to remove street light standards and traffic signal poles with luminaires as shown on the plans.

Relocation and removal work to be performed by Xcel Energy at each of the project’s locations are:

1. I-225 at Yosemite Street, North Intersection: Xcel Energy shall remove the underground power feed on the southwest corner of the intersection. This work is expected to be coordinated with construction and take 2 working days to complete.
2. I-225 at Yosemite Street, South Intersection: Xcel Energy shall remove an existing overhead power feed on the southwest corner of the intersection. This work is expected to be coordinated with construction and take 2 working days to complete.

All cost from Xcel Energy’s power feed removal work shall be per the franchise agreement and will be at no cost to the project.

After the CCD Contractor has completed the installation for the traffic signal poles and luminaries including conduit, electric meter foundation and pedestal, and wiring to the power source at each location, Xcel forces shall connect the meter and power source and install new transformers. This work is expected to be coordinated with construction and take 1 working day at each location to complete. All cost charges from the power service provider, and all necessary materials, labor and coordination required to establish new power sources required for permanent operation of equipment as shown in the plans shall be reimbursed from the Force Account Furnish and Install Electrical Service.

~~-4-~~
UTILITIES

After the Proposed traffic signals are operational, Xcel forces shall disconnect the power to the existing traffic signals. After the Contractor has removed all of the traffic signal equipment including mast arm, Xcel forces shall disconnect and remove the existing traffic signal poles that have a luminaire as shown on the plans. Existing traffic signal poles without luminaires shall be removed by the Contractor. This work is expected to be coordinated with construction and take 1 working day at each intersection to complete.

Traffic light poles at the I-225 and Yosemite interchange are coated with lead-based paint. Xcel shall follow any state and federal requirements for removal and disposal of lead-based paint. Xcel will be responsible for workers health and safety and must comply with Occupational Safety and Health Administration (OSHA) Regulation 1926.62 during project activities.

All cost from Xcel Energy's disconnection of the existing power source and removal of the existing traffic signal pole and luminaires work shall be per the franchise agreement and will be at no cost to the project.

The Contractor shall provide the utility owner written notice 45 days immediately prior to each utility work element at each intersection that is to be coordinated with construction.

Denver ITS

Denver ITS department shall inspect all Denver fiber work.

GENERAL:

Utilities are depicted on these plans in accordance with their achieved "Quality Level" as defined in the American Society of Civil Engineer's document ASCE 38, "Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data". Reliance upon these data for risk management purposes during bidding does not relieve the excavator or utility owner from following all applicable utility damage prevention statutes, policies, and/or procedures during excavation.

The Contractor shall comply with Article 1.5 of Title 9, CRS ("Excavation Requirements") when excavating or grading is planned in the area of underground utility facilities. The Contractor shall notify all affected utilities at least two (2) business days, not including the actual day of notice, prior to commencing such operations. The Contractor shall contact the Utility Notification Center of Colorado (UNCC) at phone no. 811 or 1-800-922-1987, to have locations of UNCC registered lines marked by member companies. All other underground facilities shall be located by contacting the respective owner. Utility service laterals shall also be located prior to beginning excavation or grading.

The locations of utility facilities as shown on the plan and profile sheets were obtained from the best available information. No warranty is made for the adequacy or accuracy of subsurface information provided. The Contractor shall cooperate with the utility owners in their relocation operations as provided in subsection 105.11 of the Standard Specifications for Road and Bridge Construction. No guarantee is made that utility conflicts will be resolved prior to construction activities and any delays resulting from utility relocation work shall be dealt with in accordance with subsection 108.08 of the Standard Specifications for Road and Bridge Construction as amended.

All costs incidental to the foregoing requirements will not be paid for separately but shall be included in the work.

CITY AND COUNTY OF DENVER
STATE OF COLORADO



DENVER
THE MILE HIGH CITY

DEPARTMENT OF TRANSPORTATION &
INFRASTRUCTURE

Plans/Drawings

Contract Number: 202056331

CCD FY19 HSIP Pkg 1: Yosemite St @ I225 -
Traffic Signals Upgrade

October 21, 2020

PoDI / NHS	
FHWA PROJECT OF DIVISION INTEREST (PoDI)?	<input checked="" type="checkbox"/> NO <input type="checkbox"/> YES
NATIONAL HIGHWAY SYSTEM?	<input checked="" type="checkbox"/> NO <input type="checkbox"/> YES

Related Projects:	
P. E. UNDER PROJECT:	N/A
Project Number	N/A
Project Code:	
R.O.W. Projects:	
R.O.W. Project Description	N/A

CITY AND COUNTY OF DENVER DEPARTMENT OF TRANSPORTATION & INFRASTRUCTURE TRANSPORTATION DESIGN STATE OF COLORADO

CONSTRUCTION PLANS OF PROPOSED
FY2019 HSIP PACKAGE 1: I-225 AT YOSEMITE ST
CITY PROJECT MASTER NO. 2020-PROJMSTR-0000088
CDOT PROJECT NO. SHE M320-125 (22935)



APPROVED BY:	
	9/21/2020
DIRECTOR OF DOTI	DATE
	9/21/2020
CITY ENGINEER	DATE
	9/11/2020
DIRECTOR OF ENGINEERING CAPITAL PROJECTS	DATE
	9/8/2020
CITY TRAFFIC ENGINEER	DATE



PROJECT LOCATION MAP

SHEET NO.	INDEX OF SHEETS
1	TITLE SHEET
2-3	STANDARDS PLANS LISTS
4-7	GENERAL NOTES
8-9	SUMMARY OF APPROXIMATE QUANTITIES
10-13	STORMWATER MANAGEMENT PLAN
14-15	EROSION CONTROL PLAN
16	TRAFFIC CONTROL PLAN
17-18	SURVEY CONTROL DIAGRAM
19-20	REMOVAL PLANS
21-22	ROADWAY PLANS
23-33	FLOWLINE PROFILES
34-41	ROADWAY DETAILS
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47-48	BRIDGE CONDUIT DETAILS
49-51	SUBSURFACE UTILITY ENGINEERING PLANS



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apexdesign 1675 LARIMER ST, STE 400 PH: 303-339-0440 DENVER, COLORADO 80202 FAX: 303-325-7743

Sheet Revisions		
Date:	Comments	Init.

Department of Transportation & Infrastructure
201 West Colfax Avenue
Denver, CO, 80202

As Constructed	Contract Information
No Revisions:	Contractor:
Revised:	Resident Engineer:
Void:	Project Engineer:
	PROJECT STARTED: / / ACCEPTED: / /
	Comments:

Project No./Code	SHE M320-125, 22935
	2020-PROJMSTR-0000088
Sheet Number	1

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PoDI / NHS	
FHWA PROJECT OF DIVISION INTEREST (PoDI)?	<input type="checkbox"/> NO <input type="checkbox"/> YES
NATIONAL HIGHWAY SYSTEM?	<input type="checkbox"/> NO <input type="checkbox"/> YES

Related Projects:	
P. E. UNDER PROJECT:	N/A
Project Number	N/A
Project Code:	N/A
R.O.W. Projects:	
R.O.W. Project Description	N/A

CITY AND COUNTY OF DENVER DEPARTMENT OF TRANSPORTATION & INFRASTRUCTURE TRANSPORTATION DESIGN STATE OF COLORADO

CONSTRUCTION PLANS OF PROPOSED
FY2019 HSIP PACKAGE 1: I-225 AT YOSEMITE ST
CITY PROJECT MASTER NO. 2020-PROJMSTR-0000088
CDOT PROJECT NO. SHE M320-125 (22935)

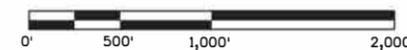


CITY AND COUNTY OF DENVER
DEPARTMENT OF TRANSPORTATION AND
INFRASTRUCTURE

APPROVED BY:	
_____ DIRECTOR OF DOTI	_____ DATE
_____ CITY ENGINEER	_____ DATE
_____ DIRECTOR OF ENGINEERING CAPITAL PROJECTS	_____ DATE
_____ CITY TRAFFIC ENGINEER	_____ DATE



PROJECT LOCATION MAP



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49-51	SUBSURFACE UTILITY ENGINEERING PLANS



**Know what's below.
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Sheet Revisions		
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**Department of Transportation
& Infrastructure**
201 West Colfax Avenue
Denver, CO, 80202

As Constructed
No Revisions:
Revised:
Void:

Contract Information	
Contractor:	
Resident Engineer:	
Project Engineer:	
PROJECT STARTED: / /	ACCEPTED: / /
Comments:	

Project No./Code
SHE M320-125, 22935
2020-PROJMSTR-0000088
Sheet Number 1

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TRANSPORTATION ENGINEERING STANDARD DRAWINGS

NO.	DESCRIPTION
1.0	<input checked="" type="checkbox"/> INDEX OF STANDARD DRAWINGS
1.1	<input type="checkbox"/> LEGEND
2.0	<input type="checkbox"/> LOCAL STREET CROSS-SECTION AND STANDARD UTILITY PLACEMENT DETAIL
3.0	<input type="checkbox"/> COLLECTOR - 2 OR 3 LANE CROSS-SECTION
4.0	<input type="checkbox"/> ARTERIAL - 4 LANE WITH MEDIAN AND NO PARKING CROSS-SECTION
4.1	<input type="checkbox"/> ARTERIAL - 4 LANE WITH MEDIAN AND PARKING CROSS-SECTION
4.2	<input type="checkbox"/> ARTERIAL - 6 LANE CROSS-SECTION
5.0	<input checked="" type="checkbox"/> CURB & GUTTER AND DETACHED SIDEWALK
5.1	<input checked="" type="checkbox"/> CURB & GUTTER AND ATTACHED SIDEWALK
5.2	<input checked="" type="checkbox"/> TYPICAL CURB & GUTTER SECTIONS
5.3	<input type="checkbox"/> SPECIAL USE CURB & GUTTER SECTIONS
5.4	<input type="checkbox"/> CONCRETE GUTTER OVERLAY
5.5	<input type="checkbox"/> CURB BULB EXTENSION
5.6	<input checked="" type="checkbox"/> MONOLITHIC MEDIAN CURB NOSE
6.0	<input type="checkbox"/> STANDARD RESIDENTIAL CURB CUT
6.1	<input type="checkbox"/> STANDARD COMMERCIAL AND MULTI-FAMILY CURB CUT
6.2	<input type="checkbox"/> CURB CUT CROSS-SECTIONS
6.3	<input type="checkbox"/> CORNER CLEARANCES & MINIMUM DISTANCES BETWEEN CURB CUTS
7.0a,b	<input checked="" type="checkbox"/> GENERAL NOTES FOR CURB RAMPS
7.1	<input checked="" type="checkbox"/> CURB RAMP TYPE 1
7.2a	<input checked="" type="checkbox"/> CURB RAMP TYPE 2
7.2b	<input type="checkbox"/> CURB RAMP TYPE 2 MODIFIED (FOR COMBINATION CURB, GUTTER AND SIDEWALK)
7.3	<input checked="" type="checkbox"/> CURB RAMP TYPE 3
7.4	<input checked="" type="checkbox"/> CURB RAMP TYPE 4
7.5	<input type="checkbox"/> DOWNTOWN SIGNALIZED CORNER BLENDED TRANSITION
7.6a,b	<input checked="" type="checkbox"/> CURB RAMP TRUNCATED DOME PLACEMENT OPTIONS
7.7	<input checked="" type="checkbox"/> CURB RAMP TYPICAL SECTION
7.8	<input checked="" type="checkbox"/> TYPICAL SIDEWALK TRANSITIONS TO CURB RAMP LANDING
7.9	<input type="checkbox"/> SIGNAL EQUIPMENT CLEAR ZONE
8.0	<input type="checkbox"/> INTERSECTION VALLEY GUTTER
8.1	<input type="checkbox"/> SIDEWALK CHASE DRAIN AND TREAD PLATE
9.0	<input type="checkbox"/> TYPICAL CONCRETE BUS PULLOUT
9.1	<input type="checkbox"/> TYPICAL CONCRETE BUS PAD IN ASPHALT ROADWAY
10.0	<input type="checkbox"/> TYPICAL ALLEY LAYOUT
10.1	<input type="checkbox"/> ALLEY CUT
10.2	<input type="checkbox"/> ALLEY CUT (HISTORICAL DISTRICT)
10.3	<input type="checkbox"/> TYPICAL ALLEY CROSS-SECTION
10.4	<input type="checkbox"/> ALLEY CURB HEAD
10.5	<input type="checkbox"/> "L" TYPE ALLEY CONFIGURATIONS
11.0a,b,c	<input checked="" type="checkbox"/> GENERAL NOTES FOR CONCRETE PAVEMENT AND PAVEMENT JOINTS
11.1	<input type="checkbox"/> CONCRETE NON-ROADWAY JOINTS H AND Z
11.2	<input type="checkbox"/> CONCRETE ROADWAY JOINTS AND TRANSITIONS A-DA
11.3	<input type="checkbox"/> CONCRETE ROADWAY JOINTS AND TRANSITIONS DC-L
11.4	<input type="checkbox"/> CONCRETE ROADWAY JOINTS AND TRANSITIONS SA-X
11.5	<input type="checkbox"/> CONCRETE ROADWAY JOINTS SEALANTS
11.6	<input type="checkbox"/> CONCRETE ROADWAY JOINTS AT NEW MANHOLES AND ALL INLETS
11.7	<input type="checkbox"/> CONCRETE ROADWAY JOINTS AT EXISTING MANHOLES
11.8	<input type="checkbox"/> CONCRETE ROADWAY TYPICAL JOINT LAYOUT
11.9	<input type="checkbox"/> CONCRETE ROADWAY PANEL REPLACEMENT
11.10	<input type="checkbox"/> CONCRETE STREET EXPLORATORY HOLES (POTHoles) TYPICAL REPAIR
12.0	<input checked="" type="checkbox"/> ASPHALT PATCH

TRANSPORTATION ENGINEERING STANDARD DRAWINGS

NO.	DESCRIPTION
12.1	<input checked="" type="checkbox"/> TRENCH PATCH THROUGH EXISTING GRAVEL OR LANDSCAPE MATERIALS
12.2	<input type="checkbox"/> TRENCH VERTICAL PATCH (ASPHALT) IN MORATORIUM STREET
12.3	<input type="checkbox"/> TRENCH ("T") PATCH (CONCRETE)
12.4	<input type="checkbox"/> TRENCH BACKFILL MATERIAL REQUIREMENTS
12.5	<input checked="" type="checkbox"/> TYPICAL ASPHALT PAVEMENT DETAIL
12.6	<input checked="" type="checkbox"/> TYPICAL ASPHALT PAVEMENT DETAIL LIFT THICKNESS CRITERIA
12.7	<input checked="" type="checkbox"/> TYPICAL ASPHALT MIX DETAILS BY TRAFFIC USE OR LIFT POSITION
13.0	<input type="checkbox"/> TREE PLANTER (RAISED CURB)
13.1	<input type="checkbox"/> TREE PLANTER (GRATES)
13.2	<input type="checkbox"/> SIDEWALK CLEAR ZONES
13.3	<input type="checkbox"/> AMENITY ZONE PERMEABLE PAVERS
14.0	<input type="checkbox"/> STANDARD CUL-DE-SAC
15.0	<input type="checkbox"/> RIGHT-OF-WAY SURVEY CONTROL-RANGE POINTS

TRAFFIC STANDARD DRAWINGS

16.1.0.1	<input checked="" type="checkbox"/> 2019 TRAFFIC SIGNAL STANDARD DRAWINGS INDEX
16.1.0.2	<input checked="" type="checkbox"/> 2019 TRAFFIC SIGNS OF PAVEMENT MARKINGS INDEX
16.1.1	<input checked="" type="checkbox"/> TRAFFIC SIGNAL NOTES
16.1.2.1	<input checked="" type="checkbox"/> LEGEND
16.1.2.2	<input checked="" type="checkbox"/> KEY NOTES
16.1.3	<input type="checkbox"/> SPAN WIRE SIGNAL DESIGN
16.1.4	<input checked="" type="checkbox"/> MOUNTING HARDWARE
16.1.5.1	<input type="checkbox"/> LOOP DETECTION SHEET 1
16.1.5.2	<input type="checkbox"/> LOOP DETECTION SHEET 2
16.1.6	<input checked="" type="checkbox"/> CONDUIT DETAILS
16.1.7	<input checked="" type="checkbox"/> PULL BOXES
16.1.8	<input checked="" type="checkbox"/> SIGNAL POLE FOUNDATION
16.1.9.1	<input checked="" type="checkbox"/> MAST ARM POLE LOADS SHEET 1
16.1.9.2	<input checked="" type="checkbox"/> MAST ARM POLE LOADS SHEET 2
16.1.10.1	<input checked="" type="checkbox"/> MOUNTING DETAILS SHEET 1
16.1.10.2	<input checked="" type="checkbox"/> MOUNTING DETAILS SHEET 2
16.1.11	<input checked="" type="checkbox"/> TABLE DATA
16.1.12.1	<input checked="" type="checkbox"/> SIGNAL POLE DETAILS - NO MAST ARM SHEET 1
16.1.12.2	<input checked="" type="checkbox"/> SIGNAL POLE DETAILS - NO MAST ARM SHEET 2
16.1.13.1	<input checked="" type="checkbox"/> PEDESTAL POLE DETAILS SHEET 1
16.1.13.2	<input checked="" type="checkbox"/> PEDESTAL POLE DETAILS SHEET 2
16.1.14	<input checked="" type="checkbox"/> POLE FOUNDATION DETAILS
16.1.15	<input checked="" type="checkbox"/> FOUNDATION FOR XCEL FACILITIES
16.1.16	<input checked="" type="checkbox"/> FOUNDATION FOR CAST-IN-PLACE TRAFFIC SIGNAL POLE
16.1.17.1	<input checked="" type="checkbox"/> "P" CABINET & BASE SHEET 1
16.1.17.2	<input checked="" type="checkbox"/> "P" CABINET & BASE SHEET 2
16.1.18	<input type="checkbox"/> "M" CABINET BASE



TRAFFIC STANDARD DRAWINGS

NO.	DESCRIPTION
16.1.19	<input checked="" type="checkbox"/> METER PEDESTAL CABINET DETAILS
16.1.20	<input checked="" type="checkbox"/> METER PEDESTAL CABINET FOUNDATION AND BASE
16.1.21	<input type="checkbox"/> FLASHING BEACON DETAIL
16.1.22	<input type="checkbox"/> DRIVER'S FEEDBACK SIGN DETAILS
16.1.23	<input type="checkbox"/> FLASHING BEACON & SIGN SHEET 1
16.1.24	<input type="checkbox"/> FLASHING BEACON & SIGN SHEET 2
16.1.25.1	<input type="checkbox"/> RRFB DETAIL & SIGN SHEET 1
16.1.25.2	<input type="checkbox"/> RRFB DETAIL & SIGN SHEET 2
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CITY AND COUNTY OF DENVER
2019 STANDARDS PLANS LIST

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Detailer:	D. HUDSON	
Subset:	STD PLAN	Subset Sheets: 1 of 2

Project No./Code
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Sheet Number 2

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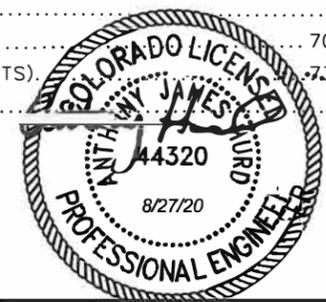
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COLORADO
DEPARTMENT OF TRANSPORTATION
M&S STANDARDS PLANS LIST
July 31, 2019
Revised on August 21, 2020

ALL OF THE M&S STANDARD PLANS, AS SUPPLEMENTED AND REVISED, APPLY TO THIS PROJECT WHEN USED BY DESIGNATED PAY ITEM OR SUBSIDIARY ITEM.

THE M&S STANDARD PLANS USED TO DESIGN THIS PROJECT ARE INDICATED BY A MARKED BOX , AND WILL BE ATTACHED TO THE PLANS. ALL THE OTHER M&S STANDARD PLANS ARE STILL ELIGIBLE FOR CONSTRUCTION IF APPROVED BY AN APPROPRIATE CDOT ENGINEER.



Print Date: 8/27/2020 File Name: DES_CDDT_Std Plans List.dgn Horiz. Scale: N/A Vert. Scale: N/A	Sheet Revisions <table border="1"> <thead> <tr> <th>Date:</th> <th>Comments</th> <th>Init.</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	Date:	Comments	Init.										 Department of Transportation & Infrastructure 201 West Colfax Avenue Denver, CO, 80202	As Constructed No Revisions: Revised: Void:	I-225 AT YOSEMITE CDOT STANDARDS PLANS LIST Designer: T. HURD Detailer: D. HUDSON Subset: STD PLAN Subset Sheets: 2 of 2	Project No./Code SHE M320-125, 22935 2020-PRDJMSTR-0000088 Sheet Number 3
Date:	Comments	Init.															

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GENERAL NOTES:

1. ANY WORK WITHIN CDDT RIGHT-OF-WAY MUST BE PERFORMED ACCORDING TO THE STANDARDS SET FORTH IN THE LATEST EDITIONS OF THE STANDARD PLANS, M&S STANDARDS, CDDT COLORADO HIGHWAY SPECIFICATIONS, AND ANY NEW AND REVISED STANDARDS AND SPECIFICATIONS. MOREOVER, ANY SUCH WORK SHALL BE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE PROJECT SPECIAL PROVISIONS AND STANDARD SPECIAL PROVISIONS.
2. CONTRACTOR SHALL COMPLY WITH CDDT-PERSONAL PROTECTIVE EQUIPMENT USE PROCEDURAL DIRECTIVE 80.1, WHICH WILL BE PROVIDED TO THE CONTRACTOR AT THE PRE-CONSTRUCTION CONFERENCE. CONTRACTOR SHALL MAKE EVERY REASONABLE EFFORT TO START ASSIGNED WORK WITHIN TWO WEEKS OF NOTIFICATION.
3. ALL WORK IN THE CITY ROW SHALL MEET CCD DOTI STANDARDS & DETAILS, LATEST EDITION.
4. PRIOR TO THE START OF ANY ROW WORK, THE CONTRACTOR SHALL SCHEDULE A PRECONSTRUCTION CONFERENCE AND INVITE DOTI ROW CONSTRUCTION ENGINEERING. CALL 303-446-3469 TO SCHEDULE A MEETING. ROW PERMITS CAN BE FOUND AT THE FOLLOWING ONLINE LINK. ALLOW 5 DAYS FOR PROCESSING.
<https://www.denvergov.org/content/denvergov/en/transportation-infrastructure/programs-services/right-of-way-services/street-occupancy.html>
5. THE USE OF TYPICAL TRAFFIC CONTROL PLANS (TCP) IS LIMITED TO USE ON LOCAL OR RESIDENTIAL STREETS. SITE SPECIFIC METHODS OF HANDLING TRAFFIC (MHT) ARE REQUIRED FOR LANE OR SIDEWALK CLOSURES ON COLLECTOR OR ARTERIAL STREETS.
6. CONTRACTOR MUST CONTACT DENVER PARKS AT PARKS.LOCATORS@DENVERGOV.ORG OR 720-865-6976 WHEN ANY WORK IS OCCURRING ADJACENT TO PARKS AND PARKWAYS.
7. CONTRACTOR WILL NEED DENVER PARKS PERMIT IF INTEND TO TOUCH ANY DENVER PARKS (PARKS OR PARKWAYS OR PARKS EASEMENTS). CONTACT DENVER PARKS AT PARKS.LOCATORS@DENVERGOV.ORG OR 720-865-6976.
8. CONTACT ERICK ANDERSON 720-865-6975 TO COORDINATE PROJECT WORK IN PARKS MAINTAINED AREAS.
9. RTD REQUIRES A THREE DAY NOTIFICATION FOR ALL BUS STOP CLOSURES. ALL REQUESTS NEED TO BE SENT TO PETE MUNIZ AT 303-299-6561 OR PETE.MUNIZ@RTD-DENVER.COM. ANY EMERGENCY CLOSURES SHOULD BE SENT TO PETE MUNIZ IMMEDIATELY.
10. ALL CITY & COUNTY OF DENVER (CCD) STORM AND/OR SANITARY SEWERS, INCLUDING MANHOLE ADJUSTMENTS, ARE TO BE INSPECTED BY CCD MAINLINE INSPECTIONS. THE CONTRACTOR SHALL CALL MAINLINE INSPECTIONS AT 303-446-3722, A MINIMUM OF TWO (2) BUSINESS DAYS PRIOR TO THE PRE-CONSTRUCTION MEETING AND PRIOR TO STARTING ANY WORK. SEWER LOCATES CAN BE REQUESTED BY CALLING 303-446-3744. ALL CCD STORM AND/OR SANITARY SEWERS MUST BE CONSTRUCTED IN ACCORDANCE WITH CURRENT CCD-WASTEWATER MANAGEMENT DIVISION (WMD) STANDARD DETAILS AND SPECIFICATIONS.
11. IN ADDITION TO THE ITEMS TABULATED THROUGHOUT THE PLAN SET, IT IS ESTIMATED THAT THE FOLLOWING ITEMS WILL BE REQUIRED FOR THIS PROJECT:

ITEM NUMBER	DESCRIPTION	UNIT	QUANTITY
625-00000	CONSTRUCTION SURVEYING	LS	1
626-00000	MOBILIZATION	LS	1

TRAFFIC SIGNALS:

12. FIBER OPTIC CABLE "SLACK" SHOULD BE PROVIDED AS FOLLOWS:
 - A) 50 FEET OF BACKBONE CABLE IN EACH INTERMEDIATE PULL BOX.
 - B) 100 FEET OF BACKBONE CABLE AT EACH SPLICE POINT.
 - C) 10 FEET OF LATERAL CABLE IN EACH CONTROLLER CABINET.
 - D) 50 FEET OF LATERAL CABLE IN EACH COMMUNICATION PULL BOX.
13. FIBER OPTIC CABLE SHALL BE NEATLY COILED AND CLEARLY TAGGED AND LABELED AT EACH COMMUNICATION PULL BOX AT ALL LOCATIONS WHERE THE FIBER IS EXPOSED.
14. TRAFFIC SIGNAL WORK FOR THIS PROJECT SHALL BE COMPLETED TO THE CITY AND COUNTY OF DENVER'S STANDARDS AND SPECIFICATIONS.
15. ALL TRAFFIC SIGNAL INDICATIONS SHALL BE LED TYPE.
16. ALL TRAFFIC SIGNAL POLES SHALL BE INSTALLED AT LOCATIONS AS SHOWN ON THE PLANS. ANY FIELD ADJUSTMENT TO THE TRAFFIC SIGNAL POLES AND PULL BOX LOCATIONS MUST BE APPROVED BY THE ENGINEER.
17. TRAFFIC AND COMMUNICATIONS PULL BOXES ARE TYPE B AND C, RESPECTIVELY, UNLESS OTHERWISE NOTED IN THE PLANS.
18. THE CONTRACTOR SHALL COORDINATE WITH XCEL ENERGY FOR REMOVAL OF EXISTING TRAFFIC SIGNAL POLES WITH LUMINAIRES.
19. ALL SIGNAL EQUIPMENT TO BE REMOVED SHALL BE DELIVERED TO DENVER TRAFFIC OPERATIONS DEPARTMENT. CALL 720-865-4002 TO COORDINATE. REMOVAL OF TRAFFIC SIGNAL EQUIPMENT WILL BE PAID FOR AS LUMP SUM.
20. EXISTING SIGNAL OPERATIONS SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION.
21. PEDESTRIAN INSTRUCTION SIGNS, R10-3E, SHALL BE INCLUDED WITH THE ASSOCIATED PUSH BUTTON STATION. THE PEDESTRIAN INSTRUCTION SIGN SHALL NOT BE PAID FOR SEPARATELY BUT INCLUDED IN THE COST OF THE PEDESTRIAN PUSH BUTTON PAY ITEM.
22. DELIVER CCTV CAMERAS TO DENVER TRAFFIC OPERATIONS DEPARTMENT FOR CALIBRATION.
23. POLE-MOUNTED SIGNAL HEADS MAY HAVE SKEWED ORIENTATION FOR PLAN PURPOSES ONLY AND DO NOT SHOW EXACT ORIENTATION. FIELD INSTALLATION SHALL ORIENT SIGNAL HEADS TO FACE THE INTENDED ONCOMING VEHICULAR TRAFFIC.
24. ALL LUMINAIRES SHALL BE LED 5300 LUMENS.
25. THE QUANTITY OF BATTERIES PROVIDED IN THE UPS SHALL BE SUFFICIENT TO PROVIDE A MINIMUM OF 4 HOURS OF POWER AT NORMAL SIGNAL OPERATION.
26. CONTACT DENVER TRAFFIC OPERATIONS AT 720-865-4002 TO ARRANGE FOR TRAFFIC SIGNAL INSPECTION.

FIBER OPTIC CABLE:

27. ALL BACKBONE FIBER OPTIC CABLES SHALL BE 72 STRAND WITH 60 SINGLE-MODE AND 12 MULTI-MODE FIBERS. PAYMENT SHALL BE MADE UNDER THE "TELEMETRY (FIELD)" PAY ITEM.
28. ALL LATERAL FIBER OPTIC CABLES SHALL BE 12 STRAND WITH SIX (6) SINGLE-MODE AND SIX (6) MULTI-MODE FIBERS. PAYMENT SHALL BE MADE UNDER THE "TELEMETRY (FIELD)" PAY ITEM. THE CABLE SHALL CONSIST OF A BLUE TUBE WITH SIX (6) SINGLE-MODE FIBERS AND AN ORANGE TUBE WITH SIX (6) MULTI-MODE FIBERS.
29. ALL SPLICE ORGANIZERS SHALL BE WALL MOUNTED TO THE INSIDE OF THE CONTROLLER CABINET WITH VELCRO TYPE ATTACHMENT. THE SPLICE ORGANIZER AND THE ASSOCIATED ATTACHMENT SHALL BE INCLUDED IN THE COST OF THE "TELEMETRY (FIELD)" PAY ITEM.
30. ANY AND ALL UNUSED MULTI-MODE AND SINGLE-MODE FIBERS SHALL REMAIN UN CUT AND FULLY INTACT (UNDAMAGED).

PAVEMENT MARKINGS:

31. ALL PAVEMENT MARKINGS SHALL BE INSTALLED ON A CLEAN SURFACE, AS CALLED FOR BY THE RESPECTIVE MANUFACTURERS. SURFACE CLEANING BY POWER WASH SHALL ALSO BE REQUIRED WHEN THERE IS A POSSIBILITY OF DEICING MATERIAL ON THE ROAD. BEFORE APPLYING NEW PAVEMENT MARKINGS THE CONTRACTOR MUST REMOVE 80% OF THE OLD MARKINGS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE APPROPRIATE SURFACE PREPARATION. PREPARATION OF THE SURFACE SHALL BE INCLUDED IN THE COST OF THE MATERIAL. PRIOR TO THE PAVEMENT BEING PREPARED FOR STRIPING, THE CONTRACTOR SHALL REVIEW SECTION 107.25 AND ALL OF SECTION 208, IN THE 2019 CDDT STANDARD SPECIFICATIONS BOOK.
32. PAVEMENT MARKING SHALL BE REMOVED FROM THE PAVEMENT TO THE MAXIMUM EXTENT POSSIBLE BY METHODS THAT DO NOT ALTER OR DAMAGE THE SURFACE OR TEXTURE OF THE PAVEMENT TO THE SATISFACTION OF THE ENGINEER. REMOVAL OF PAVEMENT MARKING SHALL BE IN ACCORDANCE OF SECTION 202.05. ALL MATERIAL ON EXISTING ROADWAY, WHICH IS LOOSENED IN THE PROCESS OF PREPARATION OF THE SURFACE FOR STRIPING, NEEDS TO BE CLEARED OFF THE ROADWAY (SWEEPING (PICK-UP BROOM)) IMMEDIATELY AND WILL NOT BE PAID FOR SEPARATELY. NONE OF THIS MATERIAL OR THE WATER USED TO PREPARE THE SURFACE SHALL BE ALLOWED TO RUN OFF INTO ANY STORM DRAIN SYSTEM, VEGETATIVE SWALE, WATERWAY, STREAM, WETLAND OR ADJACENT PROPERTY. IF RUNOFF OCCURS, THE CONTRACTOR SHALL IMMEDIATELY STOP WORK UNTIL INLET PROTECTION CAN BE INSTALLED TO PROTECT THE STORM DRAIN SYSTEM, VEGETATIVE SWALE, WATERWAY, STREAM, WETLAND OR ADJACENT PROPERTY. ANY PROTECTION SHALL BE INCLUDED IN THE COST OF THE PROJECT AND APPROVED BY THE ENGINEER PRIOR TO USE.
33. PAVEMENT MARKING REMOVAL SHALL BE COMPLETED BY SANDBLASTING OR WATERBLASTING METHODS ONLY. GRINDING WILL ONLY BE ALLOWED WITH PRIOR APPROVAL FROM THE ENGINEER.

SIGNING:

34. STREET NAME SIGN LAYOUTS SHALL FOLLOW DENVER TRAFFIC STANDARD DRAWINGS, UNLESS NOTED OTHERWISE IN THE PLANS. FOR ALL STREET NAME SIGN LETTERING, THE CONTRACTOR SHALL USE THE STANDARD ALPHABET FOR HIGHWAY SIGNS AS FOUND IN THE FHWA, STANDARD HIGHWAY SIGNS BOOK, 2004 EDITION. OVERHEAD STREET NAME SIGNS SHALL BE PAID FOR AS SIGN PANEL (SPECIAL).



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File Name: DES_GeneralNotes.dgn			No Revisions:			SHE M320-125, 22935
Horiz. Scale: N/A Vert. Scale: N/A			Revised:	Designer: T. HURD	Structure Numbers	2020-PRDJMSTR-0000088
<p>1675 LARIMER ST, STE 400 PH: 303-339-0440 DENVER, COLORADO 80202 FAX: 303-325-7743</p>		Void:	Detailer: D. HUDSON	Subset Sheets: 1 of 4	Sheet Number 4	
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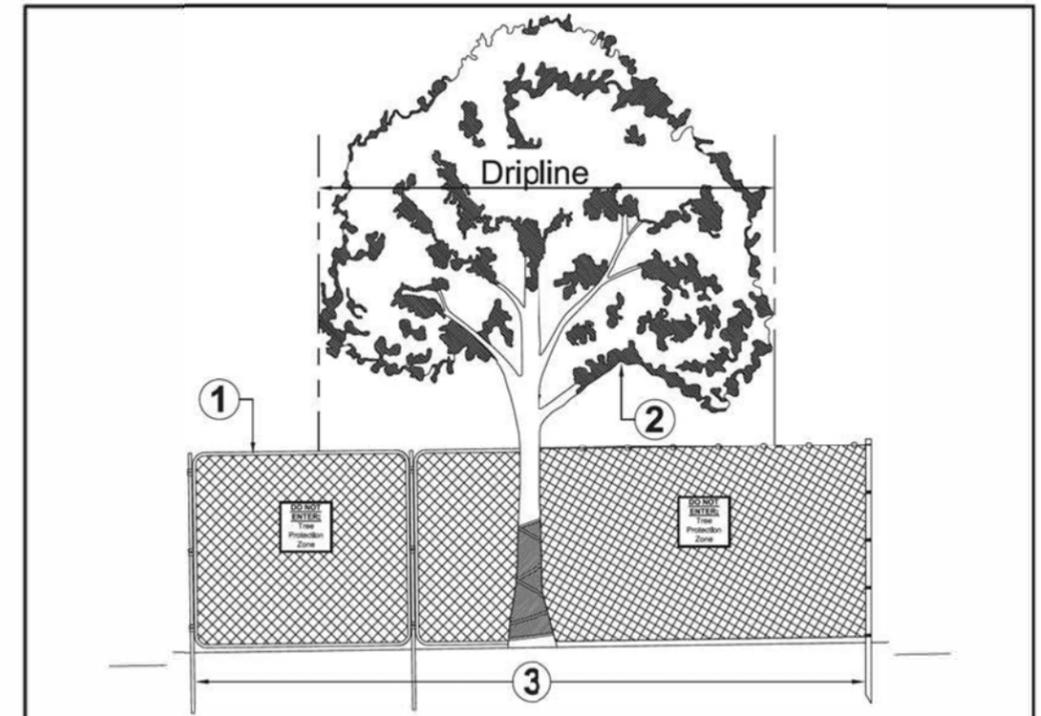
FORESTRY:

- 35. UTILITY PROJECTS THAT DO NOT GO THROUGH THE OFFICE OF THE CITY FORESTRY (OCF) REVIEW PROCESS OR DO NOT RECEIVE OCF APPROVAL; OCF RESERVES THE RIGHT TO PLANT IN THE PRW AND CANNOT BE HELD LIABLE FOR ANY DAMAGE THAT OCCURS TO UTILITY WITHIN PRW WHERE UTILITY IS NOT PLACED AT A MINIMUM DEPTH OF 36 INCHES.
- 36. OCF RESERVES THE RIGHT TO DECLARE UNENCUMBERED SPACE IN THE PRW FOR FUTURE AND REPLACEMENT PRW TREES. SHOULD THESE AREAS BE VIOLATED BY ANY UTILITY, THE UTILITY OWNER SHALL (RE)MOVE UTILITY AT OWNER'S EXPENSE.
- 37. THE CONTRACTOR SHALL NOT SPRAY, CUT, OR TRIM TREES OR OTHER LANDSCAPING ELEMENTS WITHIN ROW, UNLESS SUCH WORK IS OTHERWISE SPECIFIED OR CLEARLY INDICATED ON THE APPROVAL PLANS.
- 38. ANY DISTURBED LANDSCAPING WILL BE REPLACED TO EQUAL OR BETTER CONDITION THAN THAT WHICH EXISTED PRIOR TO WORK.
- 39. SEEDING, SODDING, AND PLANTING SHALL BE AS SPECIFIED OR OTHERWISE APPROVED BY THE CITY. CONSTRUCTION, MAINTENANCE, AND WATERING REQUIREMENTS SHALL CONFORM TO THE CITY STANDARD SPECIFICATIONS. WHERE LANDSCAPE RESTORATION MUST BE DELAYED DUE TO SEASONAL REQUIREMENTS, A SEPARATE PERMIT MAY AUTHORIZE SUCH WORK.
- 40. THE CITY REQUIRES COMPLIANCE WITH THE FOLLOWING WHEN WORK IS NECESSARY AND/OR REQUIRED ADJACENT TO TREES IN THE PRW OR OTHER PUBLIC SPACES:
 - a. TREE PROTECTION ZONE (TPZ) IS THE AREA EQUAL TO 1.5 FEET PER 1-INCH DIAMETER TREE MEASURED AT 4.5 FEET ABOVE GRADE OR THE DRIPLINE OF THE TREE, WHICHEVER IS GREATER.
 - i. TPZ FENCING SHALL BE ESTABLISHED PRIOR TO WORK COMMENCING, SEE TREE PROTECTION DETAIL AVAILABLE ON WEBSITE AND IN THE PLANS.
 - ii. NO MODIFICATION OR EQUIPMENT STORAGE SHALL OCCUR WITHIN THE TPZ WITHOUT PRIOR AUTHORIZATION FROM OCF.
 - iii. HAND WORK ONLY WITHIN THIS AREA UNLESS PRIOR AUTHORIZATION GIVEN BY OCF.
 - iv. ROOTS 2 INCHES AND LARGER SHALL NOT BE CUT. IF CONFLICT ARISES, CONTRACTOR MUST CONTACT OCF PRIOR TO CONTINUANCE OF WORK.
 - b. ALL PIT LOCATIONS MUST BE STAKED AND APPROVED PRIOR TO AN EXCAVATION.
 - c. TRENCHING SHALL NOT OCCUR WITHIN THE TPZ WITHOUT VERIFYING LOCATION OF EXISTING ROOTS THAT MAY BE IMPACTED BY EXCAVATION:
 - i. APPROVED ROOT DISCOVERY METHODS INCLUDE: HAND WORK, AIR SPADE, GROUND PENETRATING RADAR, OR OTHER OCF APPROVED METHOD.
 - ii. ADJUST THE ROUTE TO AVOID ROOTS AS MUCH AS POSSIBLE.
 - iii. MINIMIZE THE WORK PIT TO NO WIDER THAN THE TRENCH.
 - iv. STORE SOIL OPPOSITE THE TREE SIDE OF THE TRENCH.
 - v. BACKFILL QUICKLY AND CLEANLY, AND WATER ROOTS DEEPLY.
 - vi. EXPOSED ROOTS MUST BE KEPT MOIST AT ALL TIMES. COVER EXPOSED ROOTS WITH BURLAP OR OTHER MATERIAL THAT WILL HOLD MOISTURE AGAINST EXPOSED ROOTS.

FORESTRY (CONT.):

- d. TUNNELING/DIRECTIONAL BORING MUST BE AT A MINIMUM OF 36 INCHES BELOW GRADE, 48 INCHES PREFERRED.
 - i. FINAL DEPTH OF INSTALLED UTILITY MUST BE AT A MINIMUM OF 36 INCHES BELOW FINAL GRADE. DUE TO THE INABILITY TO CONSISTENTLY MAINTAIN ACCURATE BORING DEPTHS, IT IS STRONGLY RECOMMENDED TO TARGET A DEPTH OF 48 INCHES TO ENSURE NO VIOLATION OF THE 36-INCH MINIMUM DEPTH OCCURS. THE CITY MAY ORDER THE LOWERING OF INSTALLED UTILITIES WHEN THEY ARE DISCOVERED NOT TO BE DEEPER THAN THE 36-INCH MINIMUM.
- e. THE CRITICAL ROOT ZONE (CRZ) IS THE AREA WITHIN THE TPZ AND EQUAL TO 1 LINEAR FOOT RADIUS PER 1-INCH DIAMETER OF TREE TRUNK MEASURED AT 4.5 FEET ABOVE THE GROUND.
 - i. NO ROOT DISTURBANCE SHALL OCCUR WITHIN THIS AREA.
 - 1. IF NOT POSSIBLE, CONTRACTOR MUST MEET WITH OCF PERSONNEL ON SITE.
 - a. WHEN WORK OCCURS WITHIN CRZ, EXCAVATION MUST BE PERFORMED WITH HAND-TOOLS, AIR SPADE, OR OTHER OCF APPROVED METHOD.
- f. THE STRUCTURAL ROOT ZONE (SRZ) IS THE AREA WITHIN THE TPZ AND EQUAL TO 0.9 TIMES PER INCH DIAMETER OF THE TREE MEASURED AT 4.5 FEET ABOVE THE GROUND (0.9*X).
 - i. NO ACTIVITY SHALL OCCUR WITHIN THIS ZONE WITH THE EXCEPTION OF DIRECTIONAL BORING AT A MINIMUM DEPTH OF 36 INCHES BELOW GRADE, 48 INCHES PREFERRED.
 - 1. FINAL DEPTH OF INSTALLED UTILITY MUST BE AT A MINIMUM OF 36 INCHES BELOW FINAL GRADE. DUE TO THE INABILITY TO CONSISTENTLY MAINTAIN ACCURATE BORING DEPTHS, IT IS STRONGLY RECOMMENDED TO TARGET A DEPTH OF 48 INCHES TO ENSURE NO VIOLATION OF THE 36-INCH MINIMUM DEPTH OCCURS. THE CITY MAY ORDER THE LOWERING OF INSTALLED UTILITIES WHEN THEY ARE DISCOVERED NOT TO BE DEEPER THAN THE 36-INCH MINIMUM.
- 41. SHOULD ANY TREE DAMAGE OCCUR, CONTRACTOR SHALL CONTACT THE OCF IMMEDIATELY.
 - a. RETAIN AN OCF LICENSED TREE COMPANY TO PRUNE BROKEN BRANCHES AS WELL AS COMPENSATORY PRUNING IF NECESSARY FROM ROOT LOSS.
- 42. THE CITY & COUNTY OF DENVER TREE RETENTION AND PROTECTION SPECIFICATIONS MUST BE FOLLOWED. FOR A COPY OF THE TREE PROTECTION SPECIFICATIONS PLEASE CONTACT THE OFFICE OF THE CITY FORESTER AT (720) 913-0651 OR EMAIL AT EDRESIRY@DENVERGOV.ORG.

FORESTRY TREE PROTECTION DETAIL:



Area 1: Tree Protection Zone
 The Tree Protection Zone (TPZ) shall be equal to dripline or eighteen inches (18") radially from the tree for every one inch of trunk diameter at breast height (DBH = 4.5' above soil line), whichever is greater.
 A. Min 6' in height steel chain link fence is required unless otherwise approved by the Office of the City Forester (OCF). Steel chain link fence panels or rolls are acceptable.
 1. When chain link rolls are installed, it shall be fastened to heavy duty steel posts at minimum five (5) attachment points with 12-gauge wire, including points at top and bottom.
 2. Steel posts shall be driven 24" to 36" below grade and spaced at max. five to ten foot (5' - 10') o.c. intervals. Fencing must be kept taut at all times.
 3. "Tree Protection Zone" signs shall be placed one (1) per each tree protection zone minimum or more per direction of City Forester; maintain in the location and condition in which approved.
 4. TPZ, including signage, shall be maintained in the location and condition in which approved.

Area 2: Lower Canopy Protection
 Contact OCF if potential for damage exists and/or if pruning is needed for any clearance issues prior to performing work.

Area 3: Critical Root Zone and/or Structural Root Zone Protection
 Any work in these areas must have written approval of OCF prior to commencement of activity. Contact OCF for instruction.
 The Critical Root Zone (CRZ) shall be equal to twelve inches (12") radially from the tree for every one inch of trunk diameter at breast height.
 The Structural Root Zone (SRZ) shall be equal to six inches (6") radially from the tree for every one inch of trunk diameter at breast height.

Notes
 1. OCF Tree Retention and Protection Specifications shall be followed throughout duration of work.
 2. After TPZ is approved:
 A. TPZ shall not be resized, modified, removed, or altered in any manner without prior written approval. TPZ shall be maintained in place as approved until removal is authorized by OCF.
 B. Entrance/access to the TPZ is not permitted without prior written approval from the OCF.
 C. No materials, debris, equipment, or site amenities shall be stored within the TPZ without prior written approval from the OCF.
 3. While TPZ fencing is in place, trees shall be deep-root watered at an interval of once per week when temperatures are at or above 40-degrees F. Trees shall be watered at the rate of twenty (20) gallons per inch caliper. OCF may ask for documented proof of watering.
 4. Violation of TPZ or damage to protected trees is subject to penalty per City Ordinance.

MARK	BULLETIN	DATE	PREPARED BY OFFICE OF THE CITY FORESTER (OCF) PARKS AND RECREATION DEPARTMENT	CITY AND COUNTY OF DENVER 201 W. COLFAX AVE. DENVER, COLORADO 80202	TREE PROTECTION ZONE STANDARD DETAIL	NOT TO SCALE DATE: 9-14-2018 DIAGRAM TPZ 1
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Print Date: 8/21/2020		<p>Department of Transportation & Infrastructure 201 West Colfax Avenue Denver, CO, 80202</p>	As Constructed	<p>I-225 AT YOSEMITE GENERAL NOTES</p>	Project No./Code	
File Name: DES_General Notes.dgn			No Revisions:		Designer: T. HURD	SHE M320-125, 22935
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CIVIL:

- 43. EXCAVATION AND BASE COMPACTION REQUIRED FOR SOFT OR BROKEN PAVEMENT AREAS SHALL NOT BE PAID FOR SEPARATELY BUT WILL BE INCLUDED IN THE BID ITEM 403-00721 HMA (PATCHING) (ASPHALT) AND SHALL BE PLACED AS DIRECTED BY THE ENGINEER.
- 44. ANY CURB AND GUTTER, ASPHALT OR CONCRETE PAVEMENT, WHICH IS INDICATED TO REMAIN AND IS DAMAGED AS A RESULT OF THE CONTRACTOR'S OPERATION, SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.
- 45. AREAS ADJACENT TO THE SIDEWALK PLACEMENT ON PRIVATE PROPERTY SHALL NOT BE DISTURBED. CONTRACTOR SHALL REPLACE OR REPAIR ANY DAMAGED AREAS AT NO COST TO THE PROJECT.
- 46. WATER SHALL BE USED AS A DUST PALLIATIVE WHERE REQUIRED OR AS DIRECTED BY THE ENGINEER. WATER AND ANY OTHER WETTING SHALL BE INCLUDED IN THE WORK AND WILL NOT BE PAID FOR SEPARATELY.
- 47. MAGNESIUM CHLORIDE DUST PALLIATIVE MAY BE USED FOR DUST CONTROL TO SEAL EMBANKMENTS AND ROADWAY SURFACES THAT HAVE BEEN FINISHED TO ROUGH GRADE AND ARE AWAITING FINAL GRADING/PAVING AND/OR STABILIZATION (SEEDING/MULCHING). THE ENGINEER'S APPROVAL IS REQUIRED BEFORE MAG CHLORIDE IS USED FOR DUST CONTROL. MAG CHLORIDE WILL NOT BE PAID FOR WHEN USED AS A WETTING AGENT OR FOR DAILY DUST CONTROL DURING CONSTRUCTION OPERATIONS. DAILY DUST CONTROL IS INCIDENTAL TO THE AGGREGATE BASE COURSE CONTRACT ITEM AND WILL NOT BE PAID FOR SEPARATELY.
- 48. THE CONTRACTOR SHALL LIMIT CONSTRUCTION ACTIVITIES TO THOSE AREAS WITHIN THE LIMITS OF DISTURBANCE. ANY DISTURBANCE BEYOND THESE LIMITS SHALL BE RESTORED TO ORIGINAL CONDITIONS AT THE CONTRACTOR'S EXPENSE. CONSTRUCTION ACTIVITIES IN ADDITION TO NORMAL CONSTRUCTION PROCEDURES SHALL INCLUDE PARKING OF VEHICLES AND EQUIPMENT, DISPOSAL OF LITTER AND ANY OTHER ACTION WHICH WOULD ALTER EXISTING CONDITIONS.
- 49. A TACK COAT OF EMULSIFIED ASPHALT (SLOW-SETTING) IS TO BE APPLIED TO THE EXISTING ASPHALT SURFACE PRIOR TO PATCHING. DILUTED EMULSIFIED ASPHALT FOR TACK COAT SHALL CONSIST OF 1 PART EMULSIFIED ASPHALT AND 1 PART WATER.
- 50. SWEEPING OF DIRT AND GRAVEL FOR CLEANING THE EXISTING ROADWAY PRIOR TO PLACING BITUMINOUS PAVEMENT WILL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE WORK.
- 51. CONCRETE PAVEMENT, CURB AND GUTTER, SIDEWALK AND OTHER MINOR CONCRETE STRUCTURES SHALL BE CLASS P WITH 4.5% - 7.5% AIR ENTRAINMENT. ACCEPTANCE WILL BE BASED ON TESTING CRITERIA FOR CLASS P CONCRETE, UNLESS CITY ALLOWS CLASS B FOR NON-DRIVEN AREAS.
- 52. CONCRETE MEDIAN COVER MATERIAL SHALL BE CLASS B. ACCEPTANCE WILL BE BASED ON TESTING CRITERIA FOR CLASS B CONCRETE.
- 53. ALL CONCRETE EXPOSED TO WINTER DEICERS SHALL MEET CDDT 601.04 CLASS 2 SULFATE MITIGATION REQUIREMENTS FOR THIS PROJECT.
- 54. TYPE OF COMPACTION FOR THIS PROJECT SHALL BE AASHTO T-180.
- 55. CURB RAMP DETECTABLE WARNINGS SHALL BE CAST IRON, NEENAH FOUNDRY R-4984 OR APPROVED EQUAL. THESE SHALL NOT BE QUANTIFIED AND PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN THE COST OF CONCRETE CURB RAMP (SY).
- 56. MOISTURE DENSITY CONTROL SHALL BE FULL DEPTH FOR EMBANKMENTS AND 0.5 FEET FOR THE BASES OF CUTS AND FILLS. MOISTURE DENSITY CONTROL SHALL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE COST OF THE WORK.
- 57. THIS PROJECT IS NOT SUBJECT TO INCENTIVE/DISINCENTIVE PAYMENTS FOR ASPHALT PAVEMENT OR SMOOTHNESS.
- 58. DOTI T&M PROJECT MANAGER WILL NOTIFY DOTI STREET MAINTENANCE OF ASPHALT PATCH SLOPE EXCEEDING 4% SLOPE.

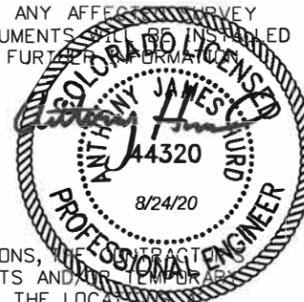
CIVIL (CONT.):

- 59. NO CLEATED OR TRACKED EQUIPMENT MAY WORK IN OR MOVE OVER PAVED SURFACES WITHOUT MATS ON THE DENVER STREET SYSTEM. ALL DIMENSIONS AND RADII ARE TO FLOWLINE UNLESS NOTED OTHERWISE.
- 60. COORDINATES, ELEVATIONS, AND DIMENSIONS CONTAINED IN THESE PLANS ARE CALCULATED FROM A RECENT FIELD SURVEY. THE CONTRACTOR SHALL VERIFY ALL DEPENDENT DIMENSIONS PRIOR TO START OF WORK.
- 61. ANY LAYER OF BITUMINOUS PAVEMENT THAT IS TO HAVE A SUCCEEDING LAYER PLACED THEREON SHALL BE COMPLETED FULL-WIDTH BEFORE A SUCCEEDING LAYER IS PLACED.
- 62. PATCHING SHALL BE TO THE DEPTH OF THE SURROUNDING EXISTING PAVEMENT AS DIRECTED BY THE ENGINEER. THE TOP LIFT MUST BE 2 INCH OR MATCH THE OVERLAY DEPTH AND CONFORM TO THE REQUIREMENTS OF HMA (GRADING SX)(100)(PG 64-28). LOWER LIFTS SHALL ALSO CONFORM TO THE REQUIREMENTS OF HMA (GRADING SX)(100)(PG 64-28). THE MINIMUM AND MAXIMUM LIFT THICKNESSES SHALL BE 2 AND 3 INCHES, RESPECTIVELY.

SURVEYING:

- 63. PROPOSED FINISHED GROUND ELEVATIONS FOR ITEMS TO BE ADJUSTED, RESET OR MODIFIED SHALL BE FIELD VERIFIED BY THE CONTRACTOR.
- 64. PRIOR TO BEGINNING WORK ON THE SOUTHEAST CORNER OF THE SOUTH INTERSECTION, THE CONTRACTOR WILL BE REQUIRED TO OBTAIN A ROW PERMIT FROM THE CITY OF GREENWOOD VILLAGE.
- 65. PRIOR TO BEGINNING WORK ON THE PROJECT, THE CONTRACTOR'S SURVEYOR SHALL PERFORM A SURVEY TO VERIFY ALL SURVEY CONTROL POINTS, CITY OF DENVER RANGE POINTS, SECTION CORNERS, AND BENCHMARKS AS SHOWN ON THE SURVEY CONTROL DIAGRAM. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING ALL SURVEY CONTROL MONUMENTS DISRUPTED BY CONSTRUCTION ACTIVITIES OR BY NEGLIGENCE ON THE PART OF THE CONTRACTOR. THE CONTRACTOR IS REQUIRED TO FOLLOW COLORADO STATE LAW REGARDING SURVEY CONTROL MONUMENTS. THE CONTRACTOR SHALL RETAIN A COLORADO LICENSED PROFESSIONAL LAND SURVEYOR TO RESET ANY AFFECTED SURVEY MONUMENTS. IT IS ESTIMATED THAT 4 SURVEY MONUMENTS WILL BE DAMAGED AND RESTORED AS SPECIFIED IN SECTION 629. FOR FURTHER INFORMATION, CONTACT:

DOTI SURVEY DEPARTMENT
ATTN: CITY SURVEYOR
201 W. COLFAX AVE.
DENVER, CO 80202
720-865-3121



- 66. AFTER COMPLETION OF THE CONSTRUCTION OPERATIONS, THE CONTRACTOR'S SURVEYOR SHALL UPGRADE TEMPORARY RANGE POINTS AND TEMPORARY SECTION CORNERS WITH PERMANENT MONUMENTS AT THE LOCATIONS INDICATED ON THE LAND SURVEY CONTROL PERPETUATION DIAGRAM. MONUMENTS SHALL MEET CURRENT COLORADO STATE LAW AND CITY AND COUNTY OF DENVER STANDARDS. SEE SECTION 629 OF THE SPECIAL PROVISIONS FOR MORE INFORMATION.
- 67. A SURVEY SHALL BE DEPOSITED WITH THE CITY AND COUNTY OF DENVER PER STATE STATUTE. CITY MONUMENT TIE OUT SHEETS SHALL BE PREPARED FOR ALL RANGE POINTS WITHIN THE PROJECT AND DEPOSITED WITH THE CITY SURVEYOR.
- 68. ANY PERSON WHO KNOWINGLY REMOVES, ALTERS, OR DEFACES ANY PUBLIC LAND SURVEY MONUMENT AND/OR BOUNDARY MONUMENT OR ACCESSORY, COMMITS A CLASS TWO (2) MISDEMEANOR PURSUANT TO C.R.S. SECTION 18-4-508.
- 69. ALL COORDINATES SHOWN ON THE PLANS ARE TO THE CONTROL LINES UNLESS OTHERWISE NOTED. THE USE OF CONTROL MONUMENTS FOR CONSTRUCTION STAKING OTHER THAN THOSE SHOWN ON THE PLANS OR APPROVED BY THE PW DEPT IS PROHIBITED, AND USE OF SUCH MONUMENTS IS AT THE CONTRACTOR'S SOLE RISK.

UTILITIES:

- 70. UTILITIES ARE DEPICTED ON THESE PLANS IN ACCORDANCE WITH THEIR ACHIEVED "QUALITY LEVEL" AS DEFINED IN THE AMERICAN SOCIETY OF CIVIL ENGINEERS DOCUMENTATION ASCE 38, "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA." RELIANCE UPON THESE DATA FOR RISK MANAGEMENT PURPOSES DURING BIDDING DOES NOT RELIEVE THE EXCAVATOR OR UTILITY OWNER FROM FOLLOWING ALL APPLICABLE UTILITY DAMAGE PREVENTION STATUES, POLICIES, AND/OR PROCEDURES DURING EXCAVATION.
- 71. THE CONTRACTOR'S ATTENTION IS DIRECTED TO SUBSECTION 105.11 OF THE STANDARD SPECIFICATIONS CONCERNING UTILITIES AND THE UTILITY SPECIFICATION FOR THIS PROJECT. THE PHYSICAL FEATURES WITHIN THE LIMITS OF THE PROJECT HAVE BEEN SHOWN BASED ON THE BEST AVAILABLE INFORMATION. THE CONTRACTOR SHALL VERIFY AND BE RESPONSIBLE FOR ALL FEATURES, INCLUDING ALL UNDERGROUND AND ABOVE GROUND UTILITIES, PRIOR TO BEGINNING ANY WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD LOCATING AND VERIFYING ALL UTILITY INFORMATION. FOR UTILITY CONSTRUCTION COORDINATION, THE CONTRACTOR SHALL CONTACT THE UTILITY NOTIFICATION CENTER FOR COLORADO AT 811.
- 72. THE CONTRACTOR SHALL COMPLY WITH ARTICLE 1.5 OF TITLE 9, CRS("EXCAVATION REQUIREMENTS") WHEN EXCAVATING OR GRADING IS PLANNED IN THE AREA OF UNDERGROUND UTILITY FACILITIES. THE CONTRACTOR SHALL NOTIFY ALL AFFECTED UTILITIES AT LEAST TWO BUSINESS DAYS, NOT INCLUDING THE ACTUAL DAY OF NOTICE, PRIOR TO COMMENCING SUCH OPERATIONS. THE CONTRACTOR SHALL CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO (UNCC) AT 811 OR 1-800-922-1987 TO HAVE LOCATIONS OF UNCC REGISTERED LINES MARKED BY MEMBER COMPANIES. ALL OTHER UNDERGROUND FACILITIES SHALL BE LOCATED BY CONTACTING THE RESPECTIVE OWNER. UTILITY SERVICE LATERALS SHALL BE LOCATED PRIOR TO BEGINNING EXCAVATION OR GRADING.
- 73. THE CONTRACTOR SHALL POTHOLE UTILITIES PRIOR TO ANY EXCAVATION WORK. ALL CONFLICTING UTILITIES SHALL BE EXPOSED BY THE CONTRACTOR PRIOR TO CONSTRUCTION AND INSPECTED BY THE ENGINEER TO VERIFY CONFORMANCE WITH THE PLANS. THIS PARTICULARLY APPLIES TO CULVERT CROSSINGS AND OTHER UNDERGROUND WORK TO BE COMPLETED ON THIS PROJECT BY THE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF UTILITY RELOCATION BY UTILITY COMPANIES, IF REQUIRED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING UTILITIES DURING CONSTRUCTION AND SHALL HOLD THE CITY AND COUNTY OF DENVER HARMLESS FOR DAMAGES ARISING FROM THE CONTRACTOR'S FAILURE TO ADEQUATELY PROTECT EXISTING UTILITIES.
- 74. IT IS ESTIMATED THAT 30 POTHOLES EACH WILL BE REQUIRED FOR UTILITY POTHOLES PER INTERSECTION, 60 TOTAL.
- 75. THE CONTRACTOR SHALL PERFORM ALL REQUIRED UTILITY ADJUSTMENTS ON STORM, SANITARY, AND WATER IMPROVEMENTS. ALL OTHER UTILITY ADJUSTMENTS WILL BE CONSTRUCTED BY THE UTILITY OWNERS.
- 76. THE CONTRACTOR SHALL SUBMIT AN APPLICATION FOR ELECTRICAL SERVICES FOR EVERY XCEL ENERGY WORK ELEMENT THAT IS TO BE COORDINATED WITH THE PROJECT. THE REQUEST IS TO BE PROCESSED THROUGH XCEL ENERGY-BUILDERS CALL LINE AT 1-800-628-2121.

UTILITY:	NORTH	SOUTH
CDDT FIBER OPTIC BACKBONE	●	
COMCAST CABLE	●	
DENVER DOTI	●	●
CENTURYLINK	●	
VERIZON (MCI)	●	
XCEL ENERGY	●	●
DENVER WATER	●	
GREENWOOD VILLAGE PUBLIC WORKS		●
METRO WASTEWATER RECLAMATION DIST		●

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apexdesign 1675 LARIMER ST, STE 400 PH: 303-339-0440
DENVER, COLORADO 80202 FAX: 303-325-7743

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Department of Transportation & Infrastructure
201 West Colfax Avenue
Denver, CO, 80202

As Constructed
No Revisions:
Revised:
Void:

I-225 AT YOSEMITE GENERAL NOTES			
Designer:	T. HURD	Structure	
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ENVIRONMENTAL:

- 77. 10 DAYS PRIOR TO WORK COMMENCING, THE CONTRACTOR'S POTENTIAL POLLUTION REPORT-SPILL CONTINGENCY PREVENTION PLAN SHALL BE COPIED AND ATTACHED TO THE PLANS PER SECTION 107.25. VEHICLE CLEANING MAY OCCUR ON SITE, IN APPROVED AREAS, WHERE WASH WATER CAN BE CONTAINED AND PROPERLY DISPOSED OF.
- 78. THERE SHALL BE NO STOCKPILING OR SIDE CASTING OF WASTE MATERIALS INCLUDING BUT NOT LIMITED TO PAINT CHIPS, ASPHALT, AND CONCRETE ADJACENT TO ANY STATE WATERS THAT RESULT FROM PROJECT ACTIVITIES.
- 79. CONTAINMENT AND CLEAN UP OF EQUIPMENT FUEL, OIL, AND LUBRICANT LEAKS: CONTRACTOR SHALL INSPECT AND CERTIFY EQUIPMENT AND VEHICLES DAILY TO ENSURE PETROLEUM, OILS AND LUBRICANTS (POL) ARE NOT LEAKING ONTO THE SOIL OR PAVEMENT. ABSORBENT MATERIAL OR CONTAINERS APPROVED BY THE ENGINEER SHALL BE USED TO PREVENT LEAKING POL FROM REACHING THE SOIL OR PAVEMENT. CONTRACTOR SHALL HAVE READY APPROVED ABSORBENT MATERIAL OR CONTAINERS OF SUFFICIENT CAPACITY TO CONTAIN ANY LEAKING POL THAT CAN REASONABLY BE FORESEEN. ALL MATERIALS RESULTING FROM POL LEAKAGE CONTROL AND CLEANUP SHALL BE THE PROPERTY OF THE CONTRACTOR AND REMOVED FROM THE SITE. THE COST FOR CONTROL AND CLEANUP OF POL LEAKS SHALL NOT BE PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN THE COST OF THE WORK.
- 80. CONTRACTOR SHALL NEITHER STAGE NOR PARK EQUIPMENT AT ANY TIME OFF THE ROADWAY/SHOULDERS OR ON VEGETATED AREAS, ON PRAIRIE DOG HOLES, OR WITHIN 100 FEET OF WATERWAYS. CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR STAGING AREAS. CONTRACTOR SHALL COMPLETE WORK IN ONE LOCATION BEFORE THEY MOVE TO ANOTHER LOCATION. FOR GRINDING, THE CONTRACTOR SHALL USE GANG STACKED DIAMOND TIP BLADES AND HAVE A VACUUM MACHINE ON SITE TO CONTROL DUST AND SLURRY. THIS ITEM WILL NOT BE PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN THE WORK.
- 81. THE CONTRACTOR SHALL LIMIT CONSTRUCTION ACTIVITIES TO THOSE AREAS WITHIN THE LIMITS OF DISTURBANCE. LIMITS OF DISTURBANCE SHALL BE DETERMINED BY THE ENGINEER AND THE CONTRACTOR. ANY DISTURBANCES BEYOND THESE LIMITS SHALL BE RESTORED TO THE ORIGINAL CONDITION BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE. DISTURBANCES WITHIN THE LIMITS SHALL BE RESTORED BY THE CONTRACTOR AND SHALL BE INCLUDED IN THE COST OF THE WORK. CONSTRUCTION ACTIVITIES IN ADDITION TO NORMAL CONSTRUCTION PROCEDURE SHALL INCLUDE THE PARKING OF VEHICLES OR EQUIPMENT, DISPOSAL OF LITTER, AND ANY OTHER ACTION WHICH WOULD ALTER EXISTING CONDITIONS. ANY OFF ROAD STAGING AREAS MUST BE PRE-APPROVED BY THE ENGINEER.
- 82. AT ANY IRRIGATED LANDSCAPES NO OFF ROAD PARKING, STAGING, OR WORK SHALL OCCUR UNLESS OTHERWISE NOTED. THE CONTRACTOR SHALL REPLACE ANY DAMAGED LANDSCAPE, INCLUDING GRASS, IRRIGATION SYSTEM COMPONENTS, TREES, SHRUBS AND GROUND COVERS TO ITS ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE. SOD SHALL MATCH EXISTING. THE CONTRACTOR SHALL COORDINATE WITH CITY AND COUNTY OF DENVER PERSONNEL AT LEAST FIVE (5) WORKING DAYS IN ADVANCE OF ANY DISTURBANCE IN THE AREA. NO LANDSCAPE SHALL BE WITHOUT WATERING SERVICES DURING THE GROWING SEASON. IF THE IRRIGATION SERVICE IS INTERRUPTED FOR MORE THAN THREE DAYS THE CONTRACTOR SHALL BE LIABLE TO HAND/TRUCK WATER. IF IRREPARABLE DAMAGE TO LANDSCAPED AREAS OCCURS, CONTRACTOR WILL BE RESPONSIBLE FOR ALL PLANT REPLACEMENT IN THE AFFECTED AREA. LANDSCAPE RESTORATION SHALL BE CONSIDERED COMPLETE WHEN THE LANDSCAPE AND IRRIGATION SYSTEM IS RESTORED TO ITS ORIGINAL CONDITION AND APPROVED BY THE MAINTAINING PERSONNEL. ALL REPAIR WORK, TO ANY IRRIGATION COMPONENTS, SHALL BE INSPECTED BY CITY AND COUNTY OF DENVER LANDSCAPE MAINTENANCE FORCES PRIOR TO BURIAL AND ACCEPTANCE OF SAID WORK.
- 83. THE CONTRACTOR WILL PREPARE AND FOLLOW A MATERIAL MANAGEMENT PLAN (MMP) TO ENSURE SPECIAL WASTES AND CONTAMINATED GROUNDWATER ARE HANDLED PROPERLY.
- 84. WHEN THE CONTRACTOR'S OPERATIONS ENCOUNTER ARCHAEOLOGICAL OR PALEONTOLOGICAL DISCOVERIES, ALL AFFECTED OPERATIONS SHALL CEASE AND THE CONTRACTOR SHALL NOTIFY THE ENGINEER.

ENVIRONMENTAL (CONT.):

- 85. CONTRACTOR SHALL TAKE REASONABLE MEASURES TO PREVENT PARTICULATE MATTER FROM BECOMING AIRBORNE AND TO PREVENT THE VISIBLE DISCHARGE OF FUGITIVE PARTICULATE EMISSIONS BEYOND THE PROPERTY LINE FROM WHICH THE EMISSIONS ORIGINATE. THE MEASURES TAKEN MUST BE EFFECTIVE AT ALL TIMES ON THE SITE, INCLUDING PERIODS OF INACTIVITY SUCH AS EVENINGS, WEEKENDS, AND HOLIDAYS AS WELL AS ANY OTHER PERIOD OF INACTIVITY.
- 86. DURING ANY SOIL DISTURBING ACTIVITIES, IF UNKNOWN/UNIDENTIFIED UNDERGROUND STORAGE TANKS, DRUMS, ODOROUS SOIL, STAINED SOIL, ASBESTOS-CEMENT PIPE (TRANSITE), BUILDING DEBRIS, OR WASTE MATERIALS ARE ENCOUNTERED, CONTRACTOR SHALL IMMEDIATELY STOP WORK IN THE AREA OF THE DISCOVERY UNTIL DDPHE MAKES A DETERMINATION OF HOW TO PROCEED. CONTRACTOR SHALL IMMEDIATELY NOTIFY DDPHE OF THE DISCOVERY AT (303) 495-8376.
- 87. EXCESS SOIL FROM A CCD PROJECT MAY BE REUSED AT ANOTHER CCD PROPERTY OR A THIRD-PARTY SITE ONLY IF THE CRITERIA ESTABLISHED IN THE DDPHE OCTOBER 5, 2017, MEMORANDUM TITLED "GUIDANCE FOR REUSE OF SOIL ON CITY PROJECTS" ARE MET AND THE SOIL IS FREE OF ODORS, STAINING, AND DEBRIS. THE GUIDANCE IS LOCATED ON OUR WEBSITE UNDER THE "ABOUT" TAB FOR ENVIRONMENTAL REVIEW AND ASSESSMENT: https://www.denver.gov/content/dam/denvergov/Portals/771/documents/EQ/Land%20Use%20and%20Planning/2019/Soil_Reuse_Guidance.pdf
- 88. DURING EXCAVATION OR ANY SOIL DISTURBING ACTIVITY, COLORADO REGULATIONS REQUIRE ALL EXPOSED CONSTRUCTION AND DEMOLITION DEBRIS (INCLUDING ASH) BE ASSESSED FOR ASBESTOS CONTAMINATION. IT IS THE CONTRACTOR'S/SUB-CONTRACTOR'S RESPONSIBILITY FOR PROVIDING THE ONSITE PERSONNEL (CERTIFIED ASBESTOS BUILDING INSPECTOR) CAPABLE OF THIS REQUIREMENT. ANY AMOUNT OF DEBRIS FOUND TO BE CONTAMINATED WITH ASBESTOS MAY BE CLASSIFIED AS REGULATED ASBESTOS CONTAMINATED SOIL (RACS) AND MUST BE MANAGED, DOCUMENTED, AND DISPOSED OF IN ACCORDANCE WITH THE CITY AND COUNTY OF DENVER'S RACS STANDARD OPERATING PROCEDURE (SEE LINK BELOW) AND THE COLORADO SOLID WASTE REGULATIONS (6 CCR 1007-2, PART 1). ONSITE MANAGEMENT OF RACS REQUIRES IMMEDIATE NOTIFICATION OF TRAINED FIELD PERSONNEL AT THE STATE HEALTH DEPARTMENT, AND IMPLEMENTATION OF MEASURES TO PREVENT CROSS CONTAMINATION TO THE PUBLIC. FOR ADDITIONAL INFORMATION, PLEASE CALL THE DENVER DEPARTMENT OF PUBLIC HEALTH & THE ENVIRONMENT (DDPHE) AT 720-865-5452. https://www.denvergov.org/content/dam/denvergov/Portals/771/documents/EQ/Land%20Use%20and%20Planning/2019/CCOD_RACS_SOP_20190502_Final.pdf
- 89. FILL MATERIAL OR SOIL TO BE IMPORTED AND PLACED ON CCD-OWNED PROPERTY OR PLACED ON REAL PROPERTY TO BE TRANSFERRED TO THE CCD MUST BE FREE OF KNOWN CONTAMINATION (OBSERVED AND DOCUMENTED, OR PREVIOUSLY DOCUMENTED) AND BE ACCEPTABLE FOR UNRESTRICTED RESIDENTIAL USE. CONTACT DAVE ERICKSON (720) 865-5433 FOR CLARIFICATION IF NEEDED.
- 90. PEDESTRIAN USE OF THE NORTH-SOUTH RUNNING SIDEWALK SHALL BE MAINTAINED DURING CONSTRUCTION WITH REASONABLE DETOURS AS NECESSARY.
- 91. THE CONTRACTOR SHALL DIRECT NON-RECYCLABLE, NON-HAZARDOUS WASTES FROM CCD-OWNED OR CONTROLLED PROPERTY OR FACILITIES TO THE DENVER ARAPAHOE DISPOSAL SITE (DADS) LANDFILL FOR DISPOSAL, FOLLOWING THE REQUIREMENTS AND PROCEDURAL GUIDANCE PER CCD EXECUTIVE ORDER 115. LABORATORY ANALYTICAL RESULTS WILL BE REQUIRED PRIOR TO DADS ACCEPTANCE FOR SOIL AND POSSIBLY OTHER MATERIALS. EARLY TESTING IS RECOMMENDED; DDPHE CAN ASSIST. CONTACT DDPHE AT 720 865 5448 WITH QUESTIONS.

ENVIRONMENTAL (CONT.):

- 92. ALL NOISE CAUSED BY CONSTRUCTION OF, OR RESULTING FROM, COMPLETED PROJECTS, MUST COMPLY WITH DENVER'S NOISE ORDINANCE, D.R.M.C. CHAPTER 36 "NOISE CONTROL." EXEMPTED HOURS FOR CONSTRUCTION IN THE CITY AND COUNTY OF DENVER ARE FROM 7 A.M. TO 9 P.M. MONDAY THROUGH FRIDAY AND 8 A.M. TO 5 P.M. ON SATURDAYS AND SUNDAYS. IF THERE IS A NEED TO WORK OUTSIDE OF THE EXEMPTED HOURS: 1) THE CONTRACTOR MUST REQUEST A VARIANCE, AND 2) THE VARIANCE PROCESS NEEDS TO BE STARTED A MINIMUM OF THREE MONTHS PRIOR TO THE DESIRED START DATE. ANY QUESTIONS SHOULD BE DIRECTED TO PAUL RIEDESEL, DDPHE COMMUNITY NOISE PROGRAM, 720-865-5410.92.
- 93. TRAFFIC LIGHT POLES AT THE I-225 AND YOSEMITE INTERCHANGE ARE COATED WITH LEAD-BASED PAINT. FOR ALL TRAFFIC LIGHT POLES NOT OWNED BY XCEL ENERGY, THE CONTRACTOR WILL RECYCLE THOSE POLE IN ACCORDANCE WITH CDDT SPEC 250 AND IN PARTICULAR, SUBSECTION 250.04. THE CONTRACTOR WILL BE RESPONSIBLE FOR WORKERS HEALTH AND SAFETY AND MUST COMPLY WITH OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) REGULATION 1926.62 DURING PROJECT ACTIVITIES.
- 94. THE CONTRACTOR SHALL COMPLY WITH ALL LOCAL AGENCY NOISE ORDINANCES AND/OR OTHER RESTRICTIONS APPLICABLE TO NIGHTTIME CONSTRUCTION ACTIVITIES FOR PROJECTS WITHIN THE LOCAL MUNICIPAL COVERAGE AREA. PROJECTS FALLING WITHIN UNINCORPORATED AREAS OF A COUNTY WILL BE GOVERNED BY COUNTY CODE. THE CONTRACTOR SHALL COORDINATE WITH THE LOCAL AGENCY(S) AND/OR CDDT FOR ALL NECESSARY NOISE EXEMPTIONS OR NOTICES, NOISE PERMIT VARIANCES, AND APPROVALS TO DO NIGHT WORK AS REQUIRED. STANDARD NOISE CONTROLS AND BMPS FOR REDUCING EQUIPMENT AND CONSTRUCTION ACTIVITY NOISE LEVELS SHALL BE UTILIZED IN ALL CASES AND WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CONSISTENTLY EMPLOY WHEN WORKING IN NOISE-SENSITIVE AREAS AFTER 9:00 PM.
- 95. THE CONTRACTOR IS REQUIRED TO REVIEW AND UNDERSTAND ALL LOCAL AGENCY ORDINANCES WITH PROJECT APPLICABLE NIGHT RESTRICTIONS. WHEN CONDITIONS APPLY, THE CONTRACTOR SHALL SUBMIT A NIGHTTIME NOISE ORDINANCE MEMORANDUM(S) TO ALL JURISDICTIONAL LOCAL AUTHORITIES. THIS MEMORANDUM SHALL REQUEST CONSTRUCTION NOISE EXEMPTIONS FOR NIGHT WORK OPERATIONS (AT LEAST TWO WEEKS PRIOR TO THE PROPOSED NIGHT WORK START DATE) WHERE CONSTRUCTION WORK IS SCHEDULED BETWEEN THE HOURS OF 9:00 PM AND 7:00 AM.
- 96. ALL NIGHTTIME CONSTRUCTION ACTIVITIES SUBJECT TO NOISE LEVEL RESTRICTIONS CANNOT BEGIN UNTIL THE NECESSARY DOCUMENTATION AND NOTIFICATIONS HAVE BEEN APPROVED BY THE LOCAL AGENCY AUTHORITY, THE CDDT ENGINEER AND/OR THE CDDT NOISE SPECIALIST. ALL EXEMPTION REQUESTS AND PERMITTING REQUIREMENTS WILL NOT BE PAID FOR SEPARATELY BUT WILL BE INCLUDED IN THE WORK.



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Department of Transportation & Infrastructure
 201 West Colfax Avenue
 Denver, CO, 80202

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No Revisions:
Revised:
Void:

I-225 AT YOSEMITE GENERAL NOTES			
Designer:	T. HURD	Structure	
Detailer:	D. HUDSON	Numbers	
Subset:	GEN NOTES	Subset Sheets:	4 of 4

Project No./Code
SHE M320-125, 22935
2020-PRDJMSTR-0000088
Sheet Number 7

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INDEX			CONTRACT ITEM NO.	CONTRACT ITEM	UNIT	NORTH INTERSECTION		SOUTH INTERSECTION		MISC		PROJECT TOTALS	
BOOK	PAGE	SHEET				PLAN	AS CONST.	PLAN	AS CONST.	Plan	As CONST.	PLAN	AS CONST.
			202-00155	Removal of Wall	LF	3						3	
			202-00190	Removal of Concrete Median Cover Material	SY	71		144				215	
			202-00200	Removal of Sidewalk	SY	81		135				216	
			202-00203	Removal of Curb and Gutter	LF	348		382				730	
			202-00206	Removal of Concrete Curb Ramp	SY	50		61				111	
			202-00220	Removal of Asphalt Mat	SY	579		343				922	
			202-00453	Removal of Portions of Present Structure (Class 2)	SY					26		26	
			202-00810	Removal of Ground Sign	EACH	3		4				7	
			202-00828	Removal of Traffic Signal Equipment	LS					1		1	
			202-01130	Removal of Guardrail Type 3	LF	45						45	
			203	Potholing	EACH					60		60	
			207-00205	Topsoil	CY					115		115	
			208-00002	Erosion Log Type 1 (12 inch)	LF					200		200	
			208-00035	Aggregate Dag	LF					200		200	
			208-00046	Pre-fabricated Concrete Washout Structure (Type 1)	EACH					1		1	
			208-00051	Storm Drain Inlet Protection (Type I)	LF					20		20	
			208-00056	Storm Drain Inlet Protection (Type III)	EACH					2		2	
			208-00103	Removal and Disposal of Sediment (Labor)	HOUR					120		120	
			208-00105	Removal and Disposal of Sediment (Equipment)	HOUR					120		120	
			208-00106	Sweeping (Sediment Removal)	HOUR					20		20	
			210-00810	Reset Ground Sign	EACH	3		3				6	
			210-00815	Reset Sign Panel	EACH	4		6				10	
			212-00006	Seeding (Native)	ACRE					0.2		0.2	
			212-00032	Soil Conditioning	ACRE					0.2		0.2	
			216-00201	Soil Retention Blanket (Straw/Cocnut) (Biodegradable Class 1)	SY					1000		1,000	
			304-06004	Aggregate Base Course (Class 6)	SY	182		207				389	
			403-00720	Hot Mix Asphalt (Patching) (Asphalt)	TON	70		80				150	
			503-00036	Drilled Shaft (36 Inch)	LF	36		36				72	
			503-00048	Drilled Shaft (48 Inch)	LF	17		17				34	
			601-03057	Concrete Class DR	CY					5		5	
			602-00000	Reinforcing Steel	LB					50		50	
			606-00301	Guardrail Type 3 (6-3 Post Spacing)	LF	37						37	
			607-11525	Fence (Plastic)	LF					300		300	
			608-00006	Concrete Sidewalk (6 Inch)	SY	122		147				269	
			608-00010	Concrete Curb Ramp	SY	125		156				281	
			609-21010	Curb and Gutter Type 2 (Section I-B)	LF			18				18	
			609-21020	Curb and Gutter Type 2 (Section II-B)	LF	279		327				606	
			610-00030	Median Cover Material (Concrete)	SF	234		807				1,041	
			612-00039	Delineator (Flexible) (Surface Mounted)	EACH			7				7	
			613	Electric Meter Pedestal Cabinet and Base	EACH	1		1				2	
			613	Pull Box (Type C)	EACH	2		2				4	
			613	Luminaire (LED) (5,300 Lumens)	EACH	4		4				8	
			613-00207	2 Inch Electrical Conduit (Bridge)(Special)	LF					672		672	
			613-00306	3 Inch Electrical Conduit (Bored)	LF	610		730				1,340	
			613-01200	2 Inch Electrical Conduit (Plastic)	LF	10		10				20	
			613-01300	3 Inch Electrical Conduit (Plastic)	LF	130		100				230	
			613-10000	Wiring	LS					1		1	
			614	Reset Bluetooth Equipment	EACH	1						1	



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**I-225 AT YOSEMITE
 SUMMARY OF
 APPROXIMATE QUANTITIES**

Designer:	T. HURD	Structure Numbers	
Detailer:	D. HUDSON	Subset Sheets:	1 of 2
Subset:	SAQ		

Project No./Code
 SHE M320-125, 22935
 2020-PRDJMSTR-0000088
 Sheet Number 8

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INDEX			CONTRACT ITEM NO.	CONTRACT ITEM	UNIT	NORTH INTERSECTION		SOUTH INTERSECTION		MISC		PROJECT TOTALS	
BOOK	PAGE	SHEET				PLAN	AS CONST.	PLAN	AS CONST.	PLAN	AS CONST.	PLAN	AS CONST.
			614	Ethernet Managed Field Switch	EACH	1		1				2	
			614-00011	Sign Panel (Class I)	SF	64		72				136	
			614-00012	Sign Panel (Class II)	SF			25				25	
			614-00035	Sign Panel (Special)	SF	17		17				34	
			614-01582	Steel Sign Support (2-1/2 in Round)(Post and Slipbase)	LF	48		48				96	
			614-70150	Pedestrian Signal Face (16) (Countdown)	EACH	6		6				12	
			614-70336	Traffic Signal Face (12-12-12)	EACH	12		12				24	
			614-70448	Traffic Signal Face (12-12-12-12)	EACH	2		2				4	
			614-72855	Traffic Signal Controller Cabinet	EACH	1		1				2	
			614-72860	Pedestrian Push Button	EACH	6		6				12	
			614-72863	Pedestrian Push Button Post Assembly	EACH	1		2				3	
			614-72866	Fire Preemption Unit and Timer (System)	EACH	1		1				2	
			614-72886	Intersection Detection System (Camera)	EACH	3		3				6	
			614-81000	Traffic Signal-Light Pole Steel	EACH	1		1				2	
			614-81150	Traffic Signal-Light Pole Steel (1-50 Foot Mast Arm)	EACH	1		1				2	
			614-81155	Traffic Signal-Light Pole Steel (1-55 Foot Mast Arm)	EACH	1		1				2	
			614-81160	Traffic Signal-Light Pole Steel (1-60 Foot Mast Arm)	EACH	1						1	
			614-81165	Traffic Signal-Light Pole Steel (1-65 Foot Mast Arm)	EACH			1				1	
			614-84100	Traffic Signal Pedestal Pole Aluminum	EACH	1						1	
			614-86105	Telemetry (Field)	EACH	1		1				2	
			614-86800	Uninterrupted Power Supply	EACH	1		1				2	
			614-87320	Closed Circuit Television	EACH	1		1				2	
			625-00000	Construction Surveying	LS					1		1	
			626-00000	Mobilization	LS					1		1	
			627-00008	Modified Epoxy Pavement Marking	GAL	4		8				12	
			627-00070	Preformed Thermoplastic Pavement Marking	SF	919		1004				1,923	
			627-01010	Preformed Plastic Pavement Marking (Type I) (Inlaid)	SF	10		27				37	
			629	Survey Monument	EACH	3		1				4	
			630-00000	Flagging	HOUR					240		240	
			630-00003	Uniformed Traffic Control	HOUR					80		80	
			630-00007	Traffic Control Inspection	DAY					24		24	
			630-00012	Traffic Control Management	DAY					60		60	
			630-80335	Barricade (Type 3 M-A) (Temporary)	EACH					4		4	
			630-80341	Construction Traffic Sign (Panel Size A)	EACH					8		8	
			630-80342	Construction Traffic Sign (Panel Size B)	EACH					28		28	
			630-80355	Portable Message Sign Panel	EACH					4		4	
			630-80356	Advance Warning Flashing or Sequencing Arrow Panel (ATY)	EACH					2		2	
			630-80363	Drum Channelizing Device (With Light) (Flashing)	EACH					50		50	
			630-80380	Traffic Cone	EACH					100		100	
			630-85041	Mobile Attenuator	DAY					5		5	
				Force Account =====									
			700-70010	F/A Minor Contract Revisions	FA					1		1	
			700-70082	F/A Furnish & Install Electrical Service	FA					1		1	
			700-70310	F/A Landscaping	FA					1		1	
			700-70380	F/A Erosion Control	FA					1		1	
			700-70589	F/A Environmental Health & Safety Management	FA					1		1	



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**I-225 AT YOSEMITE
 SUMMARY OF
 APPROXIMATE QUANTITIES**

Designer: T. HURD
 Detailer: D. HUDSON
 Subset: SAQ

Structure Numbers
 Subset Sheets: 2 of 2

Project No./Code
 SHE M320-125, 22935

2020-PRDJMSTR-0000088
 Sheet Number 9

1. SITE DESCRIPTION

- A. PROJECT SITE LOCATION: This project is located at the I-225 interchange with S Yosemite Street in Denver, CO.
- B. PROJECT SITE DESCRIPTION: This is a signal replacement project that includes updating curb ramps and minor roadway alignment adjustments. Work to be done at the project site includes removal of a 3' section of sound wall, signal equipment, asphalt, curb and gutter, sidewalk, median cover material, and curb ramps. Work will also include installation of traffic signal poles and equipment, curb and gutter, sidewalk, median cover material, curb ramps, flexible delineators, asphalt patching, fiber optic cable and conduit across the interchange bridge, conduit boring, and landscaping.
- C. ACRES OF DISTURBANCE:
 - 1. Total area of construction site (LOC AREA): 1.9 acres
 - 2. Total area of proposed disturbance (LDA): 0.3 acres
 - 3. Total area of seeding: 0.2 acres
- D. EXISTING SOIL DATA: Fondis silt loam, 1 to 3 percent slopes and renohill buick loams, 3 to 9 percent slopes in Arapahoe County (South East corner of the South intersection) No soil data available for Denver County.
- E. EXISTING VEGETATION, INCLUDING PERCENT COVER:
Vegetative transects are not required, by permit, on projects with under an acre of disturbance. However, it is advised that transects be completed prior to construction, as a quality control for post construction revegetation assessment. If transects are not completed on a project, at a minimum describe the quality of the existing vegetation.

A survey including general description of existing vegetation shall be conducted by the SWMP Administrator for Construction prior to any ground disturbance on the project. The SWMP Administrator shall photo-document existing vegetation where all work will be occurring. The SWMP Administrator shall also perform the vegetation survey transect(s) including photo documentation as outlined in Chapter 4.11.2 of CDOT's Erosion Control and Stormwater Quality Guide.

Pre-Construction Date of survey: _____ %Density: _____
 Description of existing vegetation:
 Map or table showing transect locations in SWMP Notebook:

Post-Construction Date of survey: _____ %Density: _____
 Description of existing vegetation:
 Map or table showing transect locations in SWMP Notebook:

2. STORMWATER MANAGEMENT CONTROLS FIRST CONSTRUCTION ACTIVITIES

THE CONTRACTOR SHALL PERFORM THE FOLLOWING:

- A. POTENTIAL POLLUTANT SOURCES
 - 1. Evaluate, identify and describe all potential sources of pollutants at the site in accordance with subsection 107.25 and place any BMPs/Control Measures required to contain potential pollutants.
- B. OFFSITE DRAINAGE (RUN ON WATER)
 - 1. Place BMPs/Control Measures to address run-on water in accordance with subsection 208.03.
- C. CONSTRUCTION DEWATERING:
 - 1. Obtain a dewatering permit from CDPHE if conditions of their low risk guidance for Discharges of Uncontaminated Groundwater to Land are not met; see subsection 107.25(b) 8.
- D. VEHICLE TRACKING PAD
 - 1. BMPs/Control Measures shall be implemented in accordance with subsection 208.04.

E. PERIMETER CONTROL

- 1. Perimeter control shall be established as the first item on the SWMP to prevent the potential for pollutants leaving the construction site boundaries, entering the stormwater drainage system, or discharging to state waters.
- 2. Perimeter control may consist of vegetation buffers, berms, silt fence, erosion logs, existing landforms, or other BMPs/Control Measures as approved.
- 3. Perimeter control shall be in accordance with subsection 208.04.

3. SWMP ADMINISTRATOR:

A. SWMP ADMINISTRATOR FOR DESIGN:

Name/Title	Contact Information
Tony Hurd	(303) 339-0440 or tony.hurd@apexdesignpc.com

B. SWMP ADMINISTRATOR FOR CONSTRUCTION: (As defined in Subsection 208) The Contractor shall designate a SWMP Administrator for Construction upon ownership of the SWMP. The SWMP Administrator shall become the owner/operator and assume responsibility for all design changes to the SWMP implementation and maintenance in accordance to 208.03. The SWMP Administrator shall be responsible for implementing, maintaining and revising SWMP, including the title and contact information. The activities and responsibilities of the SWMP Administrator shall address all aspects of the projects SWMP. (Update the information below for each new SWMP Administrator) (Copy of TECS Certification must also be included in the SWMP Notebook.)
The SWMP Administration for construction is not a separate pay item but is included in the cost of the work.

Name/Title	Contact Information	Certification #	Start Date	Engineer Approval

4. DURING CONSTRUCTION

The SWMP should be considered a "living document" that is continuously reviewed and modified. During construction, the following items shall be added, updated, or amended as needed by the Contractor in accordance with Section 208

- A. MATERIALS HANDLING AND SPILL PREVENTION: prior to construction commencing the Contractor shall submit a Spill Prevention, Control and Countermeasure Plan, see subsection 208.06. Materials handling shall be in accordance with subsection 208.06.
- B. STOCKPILE MANAGEMENT: shall be done in accordance with subsection 107.25 and 208.07
- C. CONCRETE WASHOUT: Concrete wash out water or waste from field laboratories and paving equipment shall be contained in accordance with subsection 208.05.
- D. SAW CUTTING: shall be done in accordance with subsection 107.25, 208.04, 208.05
- E. STREET SWEEPING: shall be done in accordance with subsection 208.04

5. BMP/CONTROL MEASURE MAINTENANCE

- A. Maintenance shall be in accordance with subsection 208.04 (f).



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Horiz. Scale: N/A Vert. Scale: N/A						Revised:	Designer: T. HURD	Structure Numbers		2020-PRDJMSTR-000088
apexdesign 1675 LARIMER ST, STE 400 PH: 303-339-0440 DENVER, COLORADO 80202 FAX: 303-325-7743					Void:	Detailer: D. HUDSON	Subset: SWMP	Subset Sheets: 1 of 4	Sheet Number 10	

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6. INTERIM AND PERMANENT STABILIZATION

A. SEEDING PLAN Soil preparation, soil conditioning or topsoil, seeding (native), mulching (weed free hay) and mulch tackifier will be required for an estimated 0.2 acres of disturbed area within the right-of-way limits which are not surfaced. The following types and rates shall be used:

COMMON NAME	BOTANICAL NAME	LBS. PLS PER ACRE
Western wheatgrass	<i>Pascopyrum smithii</i> 'Arriba'	1.5
Arizona fescue	<i>Festuca arizonica</i> 'Redondo'	0.5
Inland saltgrass	<i>Distichlis spicata</i>	0.5
Slender wheatgrass	<i>Elymus trachycaulus</i> ssp. <i>Trachycaulus</i> 'Pryor'	3.5
Alkali sacaton	<i>Sporobolus airoides</i>	0.15
Blue grama	<i>Bouteloua gracilis</i>	0.25
Buffalograss	<i>Bouteloua cactyloides</i>	3
Little bluestem	<i>Schizachyrium scoparium</i>	1
Sideoats grama	<i>Bouteloua curtipendula</i>	1.5
Oats	<i>Avena sativa</i>	3
Sulphur-flower	<i>Eriogonum umbellatum</i>	1.5
Blue flax	<i>Linum perenne</i>	1
Blackeyed Susan	<i>Rudbeckia hirta</i>	0.15
TOTAL		17.55 LBS. PLS PER ACRE

B. SEEDING APPLICATION: Drill seed 0.25 inch to 0.5 inch into the soil. In small areas not accessible to a drill, hand broadcast or hydroseed at double the rate and rake 0.25 inch to 0.5 inch into the soil per subsection 212.

C. MULCHING APPLICATION: Apply a minimum of 2 tons of certified weed free hay or 2 1/2 tons of certified weed free straw per acre and in accordance with Section 213, and mechanically crimp it into the soil in combination with an organic mulch tackifier.

1. Prior to winter shutdown or the summer seeding window closure: Uncompleted slopes shall be mulched with 2 tons of mulching (weed free) per acre, mechanically crimped into the topsoil in combination with an organic mulch tackifier per subsections 208 and 213.

D. SPECIAL REQUIREMENTS:

1. Due to high failure rates, hydroseeding will not be allowed for permanent stabilization.

E. SOIL CONDITIONING AND FERTILIZER REQUIREMENTS: Minimum amendment material requirements for all disturbances to receive seeding (native).

Soil conditioners paid for as Item 212- Soil Conditioning (Acre)		
Biological nutrient organic based fertilizer (lbs./acre)*	Humate (lbs./acre)	Compost (yds ³ /acre All areas <2:1 1/2 inch depth)
300	200	65

*Biological nutrient organic based fertilizer shall not exceed 8-8-8 (N-P-K).

Compost shall be in accordance to 212.02.

Humate shall be in accordance to 212.02.

F. SOIL RETENTION COVERING: On slopes and ditches requiring a blanket or turf reinforcement mat (trm), the blanket/trm shall be placed in lieu of mulch and mulch tackifier and placed after seeding (native). See SWMP Site Map for blanket/trm locations.

G. Permanent Stabilization Application Under Structures: Under structures shade patterns should be considered and the use of Median Cover Material (Stone) or other stabilized options with an approved Project Special Provision should be used. See SWMP Site Map for locations.

H. RESEEDING OPERATIONS/CORRECTIVE STABILIZATION:

Prior to partial acceptance.

1. All seeded areas shall be reviewed during the 7 day inspections by the SWMP Administrator for Construction and or Erosion Control Inspector for bare soils caused by surface or wind erosion. Bare areas caused by surface or gully erosion, blown away mulch, etc. shall be re-graded, seeded, and have the designated mulching applied as necessary, at no additional cost to the project.
2. The Contractor shall maintain seeding/mulch/tackifier/blanket/TRM, mow to control weeds or apply herbicide to control weeds in the seeded areas until Partial Acceptance of the stormwater construction work.

7. PRIOR TO PROJECT FINAL ACCEPTANCE

- A. Partial Acceptance shall be in accordance with subsection 107.25 (d), 208.10 and 214.04 at the Partial Acceptance of the project, it shall be determined by the SWMP Administrator for Construction and the Engineer which temporary BMPs/Control Measures shall remain until 70% revegetation is established or which shall be removed.
- B. At the end of the project, all ditch checks shall either consist of temporary erosion logs (or equivalent) or permanent riprap.
- C. All storm drains shall be cleaned prior to the Final Acceptance of the project. Work shall be included in 202 Clean Culvert.

8. NARRATIVES:

A. ADDITIONAL BMPS/CONTROL MEASURES AND NARRATIVES:

BMP/Control Measure details and narratives not covered by the SWMP or Standard Plan M-208, M-216 shall be added to the SWMP notebook by the SWMP Administrator.



Print Date: 8/21/2020		Sheet Revisions				As Constructed		I-225 AT YOSEMITE STORMWATER MANAGEMENT PLAN		Project No./Code	
File Name: DES_SWMP.dgn		Date:	Comments	Init.		No Revisions:			SHE M320-125, 22935		
Horiz. Scale: N/A Vert. Scale: N/A						Revised:	Designer: T. HURD	Structure Numbers	2020-PRDJMSTR-0000088		
apexdesign 1675 LARIMER ST, STE 400 PH: 303-339-0440 DENVER, COLORADO 80202 FAX: 303-325-7743					Void:	Detailer: D. HUDSON	Subset Sheets: 2 of 4	Sheet Number 11			

BMP Matrix:

1. M-Standards have been included along with standard BMP narratives. If a Non-Standard BMP will be used or the standard narrative does not apply, the SWMP Administrator shall write a Non-Standard BMP narrative, place an "X" in the column and complete a Non-Standard BMP Specification and Narrative for the SWMP notebook.
2. The SWMP Administrator for Construction shall place an "X" in the column In Use on Site when the BMP/Control Measure has been installed.
3. Place an "X" in the column BMP/Control Measure to be located by SWMP Administrator for Construction if the SWMP Administrator shall locate the BMP/Control Measure during construction. These BMP/Control Measures are not currently located on SWMP Plans but are anticipated to be used during construction (i.e. Vehicle Tracking Pad, Batch Plants, etc.). The SWMP Administrator for Construction shall locate these prior to or during construction and reflect on SWMP Map.
4. Place an "X" in the column Initial Construction if the BMP/Control Measure is to be installed prior to construction activity.

STRUCTURAL BMPs/Control Measures that may be potentially used on the project for erosion and sediment control; practices may include, but are not limited to:

APPLICATION, BMP/CONTROL MEASURE	NARRATIVE	M-STANDARD or "X" for NON-STANDARD	IN USE ON SITE	BMP/CONTROL MEASURE TO BE LOCATED BY SWMP ADMINISTRATOR	BMP/CONTROL MEASURE IMPLEMENTATION PHASE		
					INITIAL CONSTRUCTION ACTIVITY (CONTROL MEASURE INSTALLED PRE-CONSTRUCTION)	INTERIM CONSTRUCTION ACTIVITIES	PERMANENT STABILIZATION
PROTECTION OF EXISTING TREES/LANDSCAPING Fence (plastic)	Fence (plastic) shall be used in areas indicated in the plans to prevent encroachment of construction traffic and sediment for the protection of mature trees and/or existing landscaping prior to start of construction disturbances.				X		
Storm Drain Inlet Protection In Paved Roadways (Type 1 and 3 as shown on M-208-1, sheet 5 of 11)	Manufactured storm drain inlet protection placed prior to construction disturbances as detailed in M-208-1, to protect existing inlets or immediately upon completion of new inlets to prevent sediment from entering the inlet throughout construction.	M-208			X		
STOCKPILE PROTECTION Erosion logs, aggregate bags*	Placed within specified distance, in accordance with subsection 208.06, from toe to contain sediment around stockpile. *Aggregate bags are easily moved and replaced for access during the work day. Place prior to start of stockpile, increase control as stock pile increases size.	M-208				X	
SEDIMENT CONTROL/ SLOPE CONTROL Erosion logs	Placed on the contour of a slope to contain and slow down construction runoff. Place prior to start of construction disturbances.	M-208			X	X	
CONCRETE WASHOUT In-ground or fabricated	Construction control, used for waste management of concrete and concrete equipment cleaning. Place prior to start of concrete activities.	M-208				X	
SWEEPING	Source control, used to remove sediment tracked onto paved surfaces and to prevent sediment from entering drainage system. Sweep daily and at the end of the construction shift as needed. Kick brooms shall not be permitted.					X	
DEWATERING (Contractor is responsible for obtaining a permit from Colorado Department of Health and Environment.)	Shall be done in such a manner to prevent potential pollutants from entering state waters.	X				X	

NON-STRUCTURAL BMPs/Control Measures that may be potentially used on the project for erosion and sediment control; practices may include, but are not limited to:

Erosion control devices are used to limit the amount of soil loss on site. Sediment control devices are designed to capture sediment on the project site. Construction controls are BMPs/Control Measures related to construction access and staging. BMP/Control Measure locations are indicated on the SWMP Site Map.

* Use of vegetative buffer strip requirements. The CDPHE Water Quality Control Division Technical Memorandum dated August 27, 2015 clarifies the requirements for utilization of existing vegetation as a buffer type of sediment control measure, while maintaining compliance with the CDPS permit for Stormwater Discharges Associated with Construction Activity – CDPS Permit No. COR0300000. In general, the division does not recommend that vegetated buffers be implemented as a sediment removal control measure for runoff from disturbed areas at construction sites, unless implemented as a "finishing" component of a treatment train comprised of additional, adequate up-gradient control measures. The entire memorandum can be found at: <https://www.colorado.gov/pacific/sites/default/files/Vegetative%20Buffer%20Memo.pdf>



Print Date: 8/21/2020	0000	Sheet Revisions			<p>Department of Transportation & Infrastructure 201 West Colfax Avenue Denver, CO, 80202</p>	As Constructed		I-225 AT YOSEMITE STORMWATER MANAGEMENT PLAN		Project No./Code	
File Name: DES_SWMP.dgn		Date:	Comments	Init.		No Revisions:			SHE M320-125, 22935		
Horiz. Scale: N/A Vert. Scale: N/A						Revised:	Designer: T. HURD	Structure Numbers	2020-PRDJMSTR-0000088		
<p>1675 LARIMER ST, STE 400 PH: 303-339-0440 DENVER, COLORADO 80202 FAX: 303-325-7743</p>					Detailer: D. HUDSON		Sheet Number 12				
					Void:	Subset: SWMP	Subset Sheets: 3 of 4				

APPLICATION, BMP/CONTROL MEASURE	NARRATIVE	M-STANDARD or "X" for NON-STANDARD	IN USE ON SITE	BMP/CONTROL MEASURE TO BE LOCATED BY SWMP ADMINISTRATOR	BMP/CONTROL MEASURE IMPLEMENTATION PHASE		
					INITIAL CONSTRUCTION ACTIVITY (CONTROL MEASURE INSTALLED PRE-CONSTRUCTION)	INTERIM CONSTRUCTION ACTIVITIES	PERMANENT STABILIZATION
SEEDING PERMANENT (NATIVE)	Final Stabilization of disturbance and to reduce runoff and control erosion on disturbed areas.						X

9. TABULATION OF STORMWATER QUANTITIES

- A. BMP/Control Measure sediment removal and disposal shall be paid for as: 208 Removal and Disposal of Sediment (Equipment) and 208 Removal and Disposal of Sediment (Labor). All other BMP/Control Measure maintenance shall be included in the cost of the BMP/Control Measure.
- B. Establishment of seeded areas shall be paid for as: 212 Seeding (native). This shall include mowing, weed control, reseeding/soil retention blanket.

Pay Item	Description	Pay Unit	Initial Const.	Interim Const.	Permanent Stabilization	*Total Quantity
207-00205	Topsoil	CY			115	115
208-00002	Erosion Log Type 1 (12 inch)	LF	200			200
208-00035	Aggregate Bag	LF	200			200
208-00046	Pre-fabricated Concrete Washout Structure (Type 1)	Each		1		1
208-00051	Storm Drain Inlet Protection (Type I)	LF	20			20
208-00056	Storm Drain Inlet Protection (Type III)	Each	2			2
208-00103	Removal and Disposal of Sediment (Labor)	Hour		120		120
208-00105	Removal and Disposal of Sediment (Equipment)	Hour		120		120
208-00106	Sweeping (Sediment Removal)	Hour		20		20
212-00006	Seeding (Native)	Acre			0.2	0.2
212-00032	Soil Conditioning	Acre			0.2	0.2
216-00201	Soil Retention Blanket (Straw/Coconut) (Biodegradable Class 1)	SY			1,000	1,000
607-11525	Fence (Pastic)	LF	300			300
700-70310	F/A Landscaping	FA			1	1
700-70380	F/A Erosion Control	FA		1		1

*It is anticipated that additional BMPs/Control Measures and BMP/Control Measure quantities not shown on the SWMP Site Maps shall be required on the project for unforeseen conditions and replacement of items that are beyond their useful service life, see subsection 208.03 and 208.04. **Quantities for all BMPs/Control Measures shown above are estimated, and have been increased for unforeseen conditions and normal BMP/Control Measure life expectancy.** Quantities shall be adjusted according to the conditions encountered in the field as directed and approved by the Engineer. Payment shall be for the actual work completed and material used.

10. BIOLOGIC IMPACTS and DEWATERING

A. ENVIRONMENTAL IMPACTS:

- 1. Wetland Impacts: Refer to other environmental permits in accordance with subsection 107.02 and the permits contained in the SWMP Notebook.
- 2. Stream Impacts: Refer to other environmental permits in accordance with subsection 107.02 and the permits contained in the SWMP Notebook.
- 3. Threatened and Endangered Species: No species are anticipated to be impacted by the project.
- 4. DEWATERING: Dewatering: Refer to other environmental permits in accordance with subsection 107.02 and the permits contained in the SWMP Notebook.

11. Notes

- 1. EMC (or SWMP Administrator for Construction or Erosion Control Inspector) is included in the cost of the work.
- 2. Topsoil will be placed according to the 207 specification, at a minimum depth of 4 inches.



Print Date: 8/21/2020
 File Name: DES_SWMP.dgn
 Horiz. Scale: N/A Vert. Scale: N/A

apexdesign 1675 LARIMER ST, STE 400 PH: 303-339-0440
 DENVER, COLORADO 80202 FAX: 303-325-7743

Sheet Revisions		
Date:	Comments	Init.

Department of Transportation & Infrastructure
 201 West Colfax Avenue
 Denver, CO, 80202

As Constructed
No Revisions:
Revised:
Void:

I-225 AT YOSEMITE STORMWATER MANAGEMENT PLAN

Designer: T. HURD
 Detailer: D. HUDSON
 Subset: SWMP

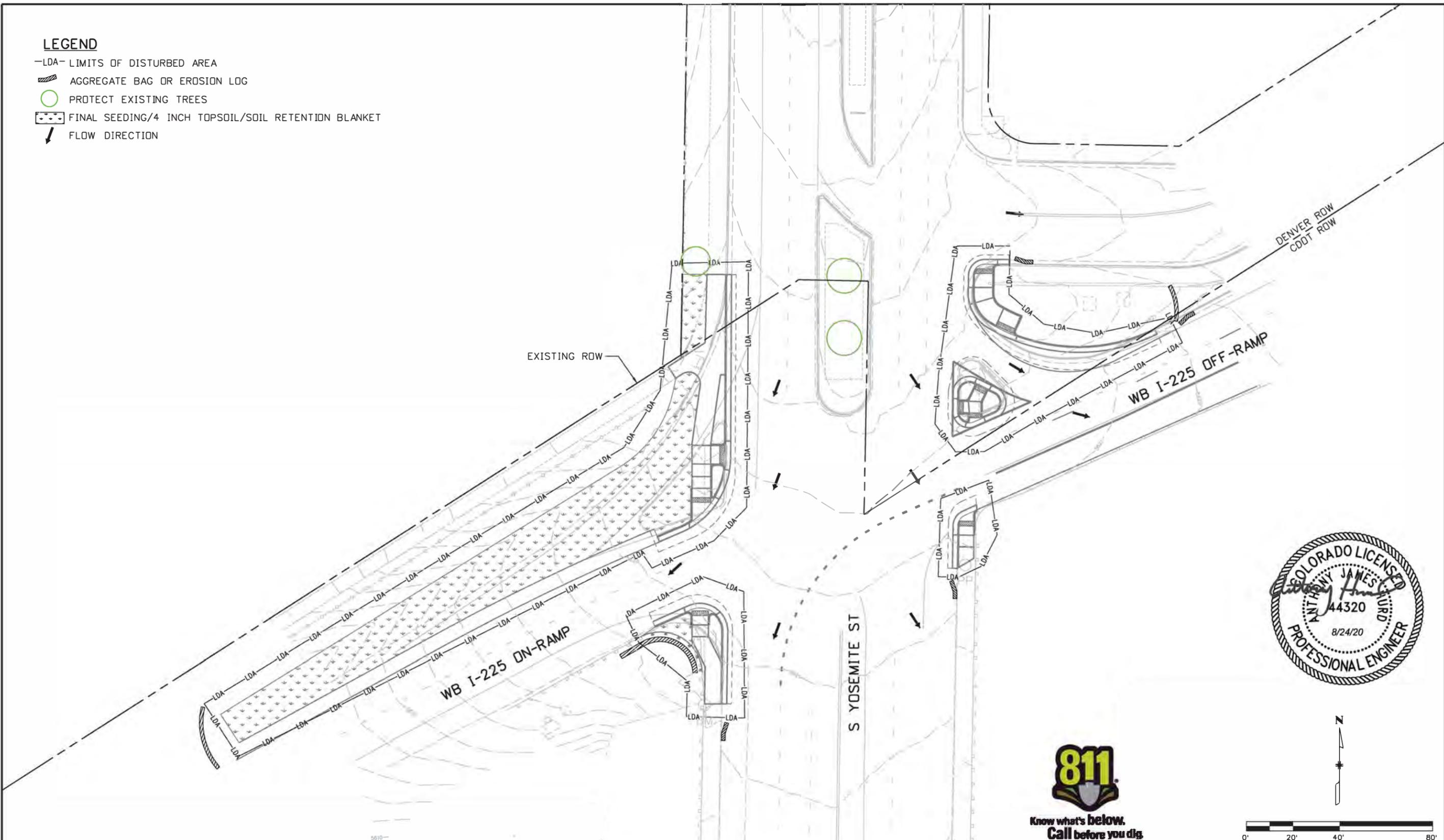
Structure Numbers
 Subset Sheets: 4 of 4

Project No./Code
SHE M320-125, 22935
2020-PRDJMSTR-0000088
Sheet Number 13

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LEGEND

- LDA- LIMITS OF DISTURBED AREA
-  AGGREGATE BAG OR EROSION LOG
-  PROTECT EXISTING TREES
-  FINAL SEEDING/4 INCH TOPSOIL/SOIL RETENTION BLANKET
-  FLOW DIRECTION



Print Date: 8/21/2020
 File Name: DES_BMP.dgn
 Horizontal Scale: 1:40 Vertical Scale: N/A


 1675 LARIMER ST, STE 400 PH: 303-339-0440
 DENVER, COLORADO 80202 FAX: 303-325-7743

Sheet Revisions			
Date:	Comments	Init.	
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Department of Transportation & Infrastructure
 201 West Colfax Avenue
 Denver, CO, 80202

As Constructed
No Revisions:
Revised:
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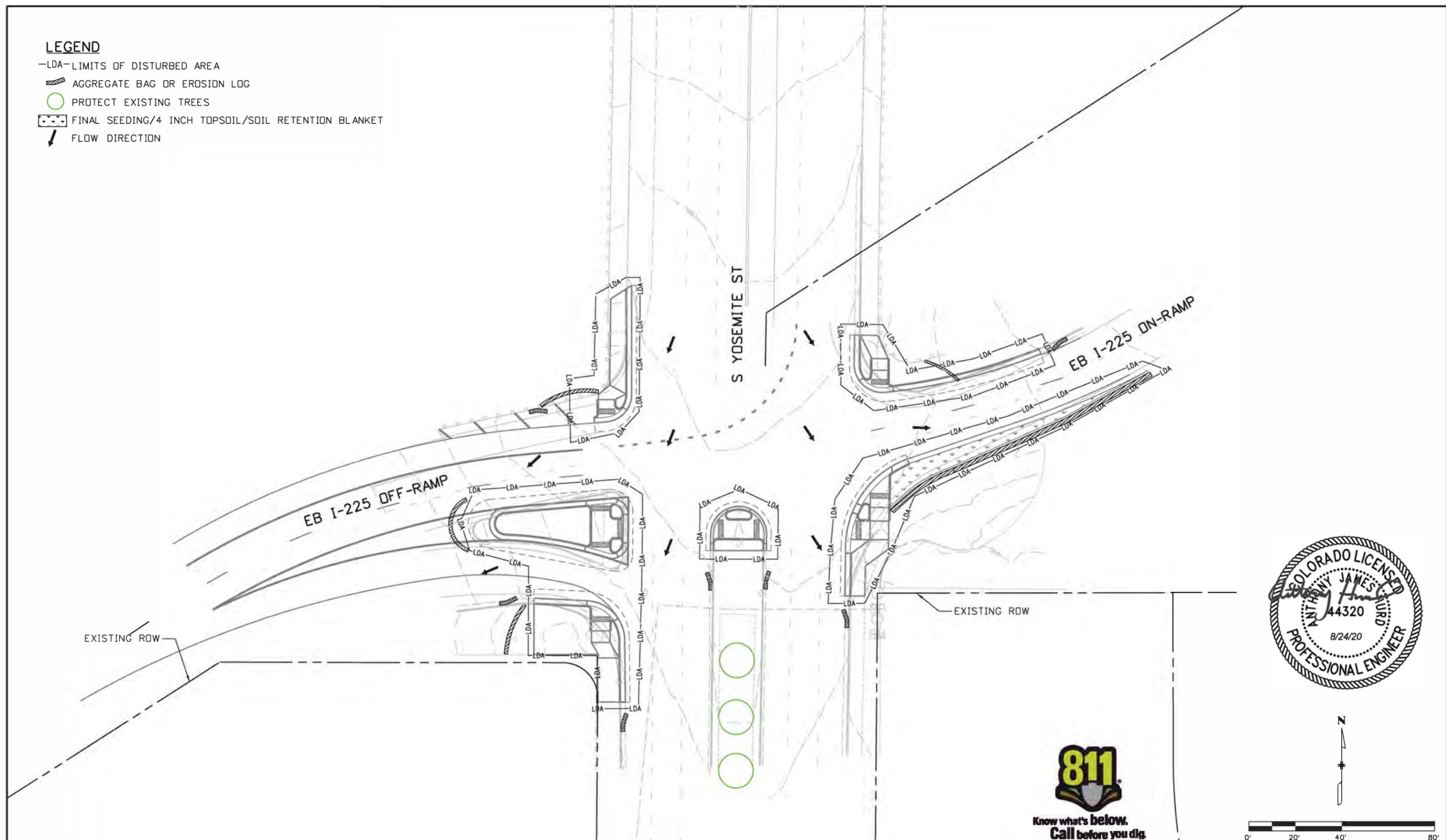
I-225 AT YOSEMITE EROSION CONTROL PLAN NORTH INTERSECTION			
Designer:	T. HURD	Structure Numbers:	
Detailer:	D. HUDSON	Subset Shee \$:	1 of 2
Subset:	BMP		

Project No./Code
SHE M320-125, 22935
2020-PRDJMSTR-0000088
Sheet Number 14

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LEGEND

- LDA- LIMITS OF DISTURBED AREA
- AGGREGATE BAG OR EROSION LOG
- PROTECT EXISTING TREES
- FINAL SEEDING/4 INCH TOPSOIL/SOIL RETENTION BLANKET
- FLOW DIRECTION



Print Date: 8/21/2020 File Name: DES_BMP.dgn Horiz. Scale: 1:40 Vert. Scale: N/A		Sheet Revisions <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">Date:</th> <th style="width: 55%;">Comments</th> <th style="width: 30%;">Init.</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	Date:	Comments	Init.													 Department of Transportation & Infrastructure 201 West Colfax Avenue Denver, CO, 80202	As Constructed No Revisions: Revised: Void:	I-225 AT YOSEMITE EROSION CONTROL PLAN SOUTH INTERSECTION Designer: T. HURD Detailer: D. HUDSON Subset: BMP	Structure Numbers Subset Sheets: 2 of 2	Project No./Code SHE M320-125, 22935 2020-PRDJMSTR-0000088 Sheet Number 15
Date:	Comments	Init.																				
 1675 LARIMER ST, STE 400 PH: 303-339-0440 DENVER, COLORADO 80202 FAX: 303-325-7743																						

TABULATION OF TRAFFIC CONTROL ITEMS

ITEM NO.	ITEM DESCRIPTION	UNIT	YOSEMITE
			QUANTITY
630-00000	FLAGGING	HR	240
630-00003	UNIFORMED TRAFFIC CONTROL	HR	80
630-00007	TRAFFIC CONTROL INSPECTION	DAY	24
630-00012	TRAFFIC CONTROL MANAGEMENT	DAY	60
630-80335	BARRICADE (TYPE 3 M-A) (TEMPORARY)	EA	4
630-80341	CONSTRUCTION TRAFFIC SIGN (PANEL SIZE A)	EA	8
630-80342	CONSTRUCTION TRAFFIC SIGN (PANEL SIZE B)	EA	28
630-80355	PORTABLE MESSAGE SIGN PANEL	EA	4
630-80356	ADVANCED WARNING FLASHING OR SEQUENCE ARROW PANEL (A TYPE)	EA	2
630-80363	DRUM CHANNELIZING DEVICE (WITH LIGHT) (FLASHING)	EA	50
630-80380	TRAFFIC CONE	EA	100
630-85041	MOBILE ATTENUATOR	DAY	5

SCHEDULE OF CONSTRUCTION TRAFFIC CONTROL SIGNS

SIGN CODE	LEGEND	DIMENSIONS	PANEL SIZE			
			EACH			
			A	B	C	SPECIAL
W20-1	ROAD WORK AHEAD	48" x 48"		4		
R52-6a	BEGIN FINES DOUBLE IN WORK ZONE	36" x 48"		4		
W20-5R	RIGHT LANE CLOSED AHEAD	48" x 48"		2		
W20-5L	LEFT LANE CLOSED AHEAD	48" x 48"		2		
W4-2R	RIGHT LANE ENDS	48" x 48"		2		
W4-2L	LEFT LANE ENDS	48" x 48"		2		
W20-7	FLAGGER (SYMBOL)	48" x 48"		2		
W20-63	RAMP WORK AHEAD	48" x 48"		2		
R52-6b	END FINES DOUBLE IN WORK ZONE	36" x 48"		4		
G20-10	XYZ CONSTRUCTION THANKS YOU XXX-XXX-XXXX	48" x 48"		4		
R9-9	SIDEWALK CLOSED	24" x 12"	4			
R9-11	SIDEWALK CLOSED AHEAD CROSS HERE	24" x 18"	4			
SIGN TOTALS			8	28		

NOTES:

- LABOR WILL NOT BE PAID SEPARATELY AND SHALL BE INCLUDED IN THE RESPECTIVE TRAFFIC CONTROL PAY ITEM.
- QUANTITIES BASED ON CDDT STANDARD PLAN S-630-1, CASES 16 AND 18.
- PEDESTRIAN USE OF THE NORTH-SOUTH RUNNING SIDEWALKS SHALL BE MAINTAINED DURING CONSTRUCTION WITH REASONABLE DETOURS AS NECESSARY.

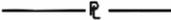


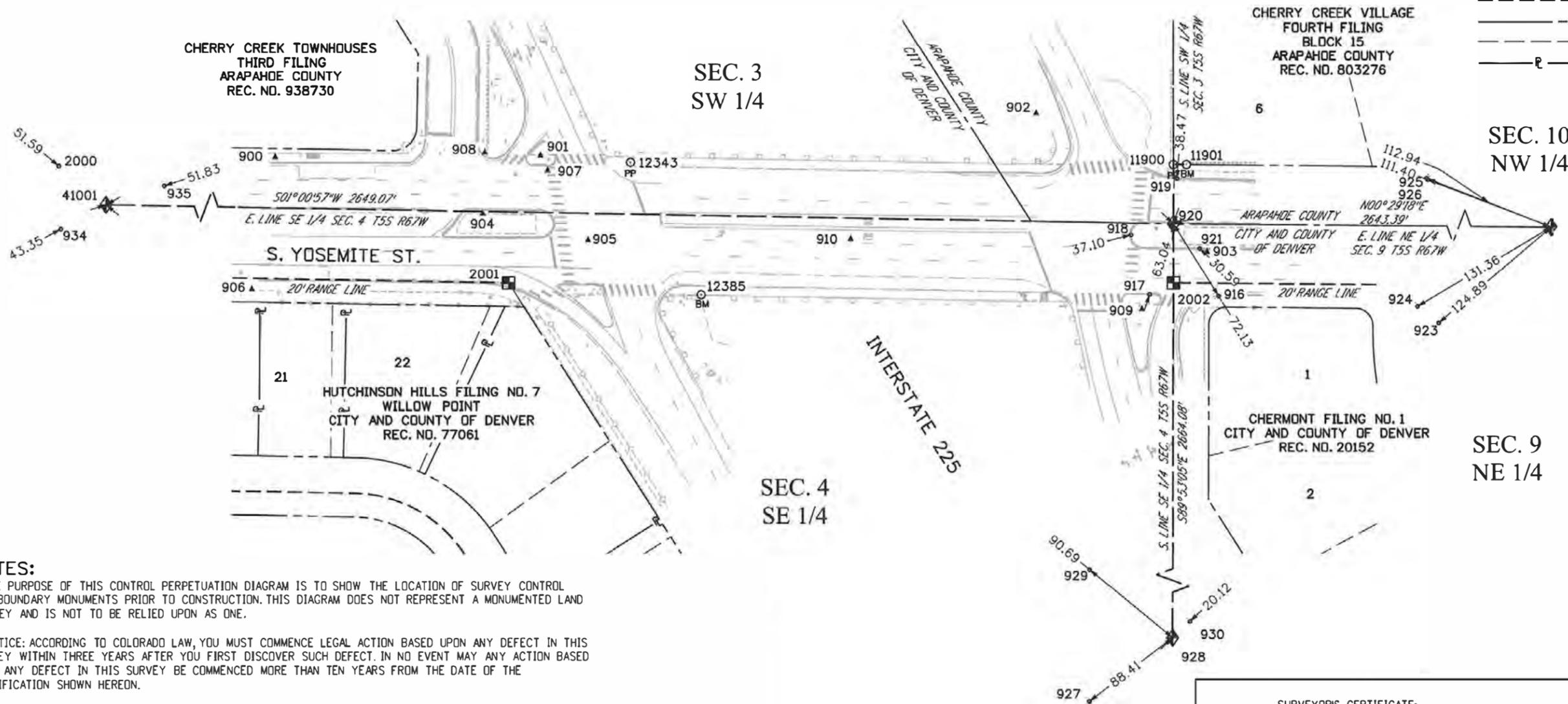
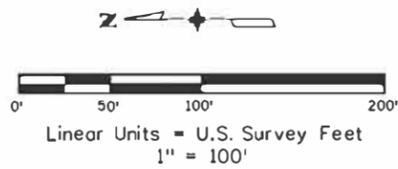
Print Date: 8/21/2020		<p>Department of Transportation & Infrastructure 201 West Colfax Avenue Denver, CO, 80202</p>	<p>As Constructed</p> <p>No Revisions:</p> <p>Revised:</p> <p>Void:</p>	<p>I-225 AT YOSEMITE TRAFFIC CONTROL PLAN</p> <p>Designer: T. HURD Detailer: D. HUDSON</p>		<p>Project No./Code</p> <p>SHE M320-125, 22935</p>		
File Name: DES_Traffic_Control.dgn							Structure Numbers	2020-PRDJMSTR-0000088
Horiz. Scale: N/A Vert. Scale:							Subset: TCP	Subset Sheets: 1 of 1
<p>1675 LARIMER ST, STE 400 PH: 303-339-0440 DENVER, COLORADO 80202 FAX: 303-325-7743</p>								

SURVEY CONTROL PERPETUATION DIAGRAM

I-225 at Yosemite St
 SW1/4 Sec. 3, SE1/4 Sec. 4, NE1/4 Sec. 9, NW1/4 Sec. 10
 Township 5 South, Range 67 West, 6th P.M.
 City and County of Denver, State of Colorado

LEGEND:

-  FOUND RANGE POINT MON.
-  FOUND SURVEY MONUMENT REFERENCE MARKER
-  FOUND ALIQUOT MON.
-  SET PROJECT CONTROL MON.
-  FOUND BOUNDARY MON.
-  RANGE LINE
-  RIGHT-OF-WAY LINE
-  SUBDIVISION LOT LINE
-  PROPERTY LINE



NOTES:

1. THE PURPOSE OF THIS CONTROL PERPETUATION DIAGRAM IS TO SHOW THE LOCATION OF SURVEY CONTROL AND BOUNDARY MONUMENTS PRIOR TO CONSTRUCTION. THIS DIAGRAM DOES NOT REPRESENT A MONUMENTED LAND SURVEY AND IS NOT TO BE RELIED UPON AS ONE.
2. NOTICE: ACCORDING TO COLORADO LAW, YOU MUST COMMENCE LEGAL ACTION BASED UPON ANY DEFECT IN THIS SURVEY WITHIN THREE YEARS AFTER YOU FIRST DISCOVER SUCH DEFECT. IN NO EVENT MAY ANY ACTION BASED UPON ANY DEFECT IN THIS SURVEY BE COMMENCED MORE THAN TEN YEARS FROM THE DATE OF THE CERTIFICATION SHOWN HEREON.
3. THE LINEAR UNITS FOR THIS SURVEY ARE U.S. SURVEY FEET.
4. ALL COORDINATES SHOWN HEREON ARE BASED ON THE CITY AND COUNTY OF DENVER LOCAL COORDINATE SYSTEM. REFER TO SHEET 2 FOR COORDINATE SYSTEM DETAILS.
5. ALL ELEVATIONS SHOWN HEREON ARE NAVD88/ U.S. SURVEY FEET AND BASED UPON CITY AND COUNTY OF DENVER BENCHMARK 343, BEING A 2" CCD BRASS CAP LOCATED AT THE NORTHWEST CORNER OF BRIDGE OVER HIGHWAY, HAVING AN NAVD88 ELEVATION OF 5620.09 FT.
6. HARRIS KOCHER SMITH DESIGN SURVEY WAS PERFORMED BETWEEN NOVEMBER 4, 2019 AND DECEMBER 2, 2019.

(NOTES CONT. NEXT PAGE)

SURVEYOR'S CERTIFICATE:

I, Aaron Murphy, a licensed professional surveyor in the State of Colorado do hereby state that the survey represented by this Survey Control Perpetuation Diagram was made under my supervision and that this diagram and the notes shown hereon accurately represent said survey to the best of my knowledge and belief.

PLS No. 38162



FILING CERTIFICATION: DAY OF _____, 20____, AT _____ M.,
 DEPOSITED THIS _____ OF THE COUNTY LAND SURVEYS/RIGHT OF WAY
 SURVEYS AT PAGE _____, RECEPTION NUMBER _____
 SIGNED _____ DEPT. _____

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Print Date: 5/21/2020	Sheet Revisions		As Constructed	I-225 AT YOSEMITE SURVEY CONTROL PERPETUATION DIAGRAM	Project No./Code
File Name: 191001 SURV_LSCD - Yosemite.dgn	Date: Comments Init.	Department of Transportation & Infrastructure 201 West Colfax Avenue Denver, CO, 80202	No Revisions:	Designer: MAG	SHE M230-125
Horiz. Scale: 1:100 Vert. Scale: N/A			Revised:	Detailer: DJH	2020-PRJ\JMSTR-0000088
FY2019 HSIP PACKAGE 1			Void:	Sheet Subset: SURVEY	Sheet Number 17
 1120 LINCOLN ST, STE 10 00 PH: 303-623-6300 DENVER, COLORADO 80203 FAX: 303-623-6311				Structure Numbers	Sheet Number 17
				Subset Sheets: 1 of 2	

CITY AND COUNTY OF DENVER LOCAL COORDINATE SYSTEM
 Projection: Transverse Mercator
 Datum: NAD83-1992
 CentralPoint False Northing = 400000.0000'
 CentralPoint False Easting = 600000.0000'
 Latitude of Origin = 39° 45' 19.00000" N
 Central Meridian = 104° 53' 53.00000" W
 Zone Width = 6° 0' 00.0"
 Scale Factor at Origin = 1.00025403000
 Geoid Model = Geoid 12B
 Units = US Survey Feet

SURVEY CONTROL PERPETUATION DIAGRAM

I-225 at Yosemite St
 SW1/4 Sec. 3, SE1/4 Sec. 4, NE1/4 Sec. 9, NW1/4 Sec. 10
 Township 5 South, Range 67 West, 6th P.M.
 City and County of Denver, State of Colorado

FOUND ALIQUOT MONUMENT COORDINATE TABLE

Point No.	City and County of Denver Local Coordinates (ft)		Elevation (ft)	Geodetic Coordinates NAD-83(92)		Ellip Height (NAVD88) (ft)	Description
	Northing(ft)	Easting(ft)		Latitude(N)	Longitude(W)		
917	357519.76	603592.06	5612.44	N39°38'19.27783"	W104°53'07.09598"	5555.70	FOUND 1" BRASS CAP PLS 20683
918	357535.59	603642.42	5613.62	N39°38'19.43423"	W104°53'06.45238"	5556.88	FOUND 1" BRASS CAP PLS 20683
919	357496.67	603690.16	5612.67	N39°38'19.04954"	W104°53'05.84242"	5555.93	FOUND 1" BRASS CAP PLS 20683
920	357499.65	603651.80	5613.08	N39°38'19.07906"	W104°53'06.33255"	5556.34	FOUND 3.5" ALUMINUM CAP PLS 38035
921	357477.36	603630.86	5612.78	N39°38'18.85889"	W104°53'06.60029"	5556.04	FOUND CUT "X"
923	354890.55	603547.69	5647.40	N39°37'53.30014"	W104°53'07.66768"	5590.73	FOUND CUT "X"
924	354908.49	603561.69	5648.80	N39°37'53.47733"	W104°53'07.48882"	5592.13	FOUND CUT "X"
925	354900.73	603669.87	5648.98	N39°37'53.40053"	W104°53'06.10655"	5592.30	TOP OF EASTERLY MOST BUMP
926	354899.59	603668.55	5649.07	N39°37'53.38923"	W104°53'06.12341"	5592.39	TOP OF EASTERLY MOST BUMP
927	357575.29	600934.10	5543.52	N39°38'19.82889"	W104°53'41.06280"	5486.87	FOUND NAIL AND TAG LS 1802
928	357505.01	600987.73	5547.43	N39°38'19.13444"	W104°53'40.37750"	5490.78	FOUND 3.5" ALUMINUM CAP PLS 16398
929	357575.09	601045.30	5542.47	N39°38'19.82684"	W104°53'39.64177"	5485.82	FOUND MAG NAIL & SHINER PLS 26288
930	357490.34	601001.50	5552.82	N39°38'18.98945"	W104°53'40.20155"	5496.16	FOUND CUT "X"
934	360186.49	603678.22	5598.58	N39°38'45.62615"	W104°53'05.98996"	5541.77	FOUND CUT "X"
935	360099.01	603714.78	5600.83	N39°38'44.76184"	W104°53'05.52294"	5544.02	FOUND CUT "X"
2000	360188.15	603731.53	5597.57	N39°38'45.64255"	W104°53'05.30865"	5540.76	FOUND NAIL IN POLE LS 2132
41001	360148.31	603698.76	5598.80	N39°38'45.24891"	W104°53'05.72747"	5541.99	FOUND 1" PIPE IN RANGE BOX

SET PROJECT CONTROL MONUMENT COORDINATE TABLE

Point No.	City and County of Denver Local Coordinates (ft)		Elevation (ft)	Geodetic Coordinates NAD-83(92)		Ellip Height (NAVD88) (ft)	Description
	Northing(ft)	Easting(ft)		Latitude(N)	Longitude(W)		
901	358034.71	603709.60	5623.11	N39°38'24.36564"	W104°53'05.59301"	5566.35	SET CUT "X"
902	357615.71	603745.10	5614.22	N39°38'20.22563"	W104°53'05.14009"	5557.47	SET CUT "X"
903	357471.21	603628.34	5611.88	N39°38'18.79809"	W104°53'06.63245"	5555.14	SET CUT "X"
904	358083.40	603660.49	5624.93	N39°38'24.84678"	W104°53'06.22051"	5568.17	SET CUT "X"
905	357994.43	603638.35	5622.23	N39°38'23.96770"	W104°53'06.50358"	5565.48	SET CUT "X"
906	358279.25	603596.49	5626.53	N39°38'26.78198"	W104°53'07.03795"	5569.77	SET CUT "X"
907	358028.68	603697.05	5623.97	N39°38'24.30604"	W104°53'05.75337"	5567.22	SET CUT "X"
908	358081.61	603712.10	5623.66	N39°38'24.82898"	W104°53'05.56092"	5566.91	SET 30D NAIL
909	357526.36	603579.85	5611.31	N39°38'19.34303"	W104°53'07.25199"	5554.57	SET CUT "X"
910	357772.49	603639.23	5617.43	N39°38'21.77491"	W104°53'06.49270"	5560.68	SET CUT "X"

CALCULATED RANGE POINT COORDINATE TABLE

Point No.	City and County of Denver Local Coordinates (ft)		Geodetic Coordinates NAD-83(92)		Description
	Northing(ft)	Easting(ft)	Latitude(N)	Longitude(W)	
2002	357499.75'	603601.83'	W104° 53' 06.96"	W039° 38' 18.97"	CALC RANGE POINT

RECOVERED RANGE POINT MONUMENT COORDINATE TABLE

Point No.	City and County of Denver Local Coordinates (ft)		Elevation (ft)	Geodetic Coordinates NAD-83(92)		Ellip Height (NAVD88) (ft)	Description
	Northing(ft)	Easting(ft)		Latitude(N)	Longitude(W)		
1005	357888.24	603043.00	5597.02	N39°38'22.91934"	W104°53'14.11204"	5540.29	FOUND CCD RANGE POINT

RECOVERED BENCHMARK MONUMENT COORDINATE TABLE

Point No.	City and County of Denver Local Coordinates (ft)		Elevation (ft)	Geodetic Coordinates NAD-83(92)		Ellip Height (NAVD88) (ft)	Description
	Northing(ft)	Easting(ft)		Latitude(N)	Longitude(W)		
12385	357898.76	603591.73	5620.09	N39°38'23.02249"	W104°53'07.09951"	5563.34	CCD BM 343

FOUND BOUNDARY MONUMENT COORDINATE TABLE

Point No.	City and County of Denver Local Coordinates (ft)		Elevation (ft)	Geodetic Coordinates NAD-83(92)		Ellip Height (NAVD88) (ft)	Description
	Northing(ft)	Easting(ft)		Latitude(N)	Longitude(W)		
12343	357958.57	603703.72	5620.84	N39°38'23.61337"	W104°53'05.66821"	5564.09	FOUND 3.5" ALUMINUM CAP CDOT 2.043069 ZBS



Print Date: 5/21/2020

File Name: I91001SURV_LSCD-Yosemite02.dgn

Horiz. Scale: 1:1

Vert. Scale: N/A

FY2019 HSIP PACKAGE 1



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**I-225 AT YOSEMITE
 SURVEY CONTROL PERPETUATION DIAGRAM**

Designer: MAG

Detailer: DJH

Sheet Subset: SURVEY

Project No./Code

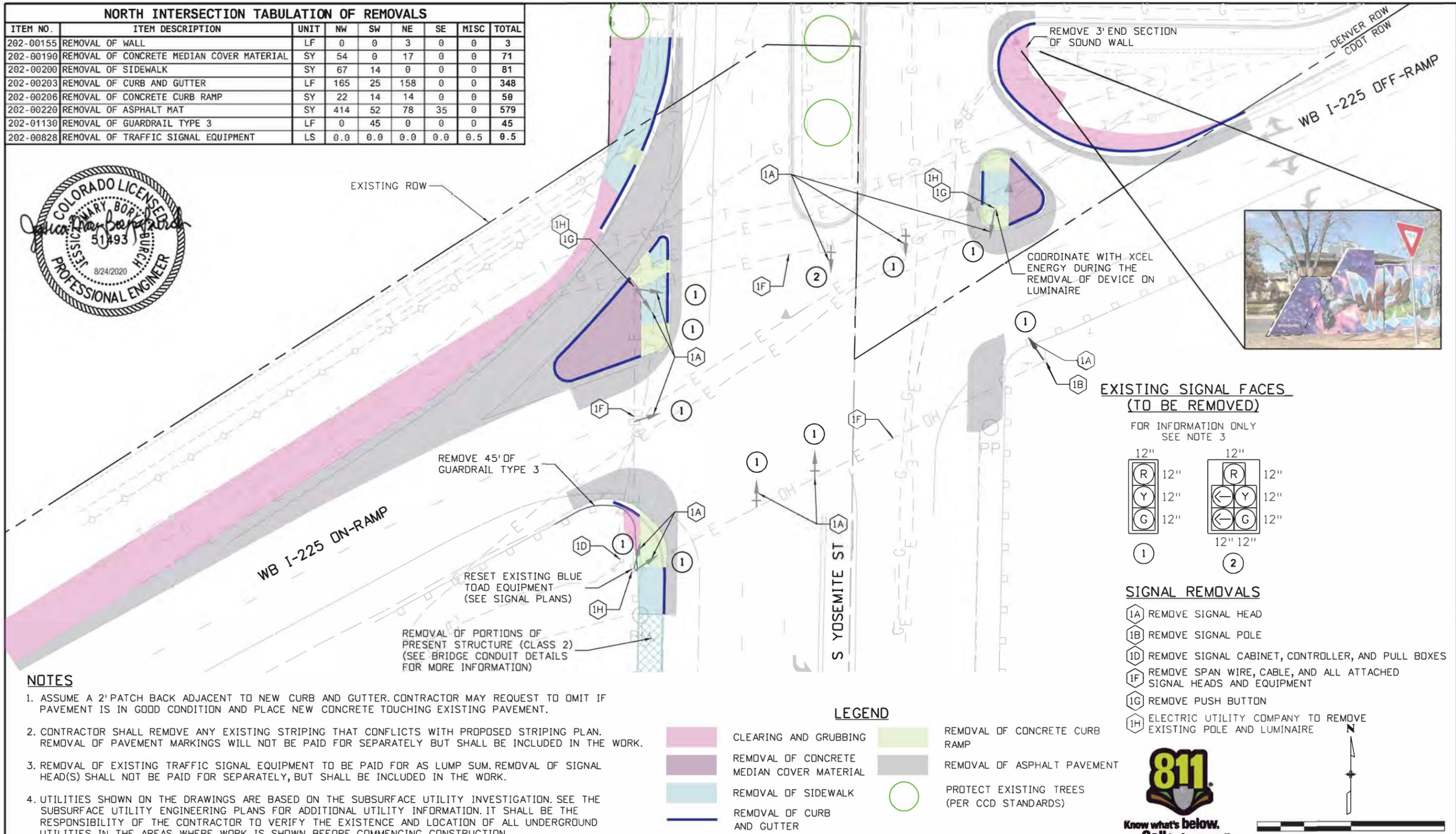
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2020-PRDJMSTR-0000088

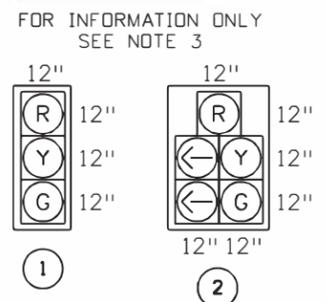
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NORTH INTERSECTION TABULATION OF REMOVALS								
ITEM NO.	ITEM DESCRIPTION	UNIT	NW	SW	NE	SE	MISC	TOTAL
202-00155	REMOVAL OF WALL	LF	0	0	3	0	0	3
202-00190	REMOVAL OF CONCRETE MEDIAN COVER MATERIAL	SY	54	0	17	0	0	71
202-00200	REMOVAL OF SIDEWALK	SY	67	14	0	0	0	81
202-00203	REMOVAL OF CURB AND GUTTER	LF	165	25	158	0	0	348
202-00206	REMOVAL OF CONCRETE CURB RAMP	SY	22	14	14	0	0	50
202-00220	REMOVAL OF ASPHALT MAT	SY	414	52	78	35	0	579
202-01130	REMOVAL OF GUARDRAIL TYPE 3	LF	0	45	0	0	0	45
202-00828	REMOVAL OF TRAFFIC SIGNAL EQUIPMENT	LS	0.0	0.0	0.0	0.0	0.5	0.5



EXISTING SIGNAL FACES (TO BE REMOVED)

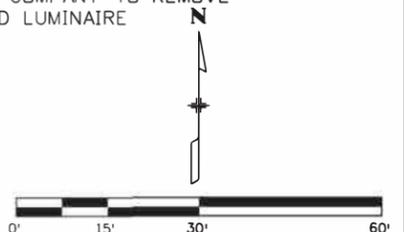


SIGNAL REMOVALS

- 1A REMOVE SIGNAL HEAD
- 1B REMOVE SIGNAL POLE
- 1D REMOVE SIGNAL CABINET, CONTROLLER, AND PULL BOXES
- 1F REMOVE SPAN WIRE, CABLE, AND ALL ATTACHED SIGNAL HEADS AND EQUIPMENT
- 1G REMOVE PUSH BUTTON
- 1H ELECTRIC UTILITY COMPANY TO REMOVE EXISTING POLE AND LUMINAIRE

LEGEND

- CLEARING AND GRUBBING
- REMOVAL OF CONCRETE MEDIAN COVER MATERIAL
- REMOVAL OF SIDEWALK
- REMOVAL OF CURB AND GUTTER
- REMOVAL OF CONCRETE CURB RAMP
- REMOVAL OF ASPHALT PAVEMENT
- PROTECT EXISTING TREES (PER CCD STANDARDS)



NOTES

1. ASSUME A 2' PATCH BACK ADJACENT TO NEW CURB AND GUTTER. CONTRACTOR MAY REQUEST TO OMIT IF PAVEMENT IS IN GOOD CONDITION AND PLACE NEW CONCRETE TOUCHING EXISTING PAVEMENT.
2. CONTRACTOR SHALL REMOVE ANY EXISTING STRIPING THAT CONFLICTS WITH PROPOSED STRIPING PLAN. REMOVAL OF PAVEMENT MARKINGS WILL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE WORK.
3. REMOVAL OF EXISTING TRAFFIC SIGNAL EQUIPMENT TO BE PAID FOR AS LUMP SUM. REMOVAL OF SIGNAL HEAD(S) SHALL NOT BE PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN THE WORK.
4. UTILITIES SHOWN ON THE DRAWINGS ARE BASED ON THE SUBSURFACE UTILITY INVESTIGATION. SEE THE SUBSURFACE UTILITY ENGINEERING PLANS FOR ADDITIONAL UTILITY INFORMATION. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE EXISTENCE AND LOCATION OF ALL UNDERGROUND UTILITIES IN THE AREAS WHERE WORK IS SHOWN BEFORE COMMENCING CONSTRUCTION.

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 Horiz. Scale: 1:30 Vert. Scale: N/A

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I-225 AT YOSEMITE REMOVAL PLAN NORTH INTERSECTION		
Designer:	D. HUDSON	Structure Numbers
Detailer:	D. HUDSON	
Subset:	REMOVAL	Subset Sheets: 1 of 2

Project No./Code
SHE M320-125, 22935
2020-PRDJMSTR-0000088
Sheet Number 19

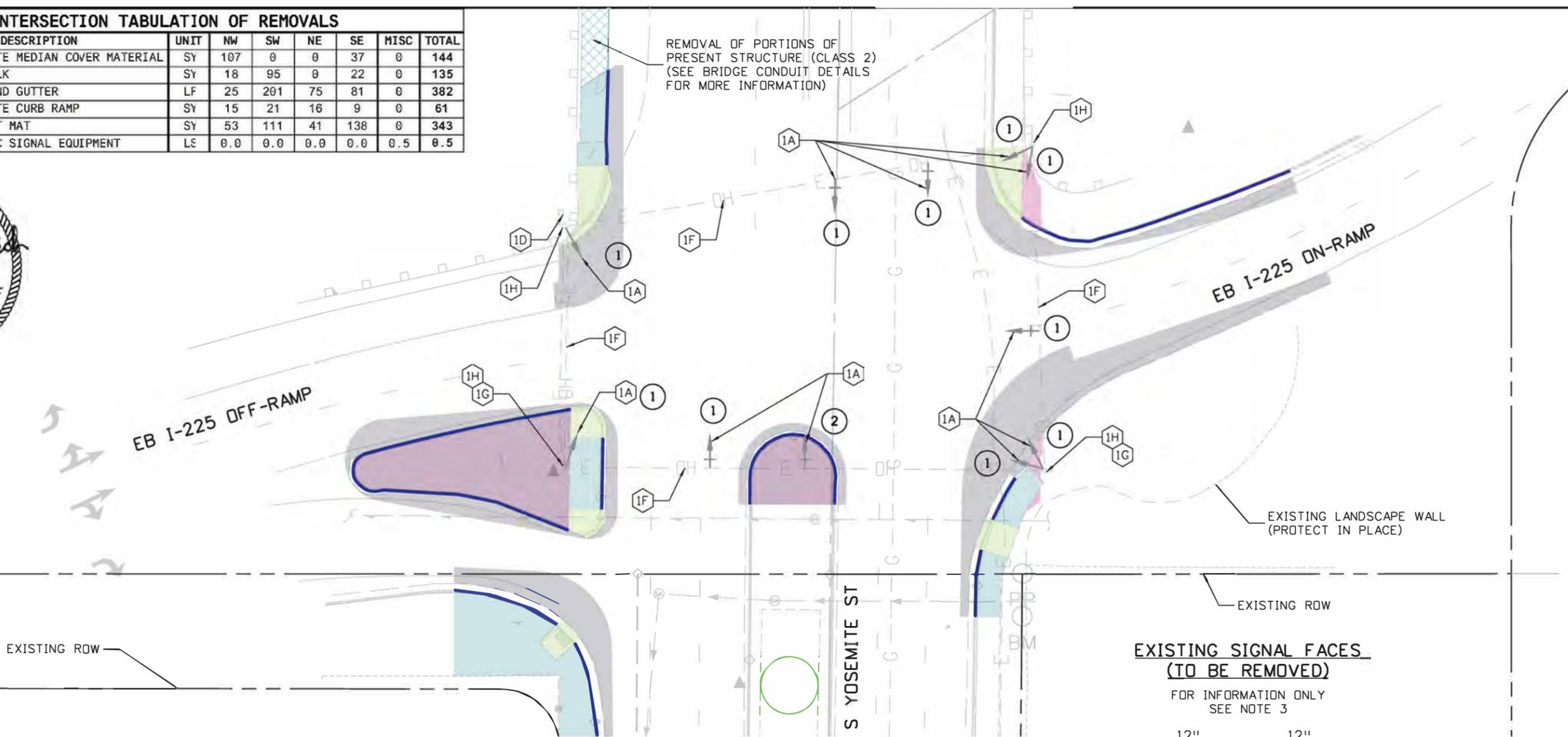
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SOUTH INTERSECTION TABULATION OF REMOVALS

ITEM NO.	ITEM DESCRIPTION	UNIT	NW	SW	NE	SE	MISC	TOTAL
202-00190	REMOVAL OF CONCRETE MEDIAN COVER MATERIAL	SY	107	0	0	37	0	144
202-00200	REMOVAL OF SIDEWALK	SY	18	95	0	22	0	135
202-00203	REMOVAL OF CURB AND GUTTER	LF	25	201	75	81	0	382
202-00206	REMOVAL OF CONCRETE CURB RAMP	SY	15	21	16	9	0	61
202-00220	REMOVAL OF ASPHALT MAT	SY	53	111	41	138	0	343
202-00828	REMOVAL OF TRAFFIC SIGNAL EQUIPMENT	LE	0.0	0.0	0.0	0.0	0.5	0.5



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NOTES

- ASSUME A 2' PATCH BACK ADJACENT TO NEW CURB AND GUTTER. CONTRACTOR MAY REQUEST TO OMIT IF PAVEMENT IS IN GOOD CONDITION AND PLACE NEW CONCRETE TOUCHING EXISTING PAVEMENT.
- CONTRACTOR SHALL REMOVE ANY EXISTING STRIPING THAT CONFLICTS WITH PROPOSED STRIPING PLAN. REMOVAL OF PAVEMENT MARKINGS WILL NOT BE PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN THE WORK.
- REMOVAL OF EXISTING TRAFFIC SIGNAL EQUIPMENT TO BE PAID FOR AS LUMP SUM. REMOVAL OF SIGNAL HEAD(S) SHALL NOT BE PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN THE WORK.
- UTILITIES SHOWN ON THE DRAWINGS ARE BASED ON THE SUBSURFACE UTILITY INVESTIGATION. SEE THE SUBSURFACE UTILITY ENGINEERING PLANS FOR ADDITIONAL UTILITY INFORMATION. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE EXISTENCE AND LOCATION OF ALL UNDERGROUND UTILITIES IN THE AREAS WHERE WORK IS SHOWN BEFORE COMMENCING CONSTRUCTION.

LEGEND

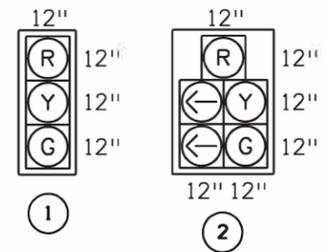
- CLEARING AND GRUBBING
- REMOVAL OF CONCRETE MEDIAN COVER MATERIAL
- REMOVAL OF SIDEWALK
- REMOVAL OF CURB AND GUTTER
- REMOVAL OF CONCRETE CURB RAMP
- REMOVAL OF ASPHALT PAVEMENT
- PROTECT EXISTING TREES (PER CCD STANDARDS)

SIGNAL REMOVALS

- 1A REMOVE SIGNAL HEAD
- 1D REMOVE SIGNAL CABINET, CONTROLLER, AND PULL BOXES
- 1F REMOVE SPAN WIRE, CABLE, AND ALL ATTACHED SIGNAL HEADS AND EQUIPMENT
- 1G REMOVE PUSH BUTTON
- 1H ELECTRIC UTILITY COMPANY TO REMOVE EXISTING POLE AND LUMINAIRE

EXISTING SIGNAL FACES (TO BE REMOVED)

FOR INFORMATION ONLY
SEE NOTE 3



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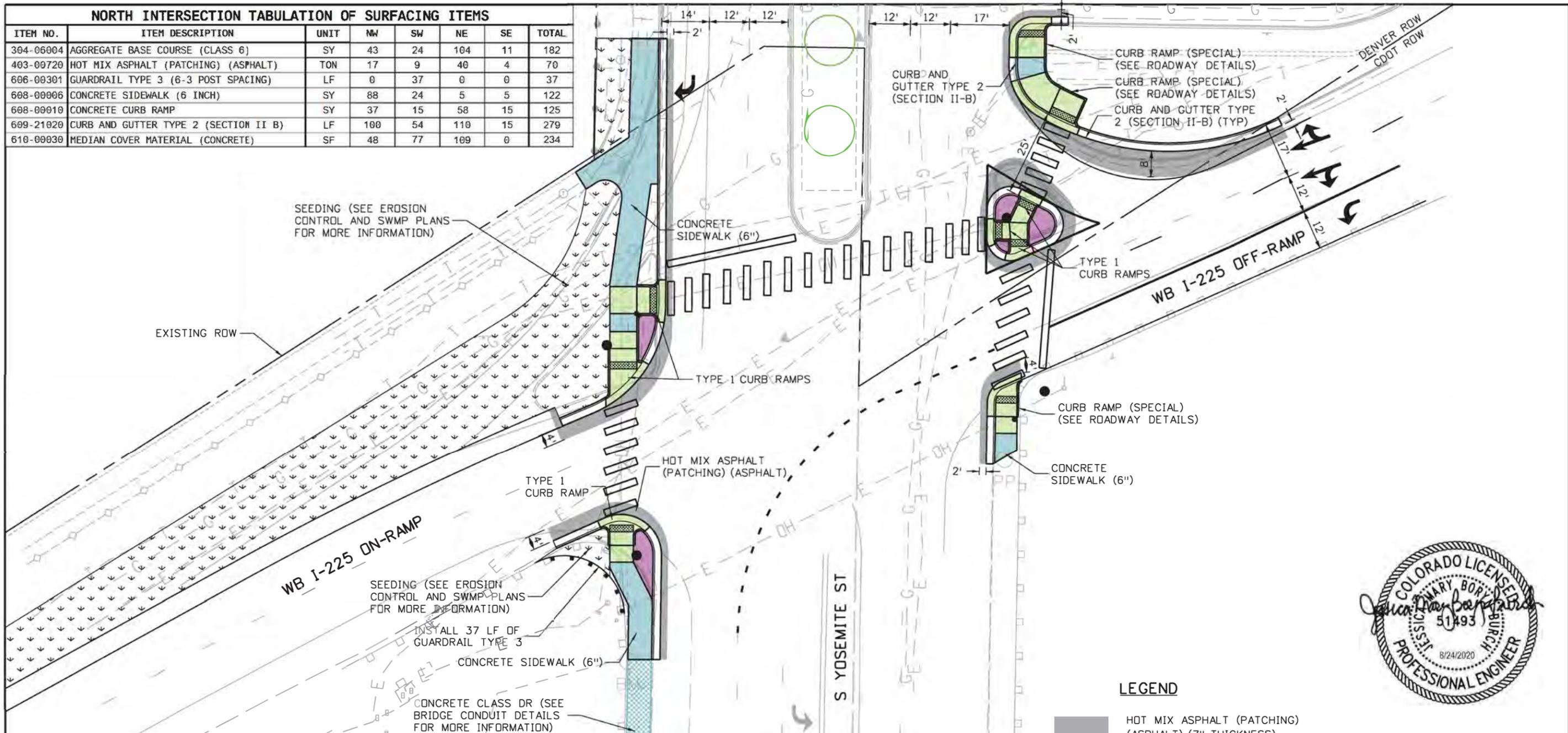
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No Revisions:
Revised:
Void:

I-225 AT YOSEMITE REMOVAL PLAN SOUTH INTERSECTION	
Designer: D. HUDSON	Structure Numbers
Detailer: D. HUDSON	
Subset: REMOVAL	Subset Sheets: 2 of 2

Project No./Code
SHE M320-125, 22935
2020-PROJ MSTR-000088
Sheet Number 20

NORTH INTERSECTION TABULATION OF SURFACING ITEMS							
ITEM NO.	ITEM DESCRIPTION	UNIT	NW	SW	NE	SE	TOTAL
304-06004	AGGREGATE BASE COURSE (CLASS 6)	SY	43	24	104	11	182
403-00720	HOT MIX ASPHALT (PATCHING) (ASPHALT)	TON	17	9	40	4	70
606-00301	GUARDRAIL TYPE 3 (6-3 POST SPACING)	LF	0	37	0	0	37
608-00006	CONCRETE SIDEWALK (6 INCH)	SY	88	24	5	5	122
608-00010	CONCRETE CURB RAMP	SY	37	15	58	15	125
609-21020	CURB AND GUTTER TYPE 2 (SECTION II B)	LF	100	54	110	15	279
610-00030	MEDIAN COVER MATERIAL (CONCRETE)	SF	48	77	109	0	234

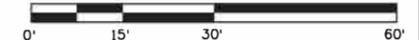


NOTES

1. ALL CURB RAMPS SHALL FOLLOW THE CITY AND COUNTY OF DENVER TRANSPORTATION STANDARDS FOR CURB RAMPS.
2. UTILITIES SHOWN ON THE DRAWINGS ARE BASED ON THE SUBSURFACE UTILITY INVESTIGATION. SEE THE SUBSURFACE UTILITY ENGINEERING PLANS FOR ADDITIONAL UTILITY INFORMATION. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE EXISTENCE AND LOCATION OF ALL UNDERGROUND UTILITIES IN THE AREAS WHERE WORK IS SHOWN BEFORE COMMENCING CONSTRUCTION.
3. ALL CURB AND GUTTER SHALL FOLLOW THE CITY AND COUNTY OF DENVER TRANSPORTATION STANDARD DRAWING 5.2 FOR 6" CURB AND GUTTER - 2' CATCH PAN.
4. SEE ROADWAY DETAIL SHEETS FOR MORE INFORMATION ON CURB RAMP AND SIDEWALK LAYOUT.
5. SEE FLOWLINE PROFILE SHEETS FOR MORE INFORMATION ON CURB AND GUTTER LAYOUT.

LEGEND

- HOT MIX ASPHALT (PATCHING) (ASPHALT) (7" THICKNESS)
- CONCRETE SIDEWALK (6")
- CONCRETE CURB RAMP
- CONCRETE MEDIAN COVER MATERIAL
- PROPOSED CAISSON LOCATION (SIGNAL OR PUSH BUTTON)
- PROTECT EXISTING TREES (PER CCD STANDARDS)



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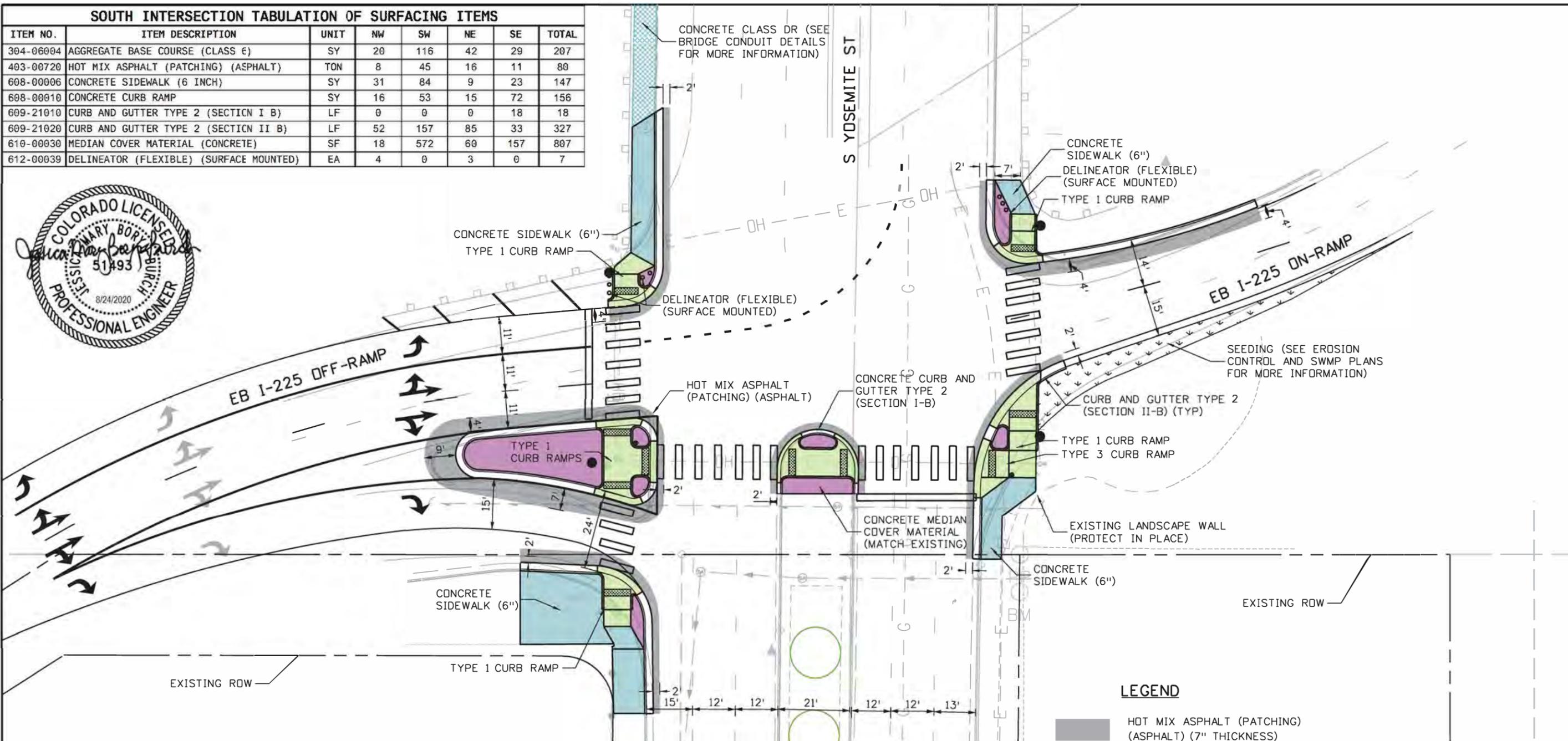
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Designer:	D. HUDSON	Structure Numbers:	
Detailer:	D. HUDSON	Subset Sheets:	1 of 2

Project No./Code
SHE M320-125, 22935
2020-PRDJMSTR-0000088
Sheet Number 21

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SOUTH INTERSECTION TABULATION OF SURFACING ITEMS

ITEM NO.	ITEM DESCRIPTION	UNIT	NW	SW	NE	SE	TOTAL
304-06004	AGGREGATE BASE COURSE (CLASS 6)	SY	20	116	42	29	207
403-00720	HOT MIX ASPHALT (PATCHING) (ASPHALT)	TON	8	45	16	11	80
608-00006	CONCRETE SIDEWALK (6 INCH)	SY	31	84	9	23	147
608-00010	CONCRETE CURB RAMP	SY	16	53	15	72	156
609-21010	CURB AND GUTTER TYPE 2 (SECTION I B)	LF	0	0	0	18	18
609-21020	CURB AND GUTTER TYPE 2 (SECTION II B)	LF	52	157	85	33	327
610-00030	MEDIAN COVER MATERIAL (CONCRETE)	SF	18	572	60	157	807
612-00039	DELINEATOR (FLEXIBLE) (SURFACE MOUNTED)	EA	4	0	3	0	7



NOTES

1. ALL CURB RAMP SHALL FOLLOW THE CITY AND COUNTY OF DENVER TRANSPORTATION STANDARDS FOR CURB RAMP.
2. UTILITIES SHOWN ON THE DRAWINGS ARE BASED ON THE SUBSURFACE UTILITY INVESTIGATION. SEE THE SUBSURFACE UTILITY ENGINEERING PLANS FOR ADDITIONAL UTILITY INFORMATION. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE EXISTENCE AND LOCATION OF ALL UNDERGROUND UTILITIES IN THE AREAS WHERE WORK IS SHOWN BEFORE COMMENCING CONSTRUCTION.
3. ALL CURB AND GUTTER SHALL FOLLOW THE CITY AND COUNTY OF DENVER TRANSPORTATION STANDARD DRAWING 5.2 FOR 6" CURB AND GUTTER - 2' CATCH PAN.
4. SEE ROADWAY DETAIL SHEETS FOR MORE INFORMATION ON CURB RAMP AND SIDEWALK LAYOUT.
5. SEE FLOWLINE PROFILE SHEETS FOR MORE INFORMATION ON CURB AND GUTTER LAYOUT.

LEGEND

- HOT MIX ASPHALT (PATCHING) (ASPHALT) (7" THICKNESS)
- CONCRETE SIDEWALK (6")
- CONCRETE CURB RAMP
- CONCRETE MEDIAN COVER MATERIAL
- PROPOSED CAISSON LOCATION (SIGNAL OR PUSH BUTTON)
- PROTECT EXISTING TREES (PER CCD STANDARDS)



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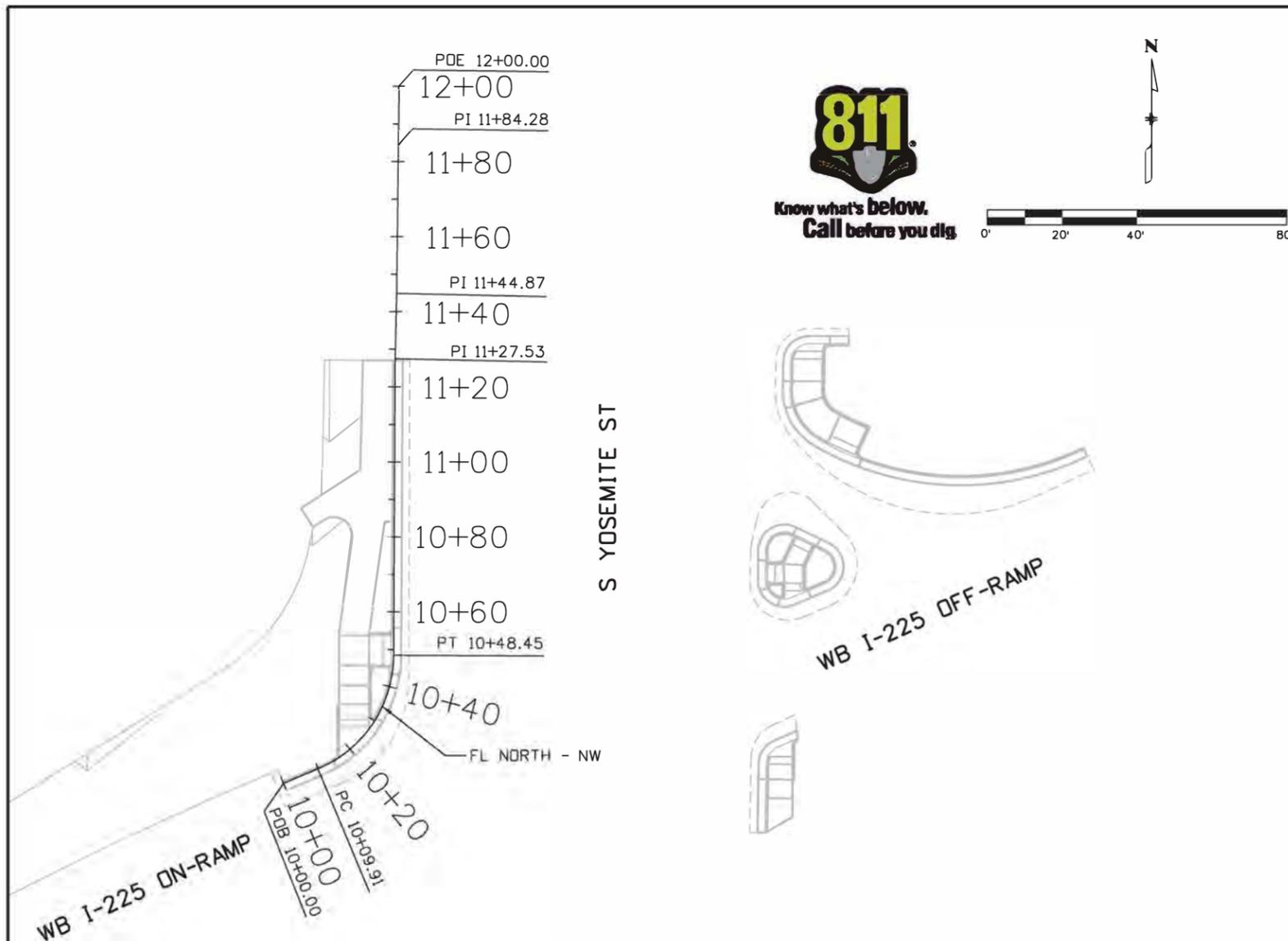
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Revised:
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I-225 AT YOSEMITE ROADWAY PLAN SOUTH INTERSECTION		
Designer:	D. HUDSON	Structure Numbers
Detailer:	D. HUDSON	
Subset:	ROADWAY	Subset Sheets: 2 of 2

Project No./Code
SHE M320-125, 22935
2020-PRDJMSTR-0000088
Sheet Number 22

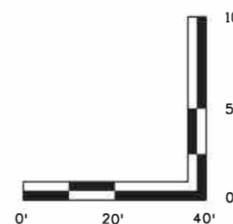
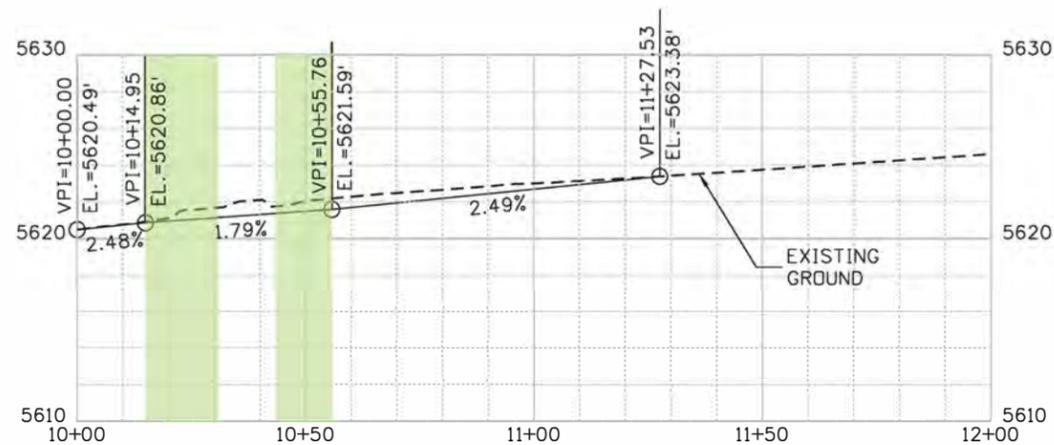
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FL North - NW								
Element	Point Type	Station	Northing	Easting	Radius	Length	Delta/Theta	Rotation Direction
Tangent	POB	10+00.00	357970.43	603571.57		9.91		
	PC	10+09.91	357974.27	603580.70				
Arc	PC	10+09.91	357974.27	603580.70	33.00	38.53	66°54'20"	Left
	PI	10+31.71	357982.72	603600.80				
	CC		358004.69	603567.92				
	PT	10+48.45	358004.52	603600.92				
Tangent	PT	10+48.45	358004.52	603600.92		79.08		
	PI	11+27.53	358083.16	603601.32				
Tangent	PI	11+27.53	358083.16	603601.32		17.34		
	PI	11+44.87	358100.94	603601.71				
Tangent	PI	11+44.87	358100.94	603601.71		39.41		
	PI	11+84.28	358140.35	603602.23				
Tangent	PI	11+84.28	358140.35	603602.23		15.72		
	POE	12+00.00	358156.06	603602.39				

FL NORTH - NW PROFILE



CURB RAMP LIMITS



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I-225 AT YOSEMITE FLOWLINE DETAILS FL NORTH - NW		
Designer:	D. HUDSON	Structure Numbers
Detailer:	D. HUDSON	
Subset:	FLOWLINE	Subset Sheets: 1 of 11

Project No./Code
SHE M320-125, 22935
2020-PRDJMSTR-0000088
Sheet Number 23

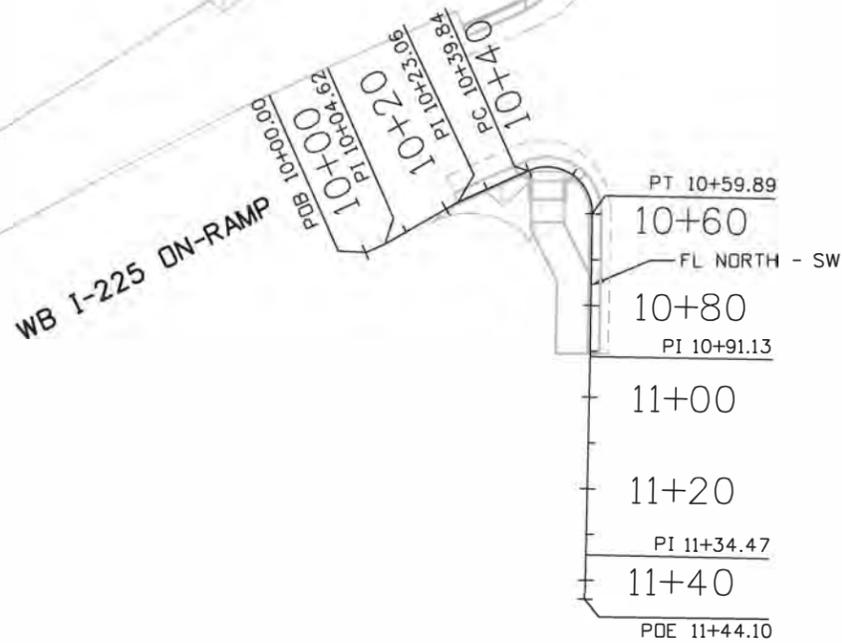


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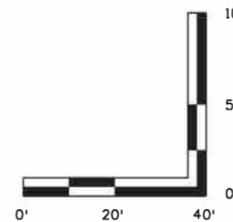
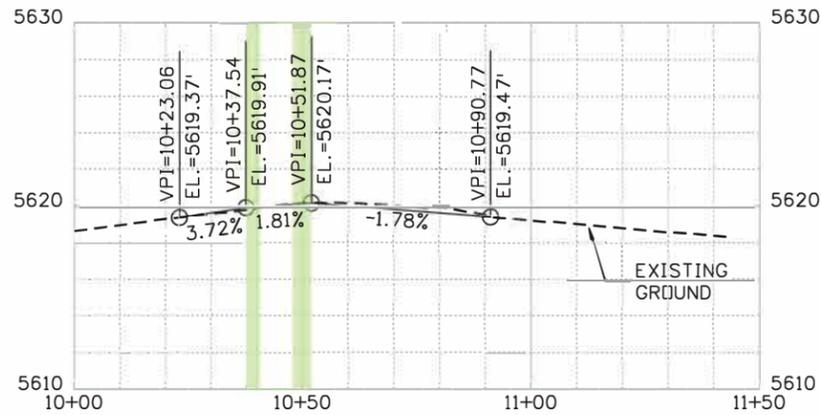


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WB I-225 OFF-RAMP



FL NORTH - SW PROFILE



CURB RAMP LIMITS



FL North - SW								
Element	Point Type	Station	Northing	Easting	Radius	Length	Delta/Theta	Rotation Direction
Tangent	POB	10+00.00	357921.44	603550.09				
	PI	10+04.62	357923.30	603554.32		4.62		
Tangent	PI	10+04.62	357923.30	603554.32		18.44		
	PI	10+23.06	357932.47	603570.32				
Tangent	PI	10+23.06	357932.47	603570.32		16.78		
	PC	10+39.84	357939.26	603585.66				
Arc	PC	10+39.84	357939.26	603585.66				
	PI	10+55.50	357945.61	603599.97	10.00	20.05	114°52'27"	Right
	PT	10+59.89	357929.95	603599.71				
Tangent	PT	10+59.89	357929.95	603599.71		31.24		
	PI	10+91.13	357898.71	603599.18				
Tangent	PI	11+34.47	357855.39	603598.26		43.34		
Tangent	PI	11+34.47	357855.39	603598.26		9.63		
	POE	11+44.10	357845.76	603598.09				

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I-225 AT YOSEMITE FLOWLINE DETAILS FL NORTH - SW

Designer:	D. HUDSON	Structure Numbers:	
Detailer:	D. HUDSON	Subset Sheets:	2 of 11

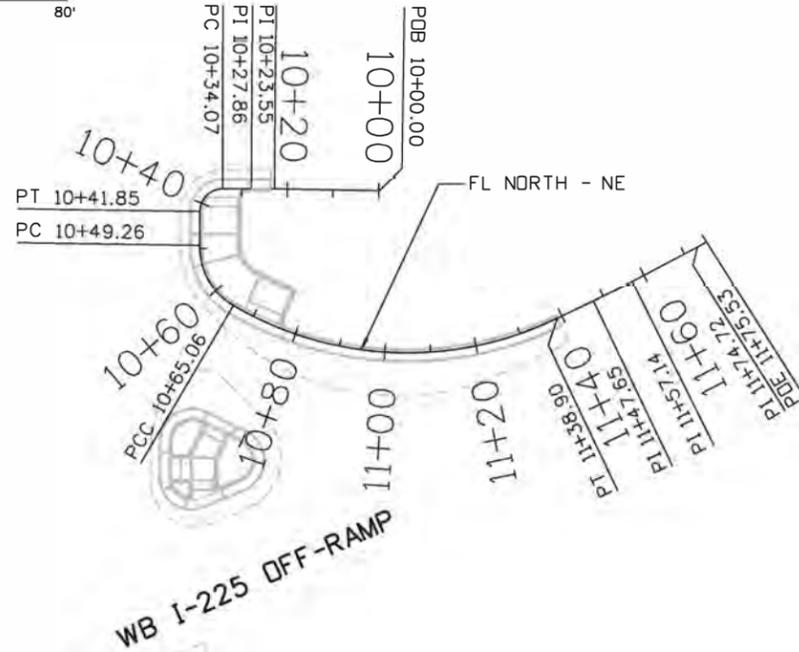
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2020-PRDJMSTR-0000088
Sheet Number 24



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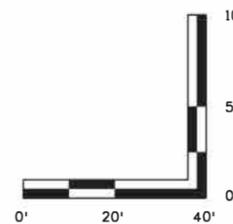
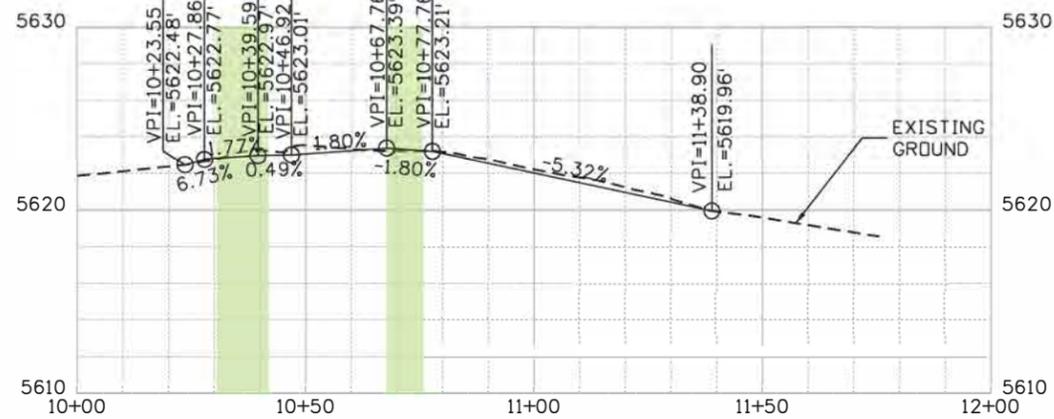


S YOSEMITE ST



FL North - NE								
Element	Point Type	Station	Northing	Easting	Radius	Length	Delta/Theta	Rotation Direction
Tangent	POB	10+00.00	358087.17	603746.15				
	PI	10+23.55	358087.56	603722.61		23.55		
Tangent	PI	10+23.55	358087.56	603722.61		4.31		
	PI	10+27.86	358087.58	603718.30				
Tangent	PI	10+27.86	358087.58	603718.30		6.21		
	PC	10+34.07	358087.58	603712.09				
Arc	PC	10+34.07	358087.58	603712.09				
	PI	10+39.00	358087.58	603707.16	5.00	7.79	89°12'34"	Left
	CC	10+41.85	358082.58	603712.09				
Tangent	PT	10+41.85	358082.65	603707.09				
	PC	10+49.26	358075.25	603706.99		7.41		
Arc	PC	10+49.26	358075.25	603706.99				
	PI	10+57.98	358066.53	603706.87	15.00	15.80	60°21'14"	Left
	CC	10+65.06	358075.04	603721.98				
Arc	PCC	10+65.06	358062.11	603714.39				
	PI	11+04.90	358041.93	603748.74	75.00	73.85	55°57'19"	Left
	CC	11+38.90	358126.77	603752.38				
Tangent	PT	11+38.90	358059.35	603785.23				
	PI	11+47.65	358063.12	603793.12		8.75		
Tangent	PI	11+47.65	358063.12	603793.12		9.49		
	PI	11+57.14	358067.34	603801.62				
Tangent	PI	11+57.14	358067.34	603801.62		17.58		
	PI	11+74.72	358075.51	603817.19				
Tangent	PI	11+74.72	358075.51	603817.19		0.81		
	POE	11+75.53	358075.94	603817.87				

FL NORTH - NE PROFILE



CURB RAMP LIMITS



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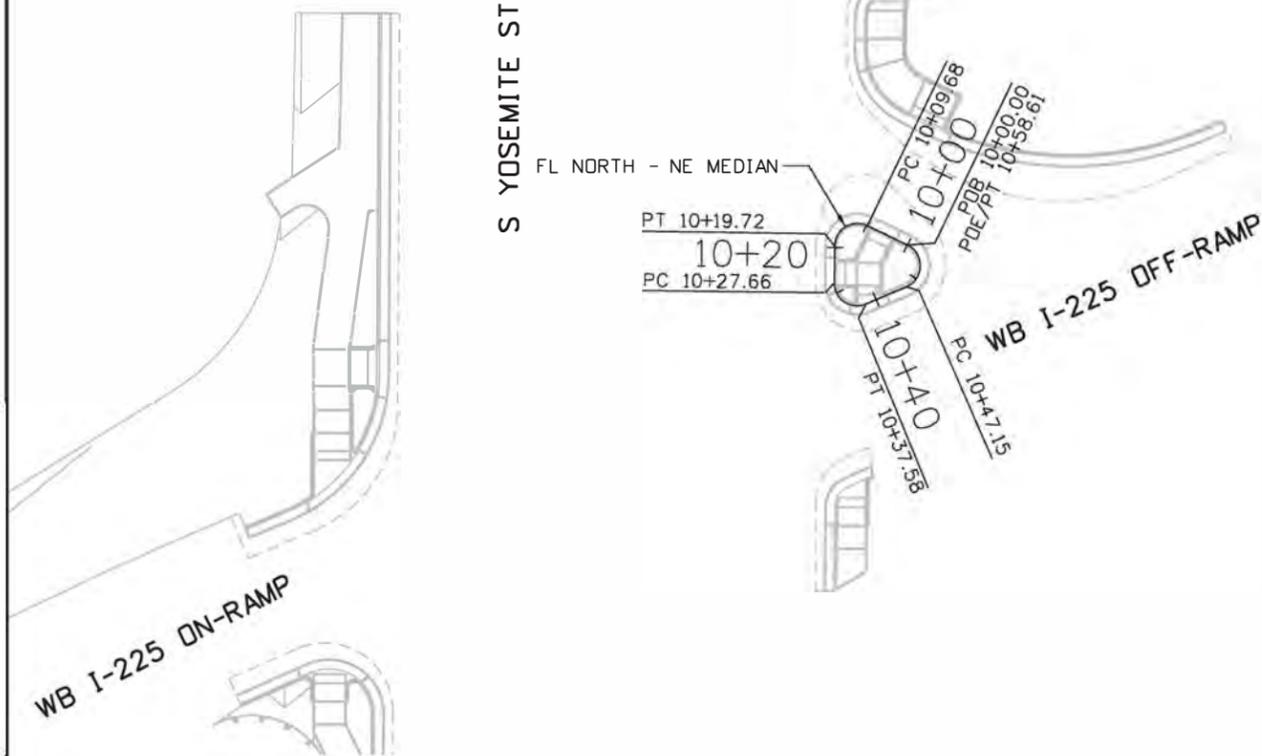
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As Constructed	No Revisions:	I-225 AT YOSEMITE FLOWLINE DETAILS FL NORTH - NE	Project No./Code	
	Revised:		SHE M320-125, 22935	
	Void:		Designer: D. HUDSON	Structure Numbers
		Detailer: D. HUDSON	Subset Sheets: 3 of 11	Sheet Number 25

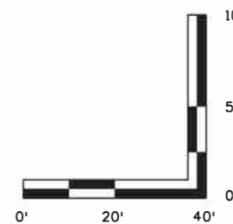
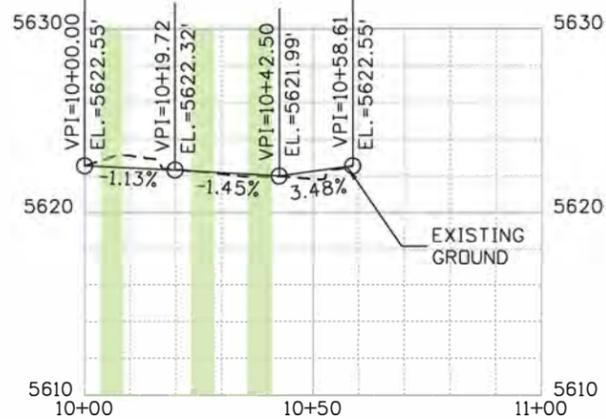
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FL NORTH - NE MEDIAN PROFILE



CURB RAMP LIMITS



FL North- NE Median								
Element	Point Type	Station	Northing	Easting	Radius	Length	Delta/Theta	Rotation Direction
Tangent	POB	10+00.00	358032.71	603716.33				
	PC	10+09.68	358036.92	603707.61		9.68		
Arc	PC	10+09.68	358036.92	603707.61	5.00	10.04	115°04'36"	Left
	PI	10+17.54	358040.33	603700.54				
	CC	10+19.72	358032.41	603705.44				
	PT	10+19.72	358032.48	603700.44				
Tangent	PT	10+19.72	358032.48	603700.44		7.94		
	PC	10+27.66	358024.53	603700.34				
Arc	PC	10+27.66	358024.53	603700.34	5.00	9.92	113°38'24"	Left
	PI	10+35.31	358016.89	603700.25				
	CC	10+37.58	358024.47	603705.34				
	PT	10+37.58	358019.87	603707.29				
Tangent	PT	10+37.58	358019.87	603707.29		9.57		
	PC	10+47.15	358023.60	603716.10				
Arc	PC	10+47.15	358023.60	603716.10	5.00	11.46	131°16'59"	Left
	PI	10+58.20	358027.90	603726.27				
	CC	10+58.20	358028.20	603714.16				
	POE	10+58.61	358032.71	603716.33				
	POE	10+58.61	358032.71	603716.33				

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**I-225 AT YOSEMITE
 FLOWLINE DETAILS
 FL NORTH - NE MEDIAN**

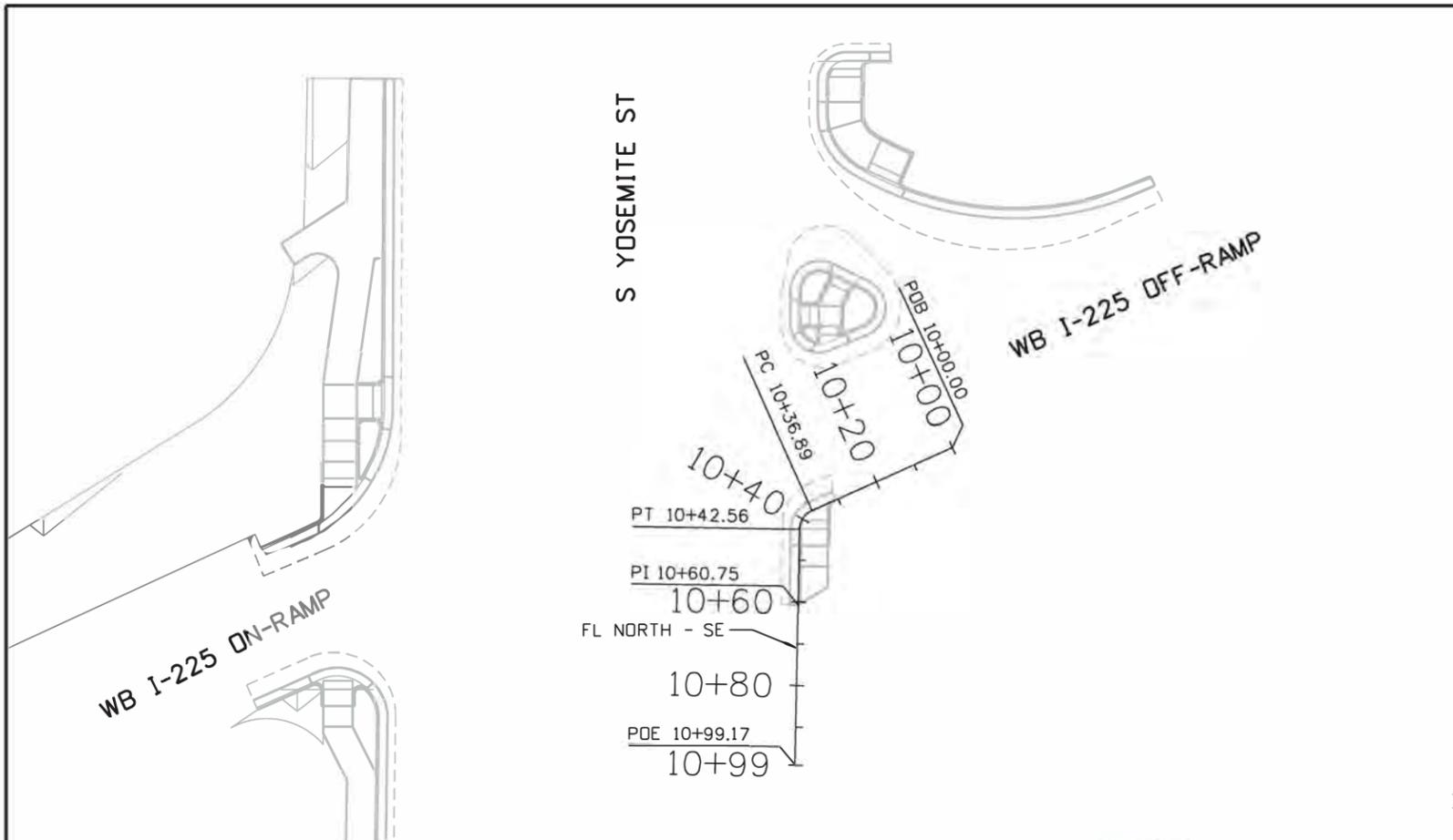
Designer: D. HUDSON
 Detailer: D. HUDSON
 Subset: FLOWLINE

Structure Numbers
 Subset Sheets: 4 of 11

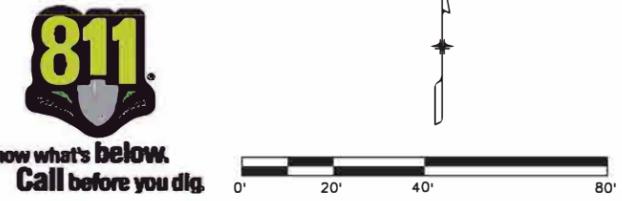
Project No./Code
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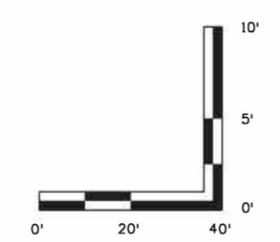
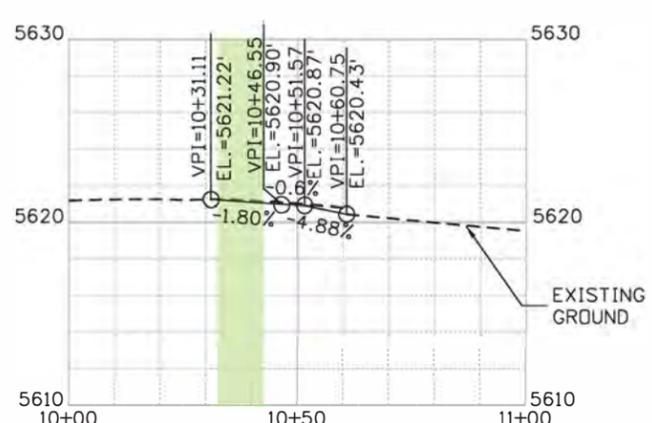
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FL North - SE								
Element	Point Type	Station	Northing	Easting	Radius	Length	Delta/Theta	Rotation Direction
Tangent	POB	10+00.00	357994.98	603737.13		36.89		
	PC	10+36.89	357979.87	603703.48				
Arc	PC	10+36.89	357979.87	603703.48	5.00	5.66	64°54'44"	Left
	PI	10+40.07	357978.57	603700.57				
	CC	10+42.56	357975.31	603705.52				
	PT	10+42.56	357975.39	603700.52				
Tangent	PT	10+42.56	357975.39	603700.52		18.19		
	PI	10+60.75	357957.11	603700.23				
Tangent	PI	10+60.75	357957.11	603700.23		38.42		
	POE	10+99.17	357918.79	603699.50				



FL NORTH - SE PROFILE



CURB RAMP LIMITS



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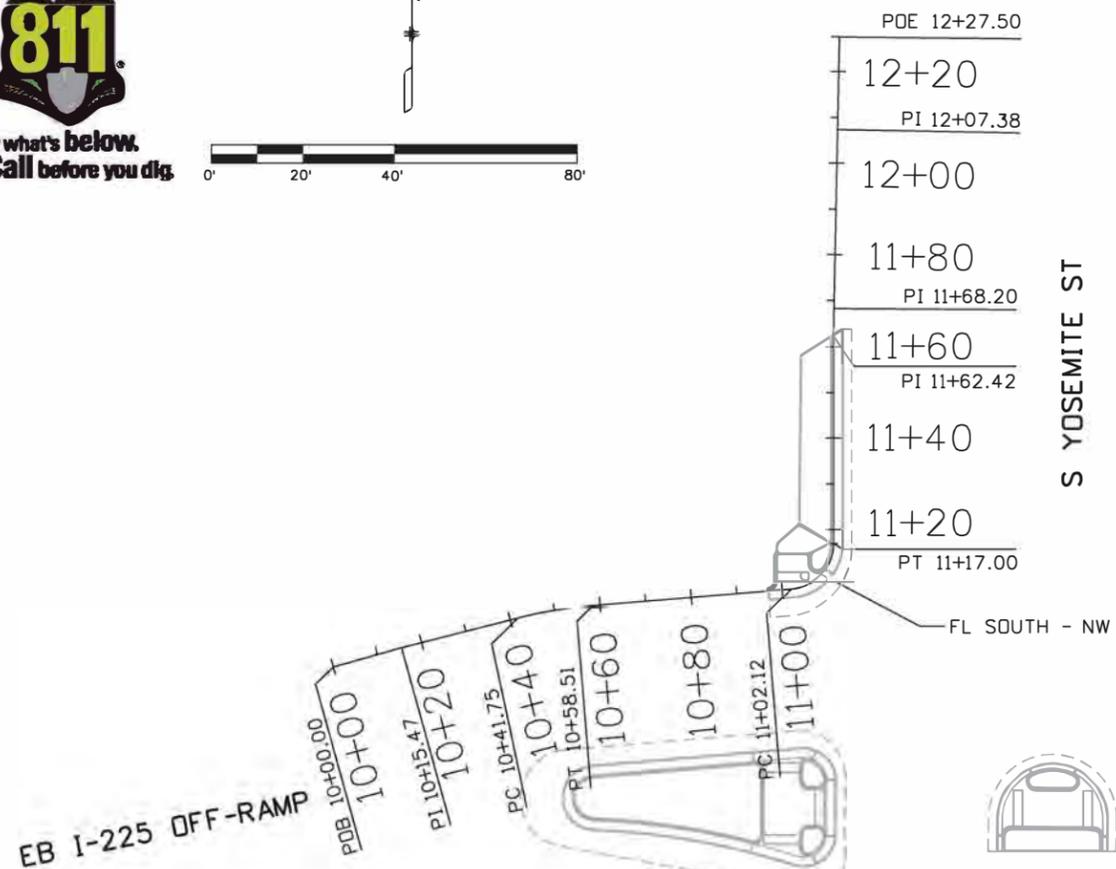
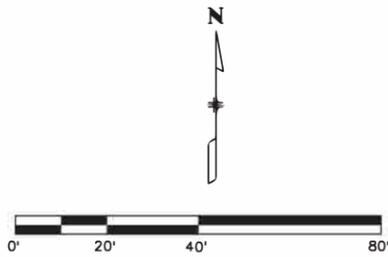
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I-225 AT YOSEMITE FLOWLINE DETAILS FL NORTH - SE		
Designer:	D. HUDSON	Structure Numbers
Detailer:	D. HUDSON	
Subset:	FLOWLINE	Subset Sheets: 5 of 11

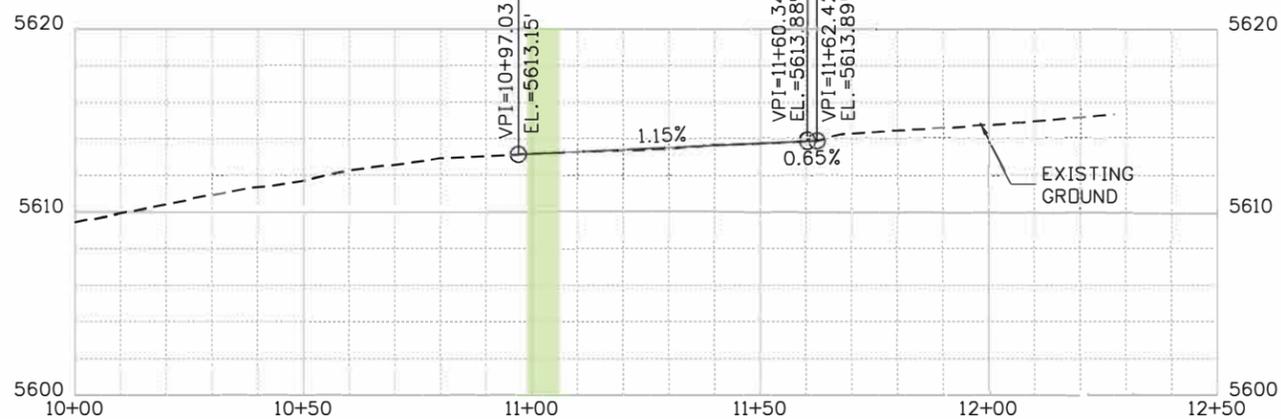
Project No./Code
SHE M320-125, 22935
2020-PRDJMSTR-0000088
Sheet Number 27



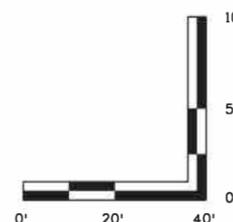
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FL SOUTH - NW PROFILE



FL South - NW								
Element	Point Type	Station	Northing	Easting	Radius	Length	Delta/Theta	Rotation Direction
Tangent	POB	10+00.00	357558.14	603484.57				
	PI	10+15.47	357562.29	603499.47		15.47		
Tangent	PI	10+15.47	357562.29	603499.47				
	PC	10+41.75	357568.80	603524.93		26.28		
Arc	PC	10+41.75	357568.80	603524.93	100.00	16.76	9°36'18"	Right
	PI	10+50.15	357570.88	603533.07				
	CC	10+58.51	357471.92	603549.71				
	PT	10+58.51	357571.58	603541.44				
Tangent	PT	10+58.51	357571.58	603541.44				
	PC	11+02.12	357575.18	603584.91		43.61		
Arc	PC	11+02.12	357575.18	603584.91	10.00	14.88	85°15'27"	Left
	PI	11+11.33	357575.94	603594.08				
	CC	11+17.00	357585.15	603584.08				
	PT	11+17.00	357585.15	603594.08				
Tangent	PT	11+17.00	357585.15	603594.08				
	PI	11+62.42	357630.57	603594.08		45.42		
Tangent	PI	11+62.42	357630.57	603594.08				
	PI	11+68.20	357636.34	603594.12		5.78		
Tangent	PI	11+68.20	357636.34	603594.12				
	PI	12+07.38	357675.51	603594.90		39.18		
Tangent	PI	12+07.38	357675.51	603594.90				
	POE	12+27.50	357695.63	603595.31		20.12		



CURB RAMP LIMITS



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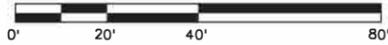
I-225 AT YOSEMITE FLOWLINE DETAILS FL SOUTH - NW		
Designer:	D. HUDSON	Structure Numbers
Detailer:	D. HUDSON	
Subset:	FLOWLINE	Subset Sheets: 6 of 11

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Sheet Number 28

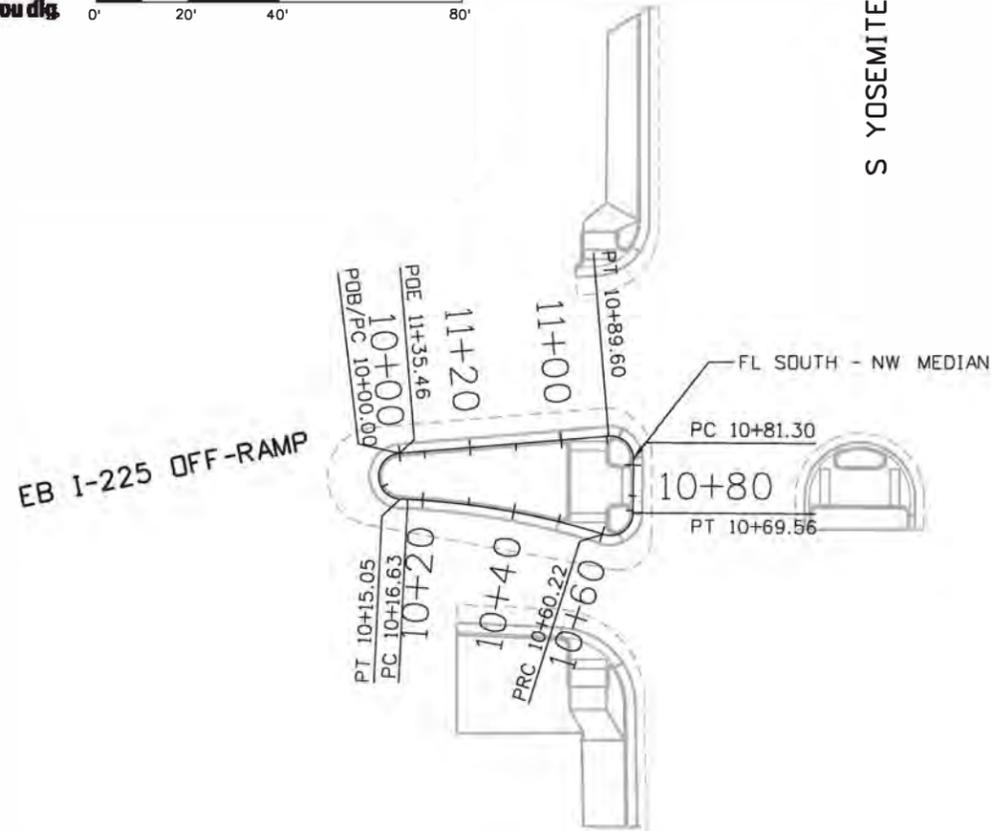
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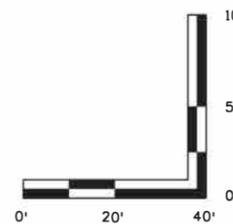
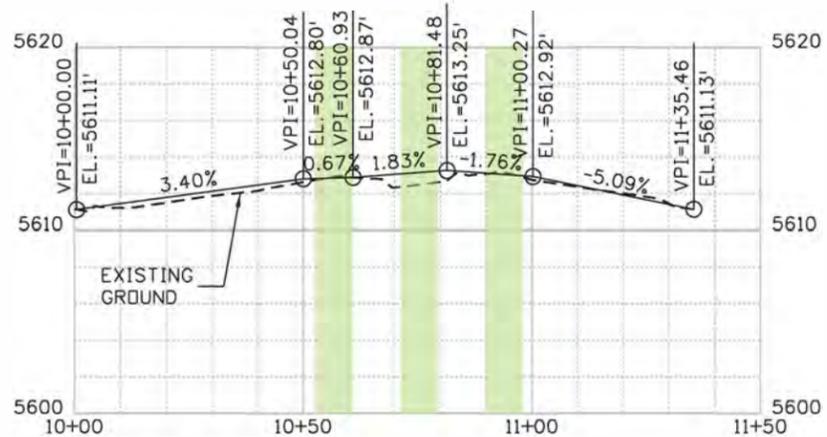


S YOSEMITE ST



FL South - SW Median								
Element	Point Type	Station	Northing	Easting	Radius	Length	Delta/Theta	Rotation Direction
Arc	POB/PC	10+00.00	357534.45	603541.42	5.00	15.05	172°28'58"	Left
	PI	10+76.11	357528.16	603465.58				
	CC	10+15.05	357529.47	603541.84				
	PT	10+15.05	357524.47	603541.60				
Tangent	PT	10+15.05	357524.47	603541.60		1.58		
	PC	10+16.63	357524.39	603543.17				
Arc	PC	10+16.63	357524.39	603543.17	170.00	43.59	14°41'31"	Right
	PI	10+38.54	357523.33	603565.06				
	CC	10+60.22	357354.59	603534.94				
	PRC	10+60.22	357516.76	603585.97				
Arc	PRC	10+60.22	357516.76	603585.97	5.00	9.35	107°05'26"	Left
	PI	10+66.99	357514.72	603592.42				
	CC	10+69.56	357521.53	603587.47				
	PT	10+69.56	357521.49	603592.47				
Tangent	PT	10+69.56	357521.49	603592.47		11.74		
	PC	10+81.30	357533.22	603592.54				
Arc	PC	10+81.30	357533.22	603592.54	5.00	8.30	95°07'07"	Left
	PI	10+86.76	357538.69	603592.58				
	CC	10+89.60	357533.26	603587.54				
	PT	10+89.60	357538.24	603587.13				
Tangent	PT	10+89.60	357538.24	603587.13		45.86		
	POE	11+35.46	357534.45	603541.42				

FL SOUTH - NW MEDIAN PROFILE



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**I-225 AT YOSEMITE
 FLOWLINE DETAILS
 FL SOUTH - NW MEDIAN**

Designer: D. HUDSON
 Detailer: D. HUDSON
 Subset: FLOWLINE

Structure Numbers
 Subset Sheets: 7 of 11

Project No./Code
 SHE M320-125, 22935

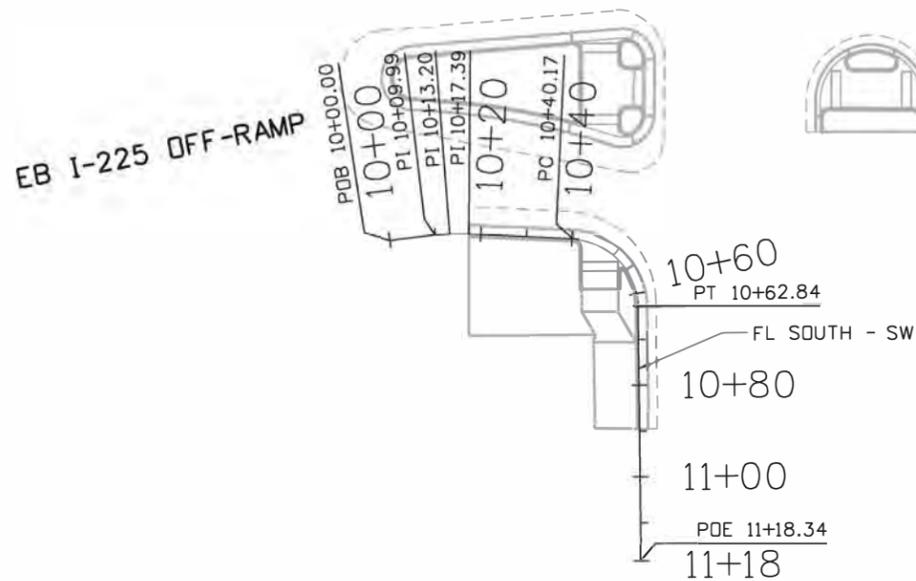
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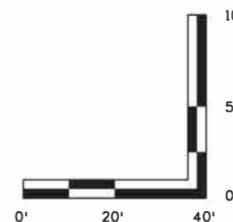
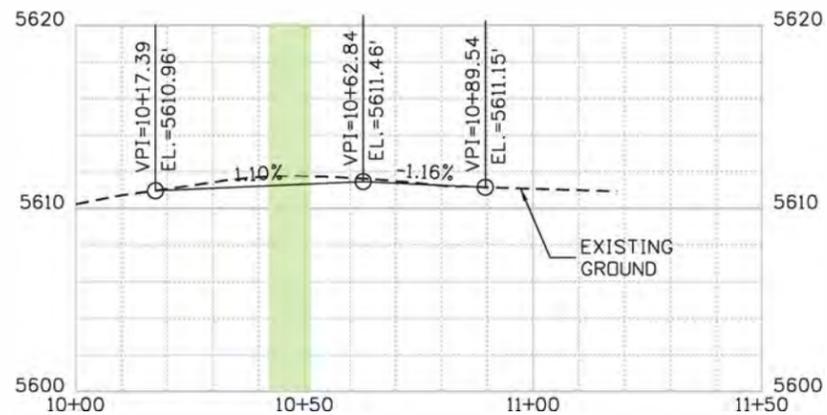
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FL SOUTH - SW PROFILE



CURB RAMP LIMITS

FL South - SW								
Element	Point Type	Station	Northing	Easting	Radius	Length	Delta/Theta	Rotation Direction
Tangent	POB	10+00.00	357494.02	603536.64				
	PI	10+09.99	357495.23	603546.55		9.99		
Tangent	PI	10+09.99	357495.23	603546.55				
	PI	10+13.20	357495.48	603549.76		3.21		
Tangent	PI	10+13.20	357495.48	603549.76				
	PI	10+17.39	357495.45	603553.95		4.19		
Tangent	PI	10+17.39	357495.45	603553.95				
	PC	10+40.17	357494.37	603576.70		22.78		
Arc	PC	10+40.17	357494.37	603576.70	15.00	22.67	86°35'17"	Right
	PI	10+54.30	357493.70	603590.82				
	CC	10+54.30	357493.70	603590.82				
Tangent	PT	10+62.84	357479.57	603590.99				
	PT	10+62.84	357479.57	603590.99				
Tangent	POE	11+18.34	357424.08	603591.66		55.50		



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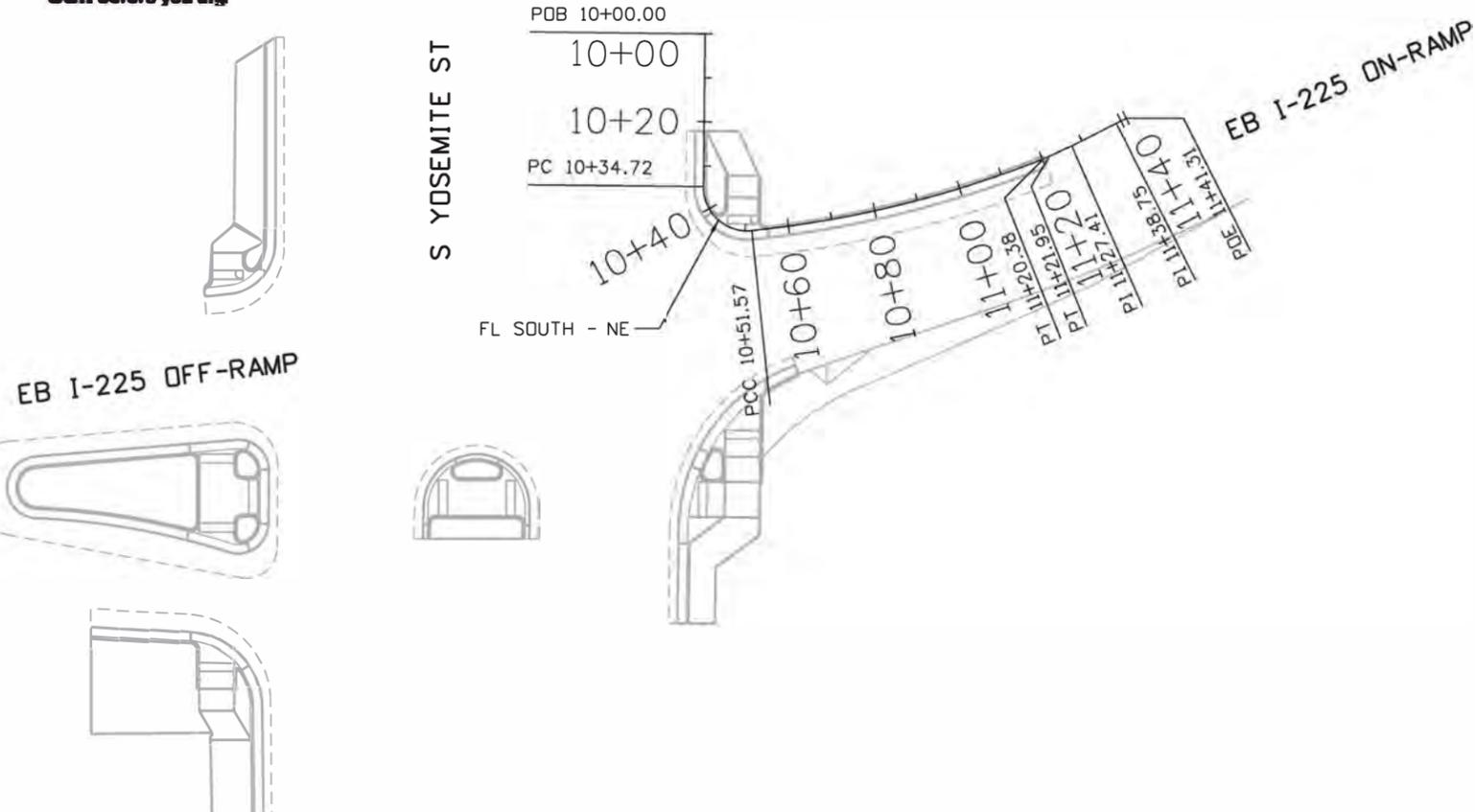
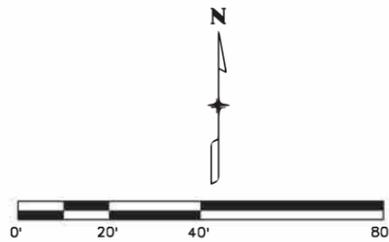
I-225 AT YOSEMITE FLOWLINE DETAILS FL SOUTH - SW

Designer:	D. HUDSON	Structure Numbers	
Detailer:	D. HUDSON		
Sub set:	FLOWLINE	Sub set Sheets:	8 of 11

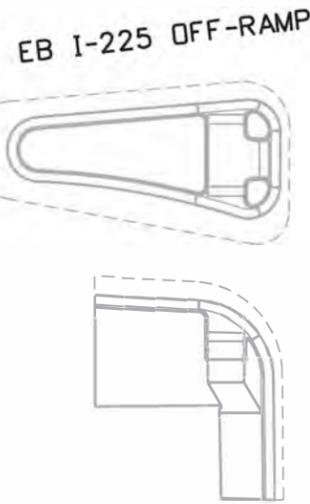
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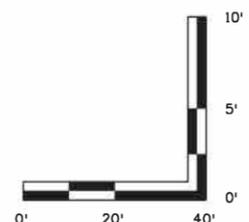
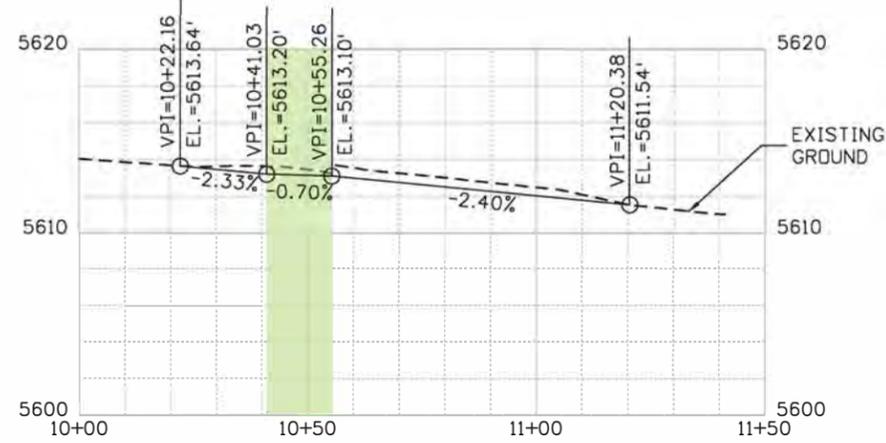
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FL South - NE								
South	Point Type	Station	Northing	Easting	Radius	Length	Delta/Theta	Rotation Direction
Tangent	POB	10+00.00	357632.65	603694.16				
	PC	10+34.72	357597.93	603693.80		34.72		
Arc	PC	10+34.72	357597.93	603693.80	10.00	17.06	96°32'44"	Left
	PI	10+45.93	357586.71	603693.69				
	CC	10+51.57	357597.82	603703.80				
	PCC	10+51.57	357587.88	603704.84				
Arc	PCC	10+51.57	357587.88	603704.84	250.00	68.81	15°46'14"	Left
	PI	10+86.20	357591.47	603739.28				
	CC	11+20.38	357836.53	603678.88				
	PT	11+20.38	357604.29	603771.44				
Tangent	PT	11+20.38	357604.29	603771.44		1.57		
	PI	11+21.95	357604.87	603772.89				
Tangent	PI	11+21.95	357604.87	603772.89		5.46		
	PI	11+27.41	357607.08	603777.89				
Tangent	PI	11+27.41	357607.08	603777.89		11.34		
	PI	11+38.75	357612.21	603788.00				
Tangent	PI	11+38.75	357612.21	603788.00		2.56		
	POE	11+41.31	357613.40	603790.27				



FL SOUTH - NE PROFILE



CURB RAMP LIMITS



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Department of Transportation
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 201 West Colfax Avenue
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I-225 AT YOSEMITE
 FLOWLINE DETAILS
 FL SOUTH - NE

Designer: D. HUDSON
 Detailer: D. HUDSON
 Subset: FLOWLINE

Structure Numbers
 Su bset Sheets: 9 of 11

Project No./Code
 SHE M320-125, 22935
 2020-PRDJMSTR-0000088
 Sheet Number 31

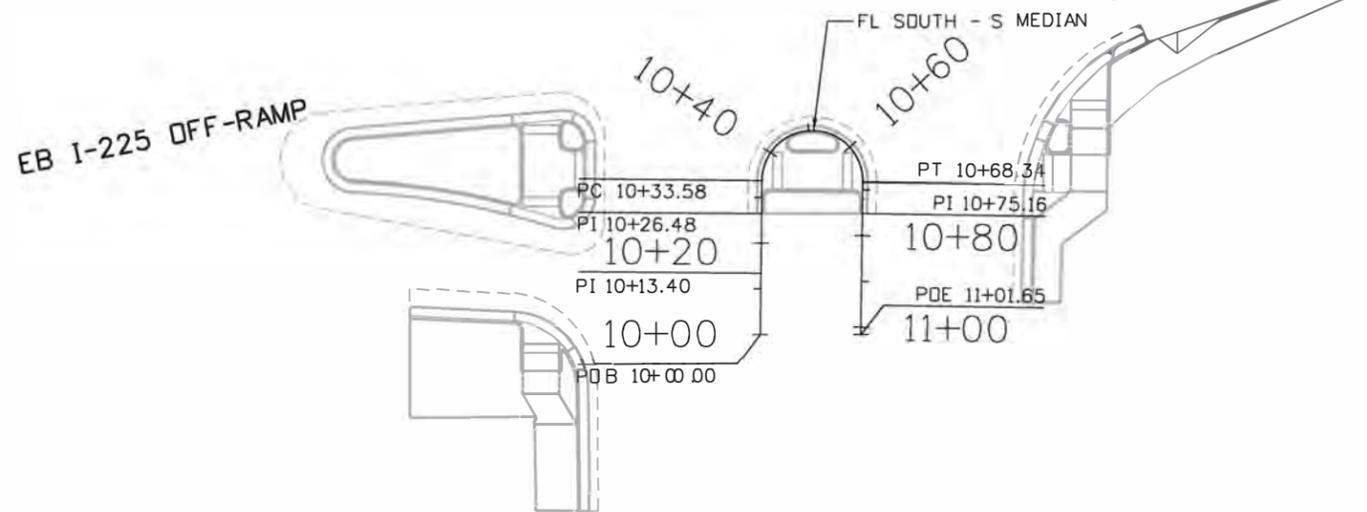
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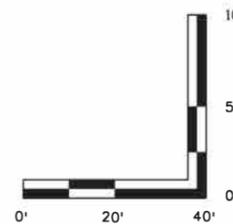
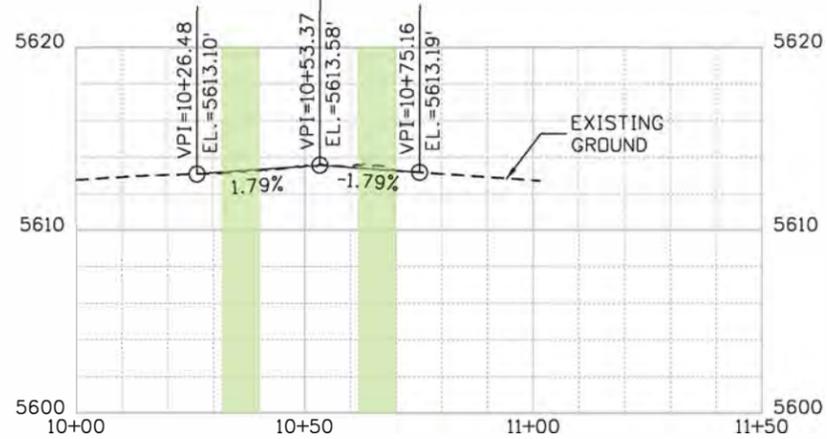


S YOSEMITE ST



FL South - S Median								
Element	Point Type	Station	Northing	Easting	Radius	Length	Delta/Theta	Rotation Direction
Tangent	POB	10+00.00	357491.37	603630.71				
	PI	10+13.40	357504.77	603630.81		13.40		
Tangent	PI	10+13.40	357504.77	603630.81		13.08		
	PI	10+26.48	357517.85	603630.91				
Tangent	PI	10+26.48	357517.85	603630.91		7.10		
	PC	10+33.58	357524.94	603630.99				
Arc	PC	10+33.58	357524.94	603630.99				
	CC		357524.83	603642.03	11.05	34.76	180°14'41"	Right
Tangent	PT	10+68.34	357524.67	603653.08				
	PI	10+68.34	357524.67	603653.08		6.82		
Tangent	PI	10+75.16	357517.85	603652.98				
	POE	11+01.65	357491.37	603652.63		26.49		

FL SOUTH - S MEDIAN PROFILE



CURB RAMP LIMITS



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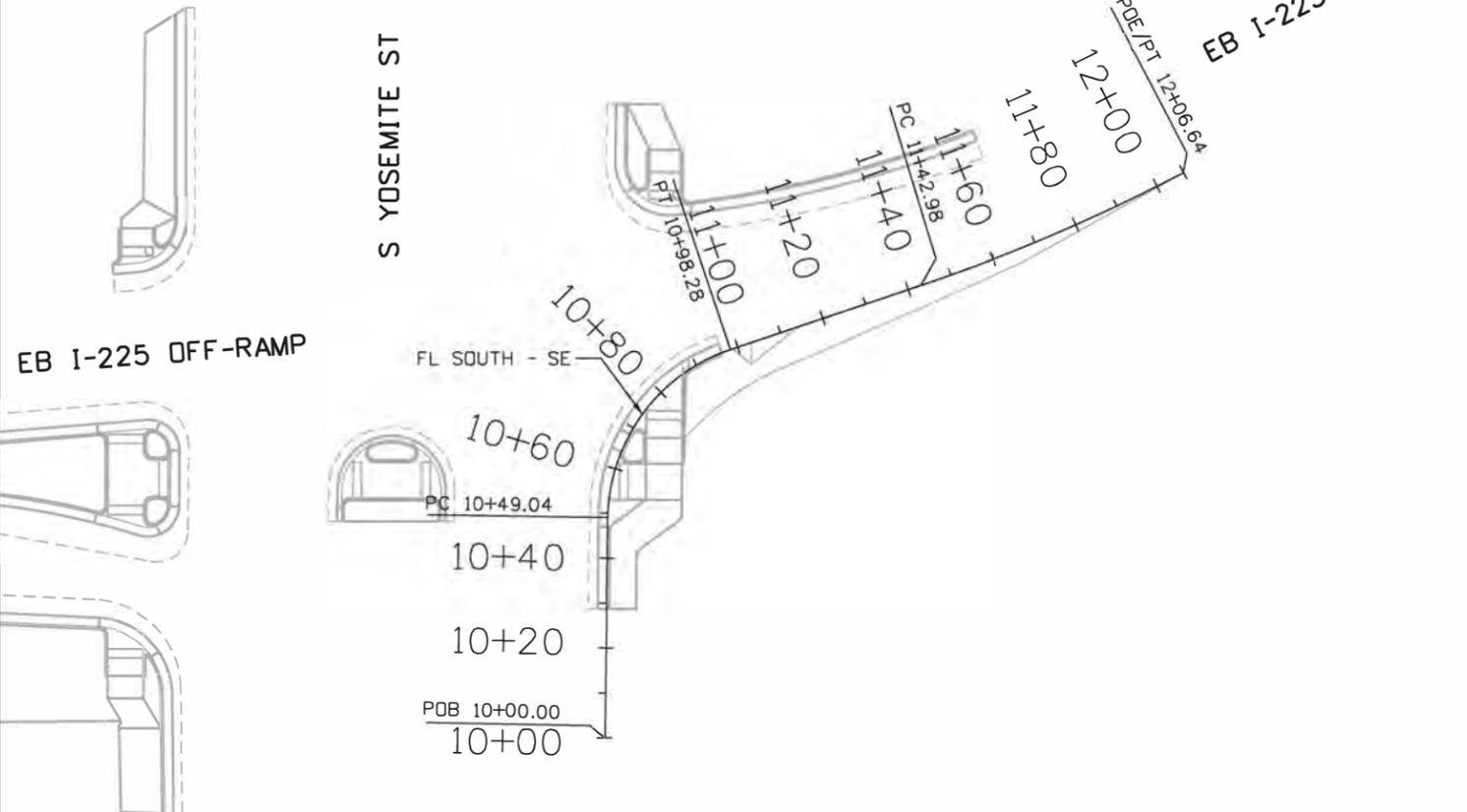
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 No Revisions:
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I-225 AT YOSEMITE FLOWLINE DETAILS FL SOUTH - S MEDIAN
 Designer: D. HUDSON
 Detailer: D. HUDSON
 Subset: FLOWLINE

Project No./Code
 SHE M320-125, 22935
 2020-PRDJMSTR-0000088
 Sheet Number 32

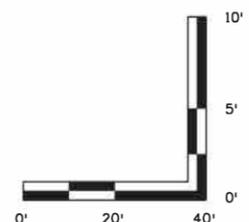
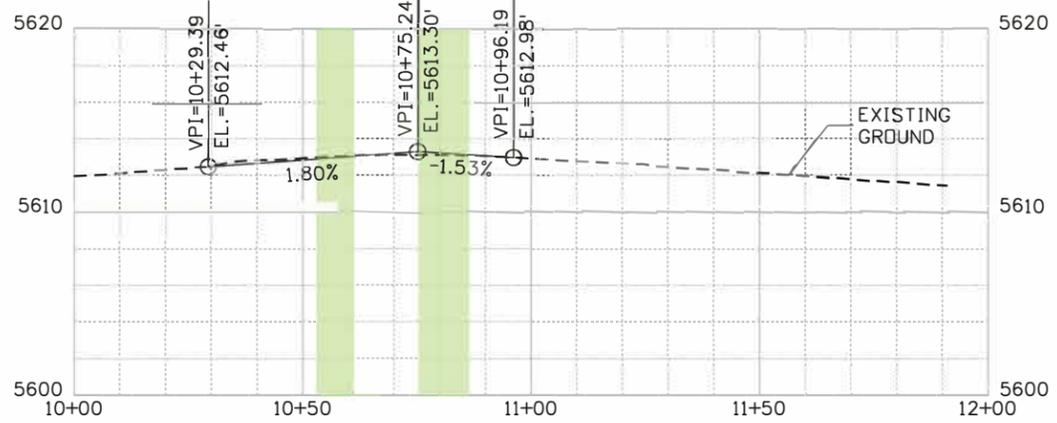


Know what's below.
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FL South - SE								
Element	Point Type	Station	Northing	Easting	Radius	Length	Delta/Theta	Rotation Direction
Tangent	POB	10+00.00	357469.69	603689.38				
	PC	10+49.04	357518.73	603690.13		49.04		
Arc	PC	10+49.04	357518.73	603690.13	40.00	49.23	70°31'11"	Right
	PI	10+77.32	357547.00	603690.56				
	CC	10+98.28	357556.02	603730.12				
	PT	10+98.28	357556.02	603717.36				
Tangent	PT	10+98.28	357556.02	603717.36		44.70		
	PC	11+42.98	357570.28	603759.73				
Arc	PC	11+42.98	357570.28	603759.73	402.00	63.67	9°04'26"	Left
	PI	11+74.88	357580.46	603789.96				
	CC	11+96.64	357595.28	603831.49				
	POE/PT	12+06.64	357595.28	603818.21				

FL SOUTH - SE PROFILE



CURB RAMP LIMITS



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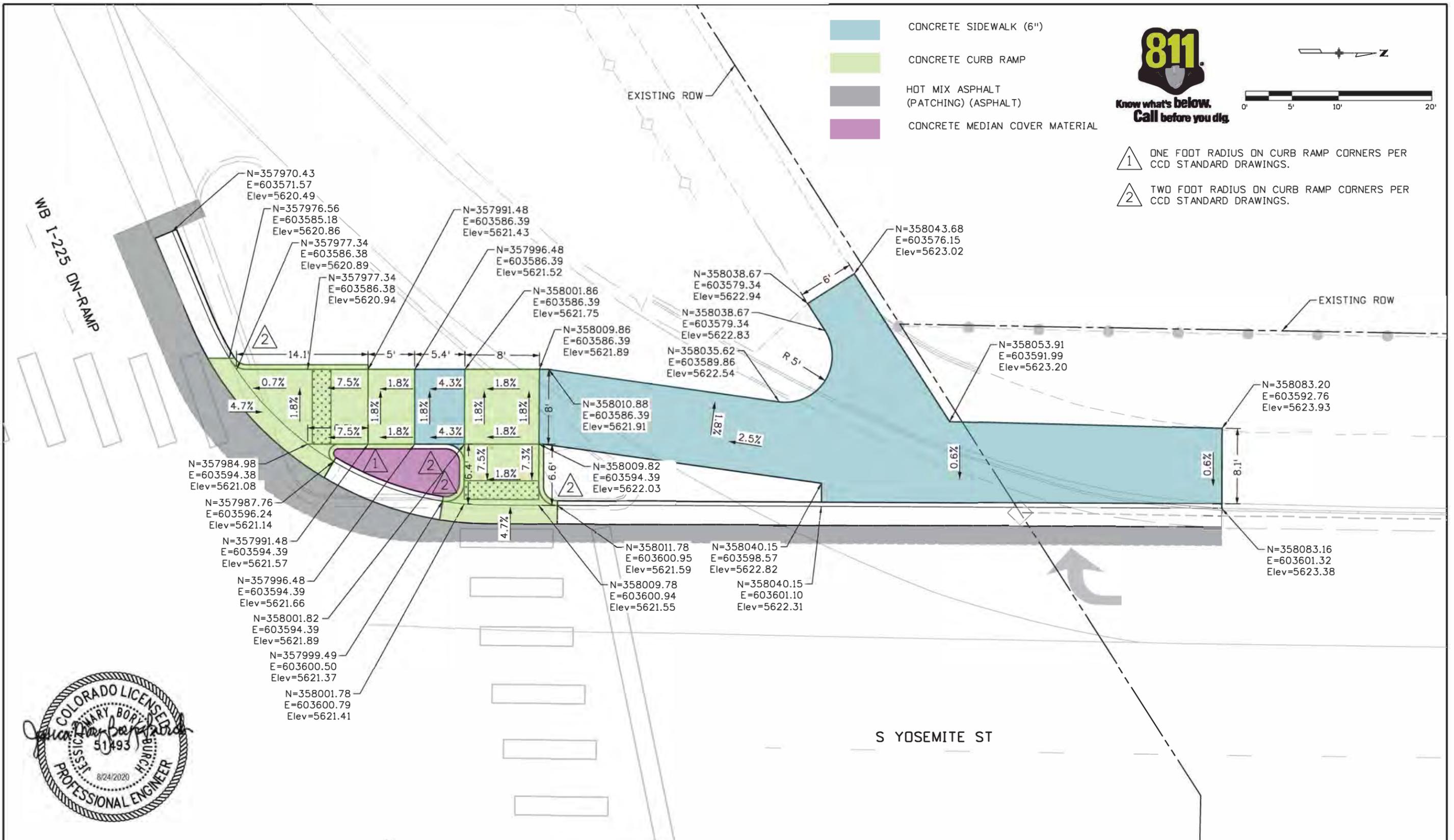
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	Designer: D. HUDSON	Structure Numbers	2020-PRDJMSTR-0000088
	Detailer: D. HUDSON	Subset Sheets: 11 of 11	Sheet Number 33

dani.hudson 11:55:55 AM P:\Projects\160246 - CCD - 2016 CCD Transportation and Mobility On-Call\13 - FY19 HSIP Package 1 Yosemite at I-225\CADD\Plan Sheets\RDWY_Geometry.dgn

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- 1 ONE FOOT RADIUS ON CURB RAMP CORNERS PER CCD STANDARD DRAWINGS.
- 2 TWO FOOT RADIUS ON CURB RAMP CORNERS PER CCD STANDARD DRAWINGS.



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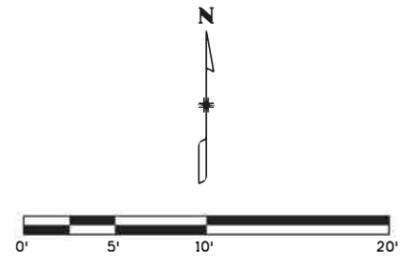
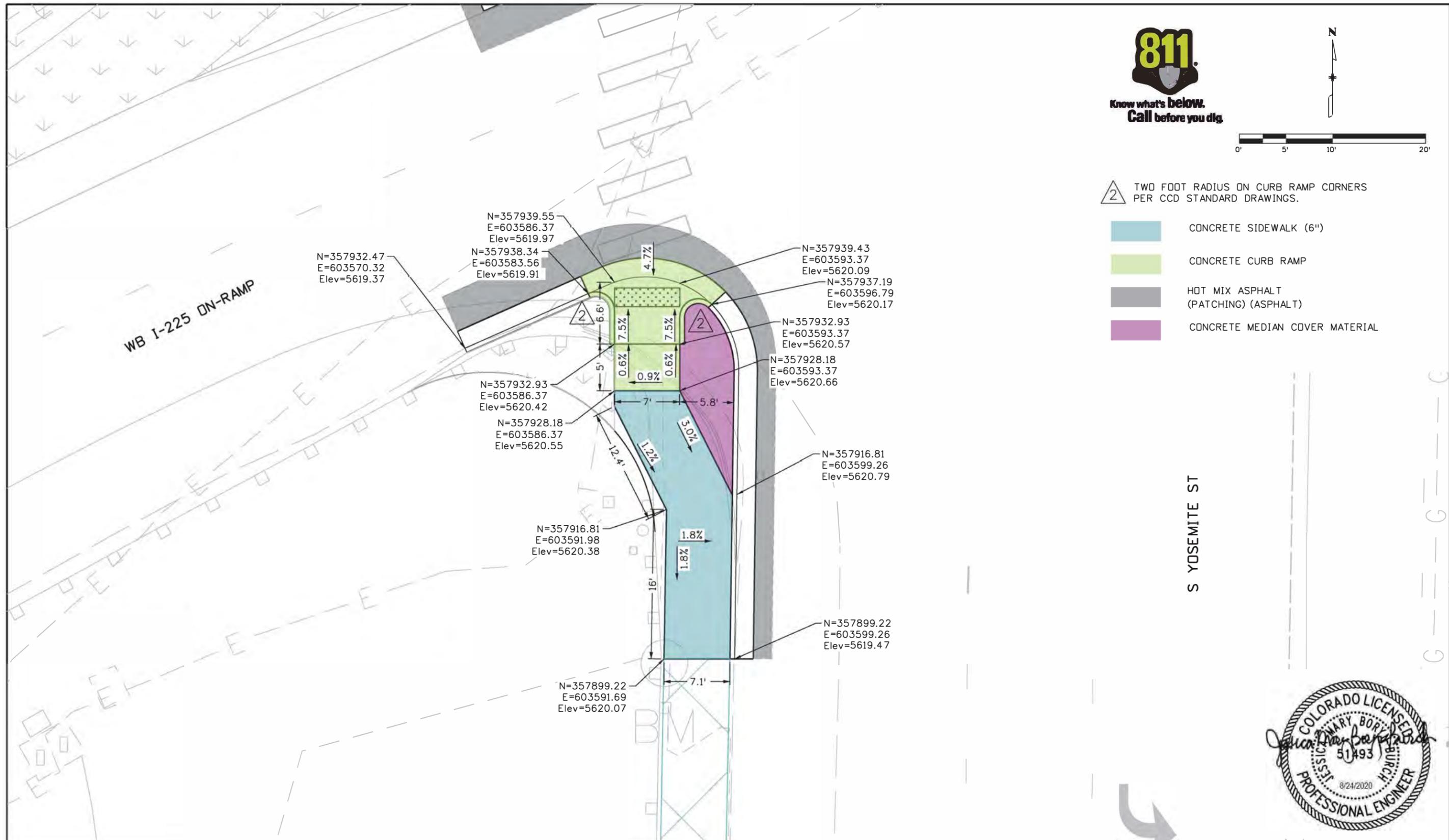
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I-225 AT YOSEMITE ROADWAY DETAILS NORTH NW		
Designer:	D. HUDSON	Structure Numbers
Detailer:	D. HUDSON	
Subset:	DETAILS	Subset Sheets: 1 of 8

Project No./Code
SHE M320-125, 22935
2020-PRDJMSTR-0000088
Sheet Number 34

damt.hudson 11:57:12 AM P:\Projects\160246 - CCD - 2016 CCD Transportation and Mobility Dr-Cali\TD 13 - FY19 HSIP Package 1 Yosemite at I-225\CADD\Plan Sheets\RDWY_Details.dgn



△ 2 TWO FOOT RADIUS ON CURB RAMP CORNERS PER CCD STANDARD DRAWINGS.

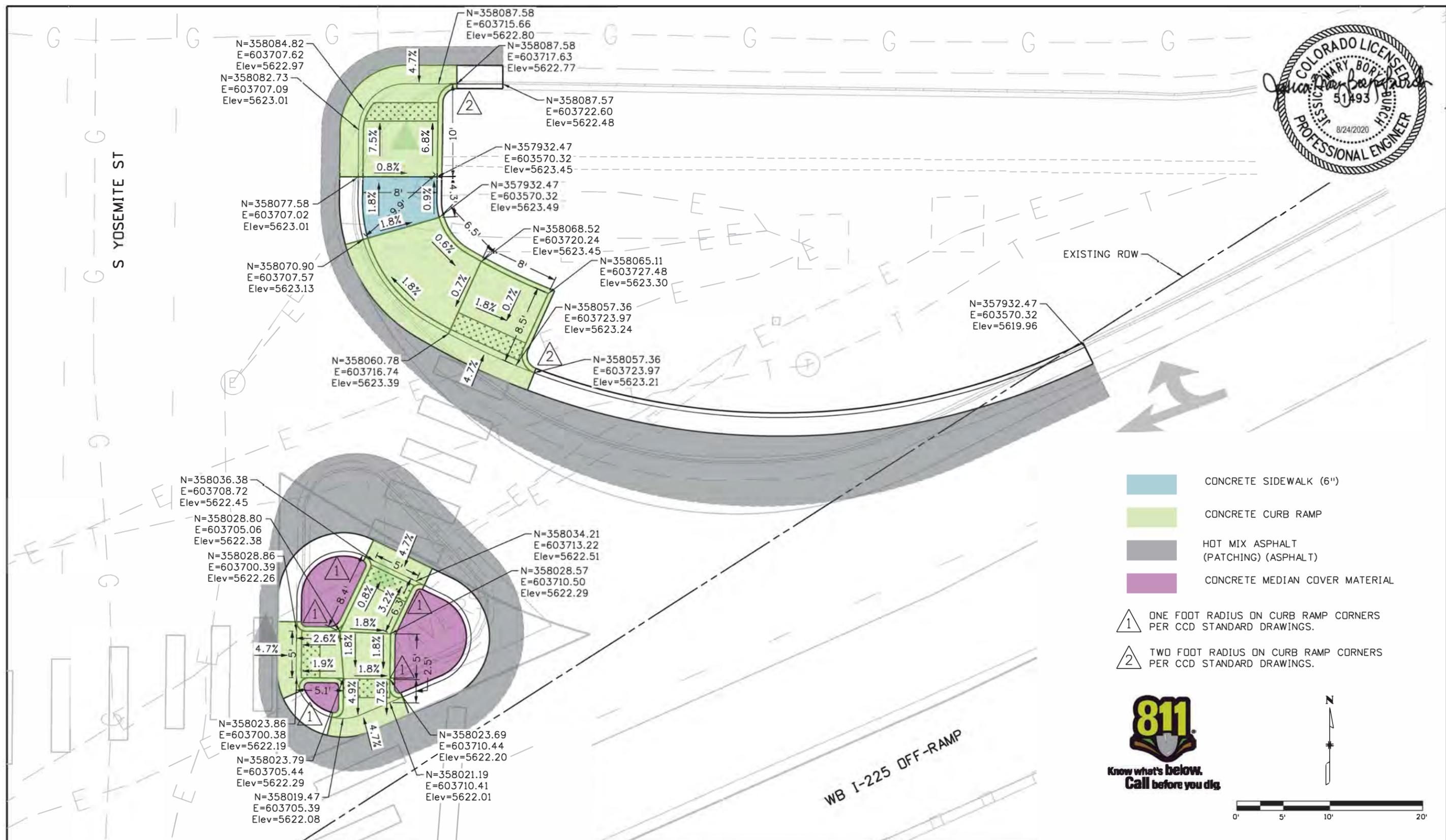
- CONCRETE SIDEWALK (6")
- CONCRETE CURB RAMP
- HOT MIX ASPHALT (PATCHING) (ASPHALT)
- CONCRETE MEDIAN COVER MATERIAL

S YOSEMITE ST



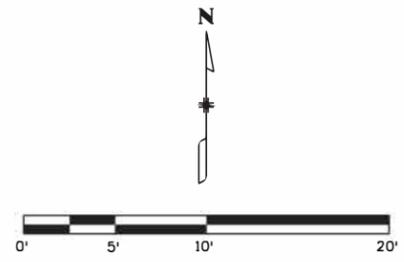
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File Name: RDWY_Details.dgn		Date: Comments Init.	Department of Transportation & Infrastructure 201 West Colfax Avenue Denver, CO, 80202	No Revisions:	Designer: D. HUDSON	SHE M320-125, 22935
Horiz. Scale: 1:10 Vert. Scale: N/A	0000			Revised:	Detailer: D. HUDSON	2020-PRDJMSTR-0000088
apexdesign 1675 LARIMER ST, STE 400 PH: 303-339-0440 DENVER, COLORADO 80202 FAX: 303-325-7743			DENVER THE MILE HIGH CITY	Void:	Subset: DETAILS	Sheet Number 35
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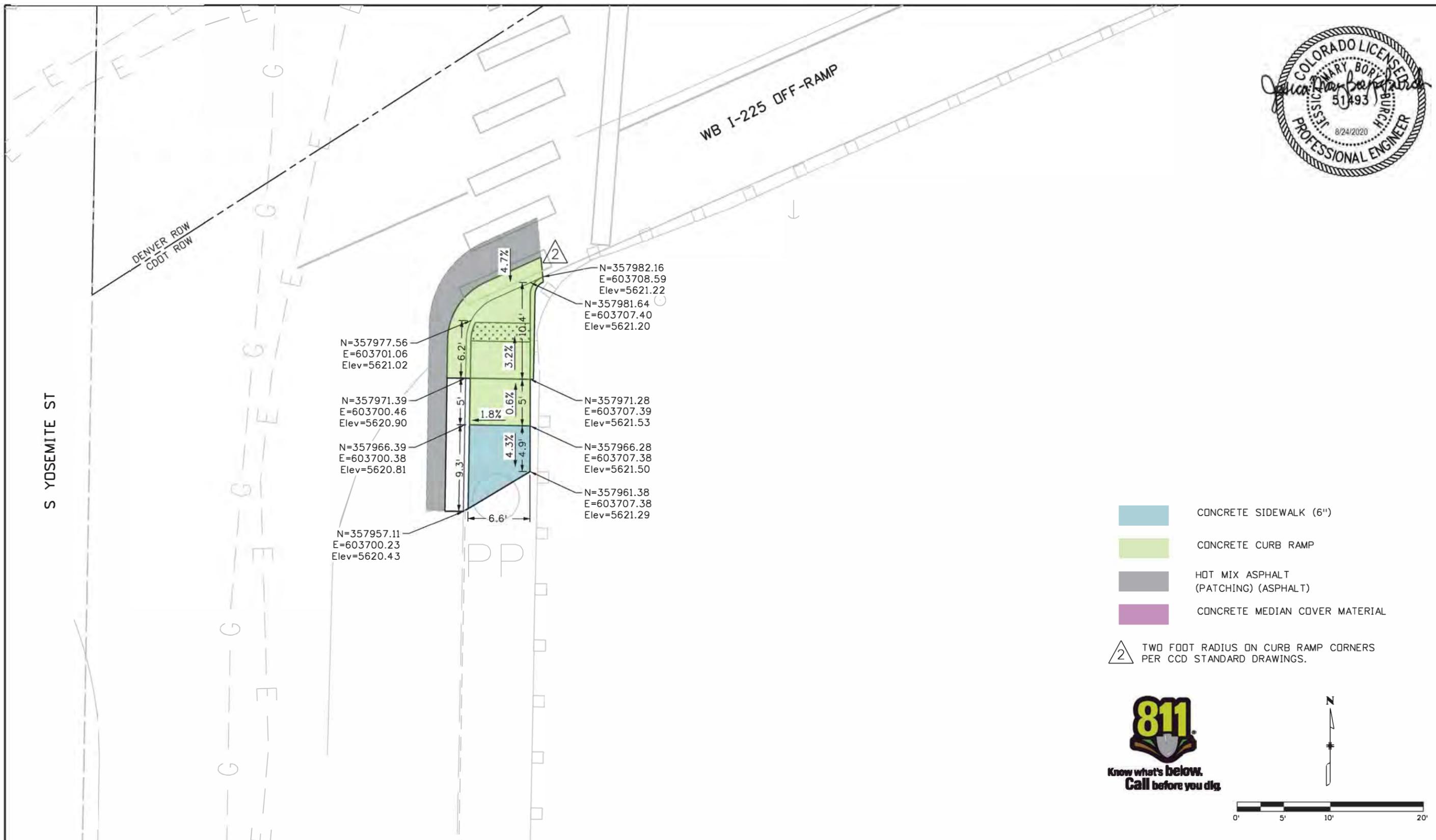
- CONCRETE SIDEWALK (6")
- CONCRETE CURB RAMP
- HOT MIX ASPHALT (PATCHING) (ASPHALT)
- CONCRETE MEDIAN COVER MATERIAL

- 1 ONE FOOT RADIUS ON CURB RAMP CORNERS PER CCD STANDARD DRAWINGS.
- 2 TWO FOOT RADIUS ON CURB RAMP CORNERS PER CCD STANDARD DRAWINGS.



Print Date: 8/21/2020 File Name: RDWY_Details.dgn Horiz. Scale: 1:10 Vert. Scale: N/A	Sheet Revisions <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">Date:</th> <th style="width: 60%;">Comments</th> <th style="width: 30%;">Init.</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	Date:	Comments	Init.										 Department of Transportation & Infrastructure 201 West Colfax Avenue Denver, CO, 80202	As Constructed No Revisions: Revised: Void:	I-225 AT YOSEMITE ROADWAY DETAILS NORTH NE Designer: D. HUDSON Detailer: D. HUDSON Subset: DETAILS	Project No./Code SHE M320-125, 22935 2020-PRDJMSTR-0000088 Sheet Number 36
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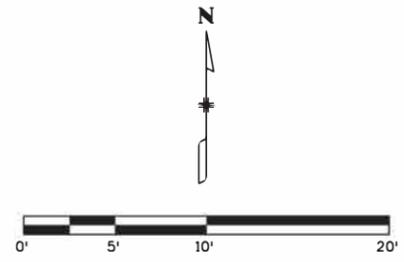
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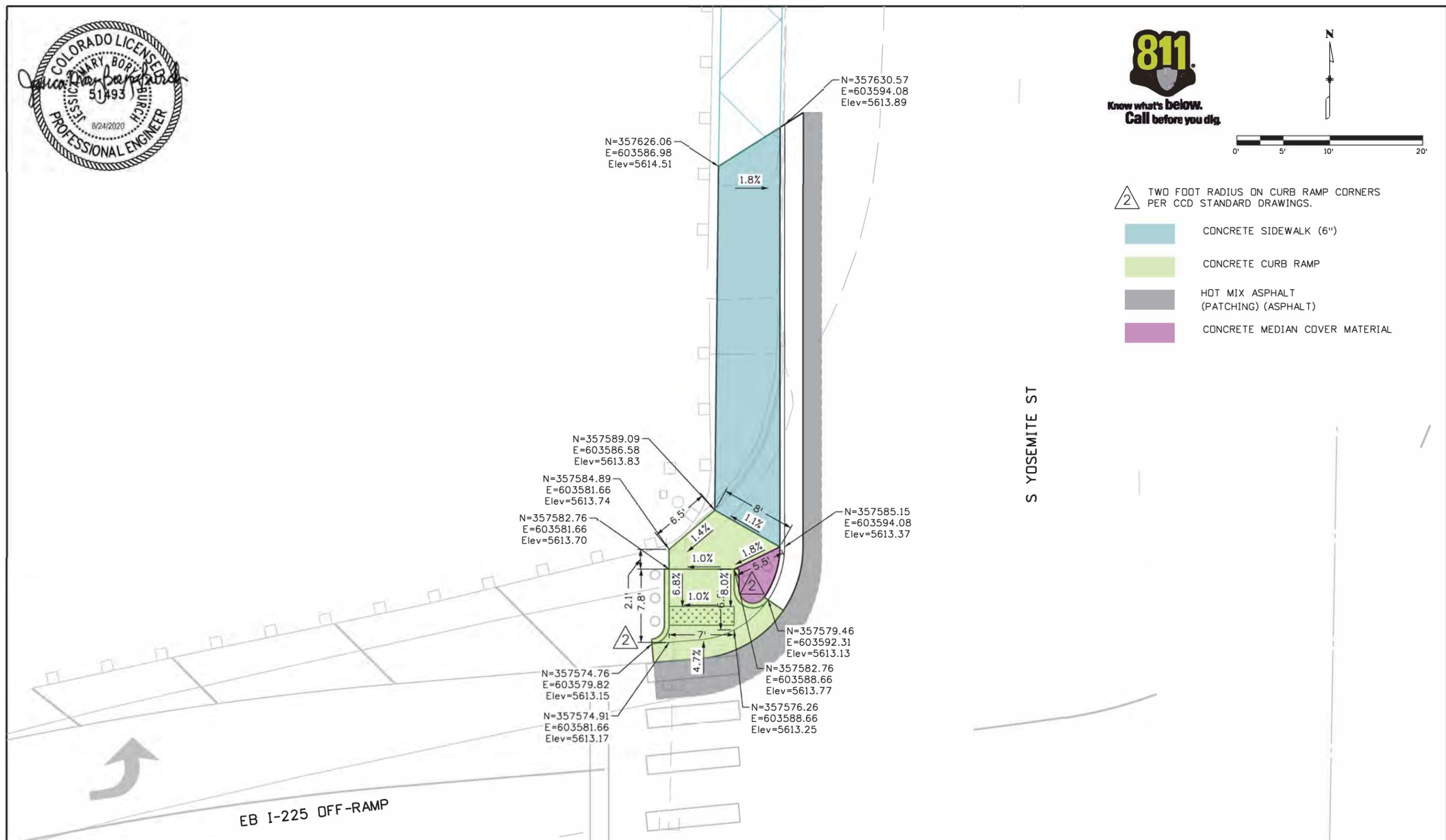
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I-225 AT YOSEMITE ROADWAY DETAILS NORTH SE		
Designer:	D. HUDSON	Structure Numbers
Detailer:	D. HUDSON	
Subset:	DETAILS	Subset Sheets: 4 of 8

Project No./Code
SHE M320-125, 22935
2020-PRDJMSTR-0000088
Sheet Number 37



- TWO FOOT RADIUS ON CURB RAMP CORNERS PER CCD STANDARD DRAWINGS.
- CONCRETE SIDEWALK (6")
- CONCRETE CURB RAMP
- HOT MIX ASPHALT (PATCHING) (ASPHALT)
- CONCRETE MEDIAN COVER MATERIAL



dani.hudson 11:58:17 AM P:\Projects\160246 - CCD - 2016 CCD Transportation and Mobility In-Call\TD 13 - FY19 HSIP Package 1 Yosemite at I-225\CADD\Plan Sheets\RDWY_Details.dgn

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File Name: RDWY_Details.dgn		Date:	Comments	No Revisions:	Designer: D. HUDSON	SHE M320-125, 22935
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apexdesign 1675 LARIMER ST, STE 400 PH: 303-339-0440 DENVER, COLORADO 80202 FAX: 303-325-7743				Void:	Subset: DETAILS	Structure Numbers
					Subset Sheets: 5 of 8	Sheet Number 38



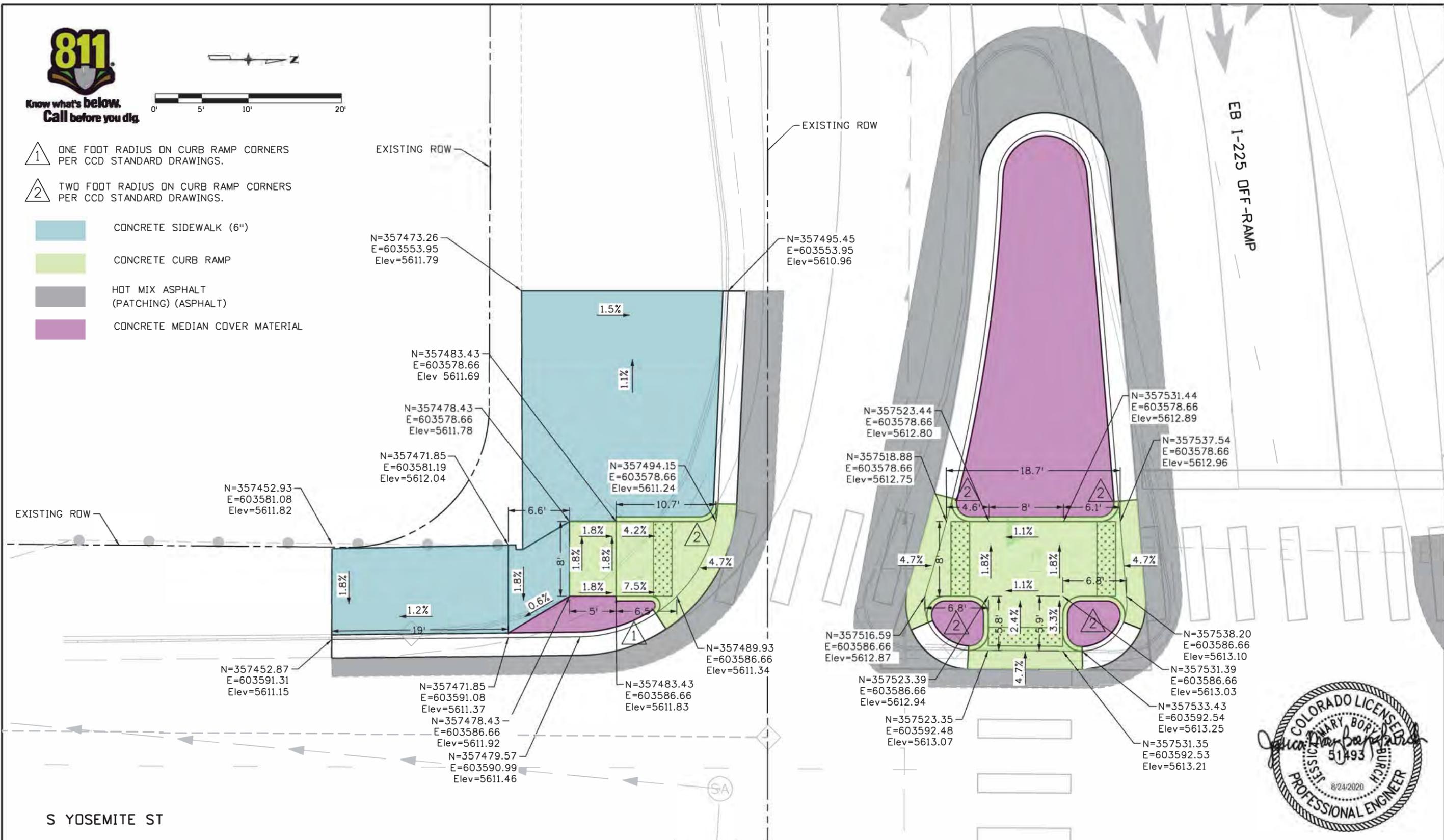


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- 1 ONE FOOT RADIUS ON CURB RAMP CORNERS PER CCD STANDARD DRAWINGS.
- 2 TWO FOOT RADIUS ON CURB RAMP CORNERS PER CCD STANDARD DRAWINGS.

- CONCRETE SIDEWALK (6")
- CONCRETE CURB RAMP
- HOT MIX ASPHALT (PATCHING) (ASPHALT)
- CONCRETE MEDIAN COVER MATERIAL



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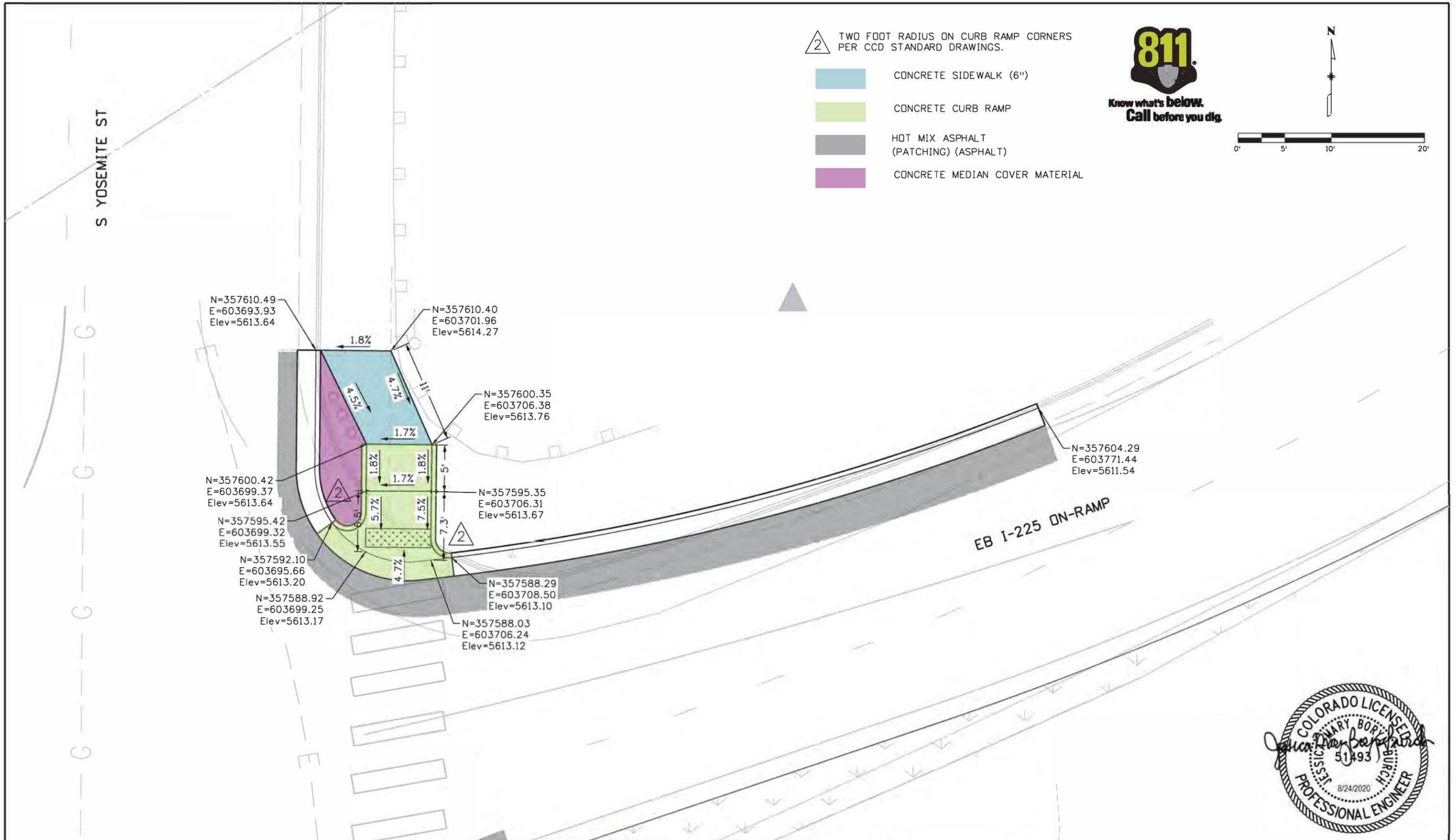
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I-225 AT YOSEMITE ROADWAY DETAILS SOUTH SW

Designer:	D. HUDSON	Structure Numbers:	
Detailer:	D. HUDSON	Subset Sheets:	6 of 8

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 Sheet Number 39

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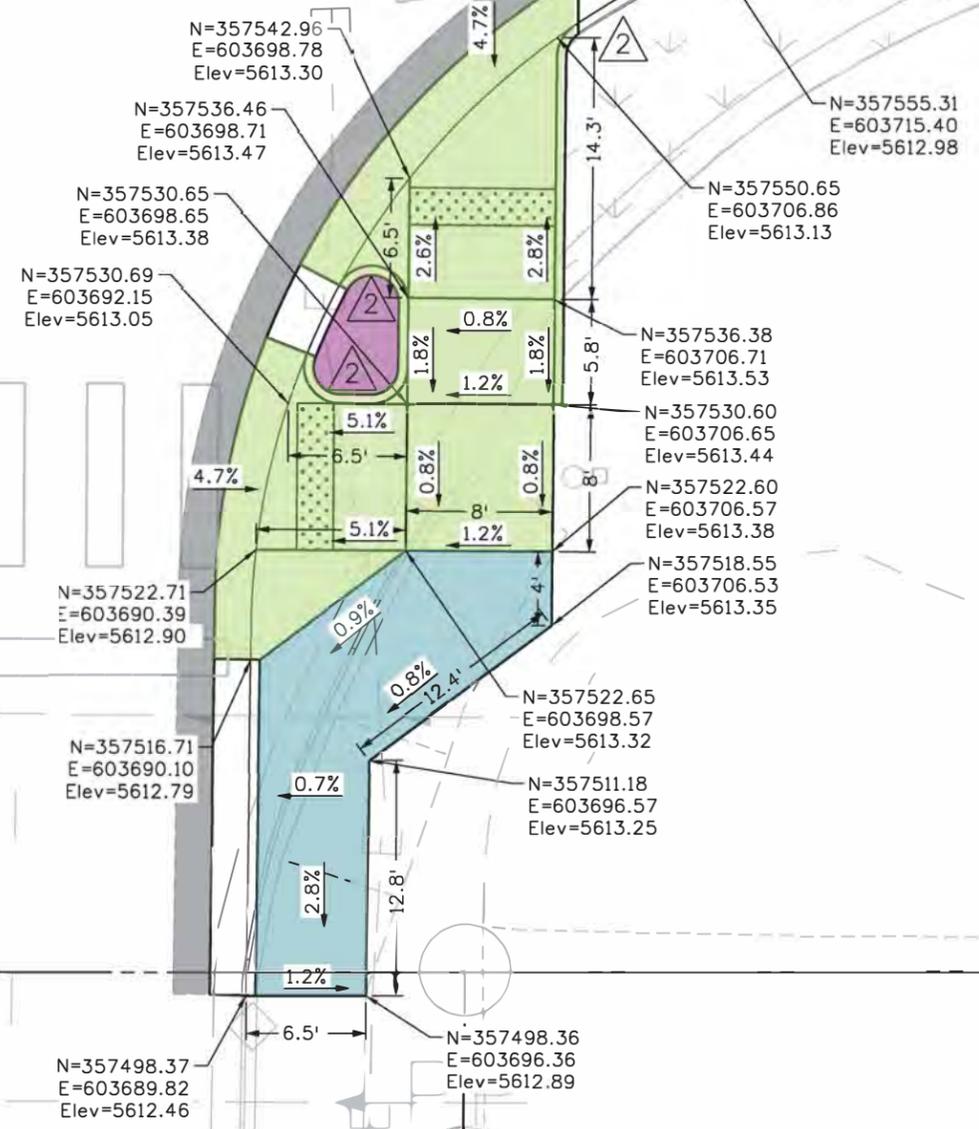
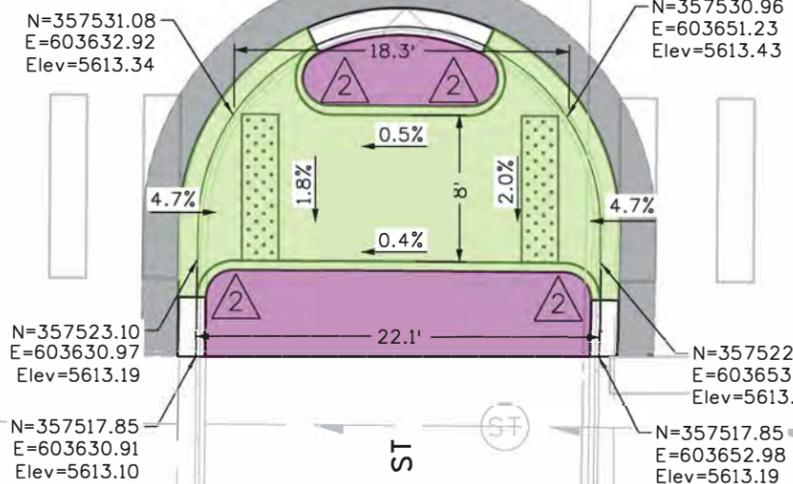


△ TWO FOOT RADIUS ON CURB RAMP CORNERS PER CCD STANDARD DRAWINGS.

- CONCRETE SIDEWALK (6")
- CONCRETE CURB RAMP
- HOT MIX ASPHALT (PATCHING) (ASPHALT)
- CONCRETE MEDIAN COVER MATERIAL



EB I-225 ON-RAMP



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I-225 AT YOSEMITE ROADWAY DETAILS SOUTH SE		
Designer:	D. HUDSON	Structure Numbers
Detailer:	D. HUDSON	
Subset:	DETAILS	Subset Sheets: 8 of 8

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SHE M320-125, 22935
2020-PRDJMSTR-0000088
Sheet Number 41

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INSTALLATIONS

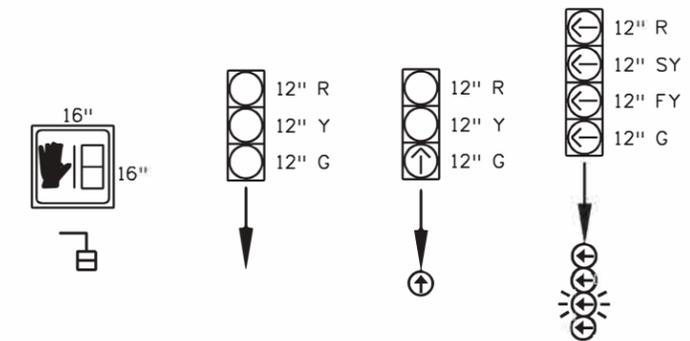
- 3A INSTALL SIGNAL HEAD OR HEADS
- 3B INSTALL SIGNAL CABINET, CONTROLLER, AND ASSOCIATED EQUIPMENT
- 3C INSTALL PUSH BUTTON
- 3D INSTALL CONDUIT
- 3E INSTALL SIGNAL POLE
- 3F INSTALL MAST ARM - (LENGTH AS SHOWN)
- 3H COMM - INSTALL PULL BOX MARKED "COMM" ON LID
- 3H ELEC - INSTALL PULL BOX MARKED "ELECTRIC" ON LID
- 3I INSTALL PULL BOX MARKED "TRAFFIC" ON LID
- 3K INSTALL CLOSED CIRCUIT CAMERA
- 3L ELECTRIC UTILITY COMPANY TO INSTALL POWER FEED. CONTRACTOR TO EXTEND TO CONTROLLER
- 3N INSTALL LUMINAIRE
- 3T INSTALL EMERGENCY VEHICLE PREEMPTION DETECTOR
- 3U INSTALL INTERCONNECT (SIZE AND TYPE AS SHOWN)
- 3V INSTALL INFRARED DETECTION CAMERA
- 3W INSTALL ELECTRIC METER

TABULATION OF TRAFFIC SIGNAL ITEMS						
ITEM NO.	ITEM DESCRIPTION	UNIT	NORTH	SOUTH	MISC	TOTAL
503-00036	DRILLED SHAFT (36 INCH)	LF	36	36		72
503-00048	DRILLED SHAFT (48 INCH)	LF	17	17		34
613	ELECTRIC METER PEDESTAL CABINET AND BASE	EA	1	1		2
613	PULL BOX (TYPE C)	EA	2	2		4
613	LUMINAIRE (LED) (5,300 LUMENS)	EA	4	4		8
613-00306	3 INCH ELECTRICAL CONDUIT (BORED)	LF	610	730		1340
613-01200	2 INCH ELECTRICAL CONDUIT (PLASTIC)	LF	10	10		20
613-01300	3 INCH ELECTRICAL CONDUIT (PLASTIC)	LF	130	100		230
613-10000	WIRING	LS			1	1
614	RESET BLUETOOTH EQUIPMENT	EA	1			1
614	ETHERNET MANAGED FIELD SWITCH	EA	1	1		2
614-70150	PEDESTRIAN SIGNAL FACE (16) (COUNTDOWN)	EA	6	6		12
614-70336	TRAFFIC SIGNAL FACE (12-12-12)	EA	12	12		24
614-70448	TRAFFIC SIGNAL FACE (12-12-12-12)	EA	2	2		4
614-72855	TRAFFIC SIGNAL CONTROLLER CABINET	EA	1	1		2
614-72860	PEDESTRIAN PUSH BUTTON	EA	6	6		12
614-72863	PEDESTRIAN PUSH BUTTON POST ASSEMBLY	EA	1	2		3
614-72866	FIRE PREEMPTION UNIT AND TIMER (SYSTEM)	EA	1	1		2
614-72886	INTERSECTION DETECTION SYSTEM (CAMERA)	EA	3	3		6
614-81000	TRAFFIC SIGNAL-LIGHT POLE STEEL	EA	1	1		2
614-81150	TRAFFIC SIGNAL-LIGHT POLE STEEL (1-50 FOOT MAST ARM)	EA	1	1		2
614-81155	TRAFFIC SIGNAL-LIGHT POLE STEEL (1-55 FOOT MAST ARM)	EA	1	1		2
614-81160	TRAFFIC SIGNAL-LIGHT POLE STEEL (1-60 FOOT MAST ARM)	EA	1			1
614-81165	TRAFFIC SIGNAL-LIGHT POLE STEEL (1-65 FOOT MAST ARM)	EA		1		1
614-84100	TRAFFIC SIGNAL PEDESTAL POLE ALUMINUM	EA	1			1
614-86105	TELEMETRY (FIELD)	EA	1	1		2
614-86800	UNINTERRUPTED POWER SUPPLY	EA	1	1		2
614-87320	CLOSED CIRCUIT TELEVISION	EA	1	1		2

LEGEND

- | | | | |
|--|--|--|--|
| | CONTROLLER CABINET (DARKENED PORTION INDICATES DOOR SIDE OF CABINET) | | PEDESTRIAN PUSH BUTTON, LEFT OR RIGHT ARROW |
| | PULL BOX (TRAFFIC) | | SIGNAL HEAD WITH BACKPLATE |
| | PULL BOX (TRAFFIC COMMUNICATIONS) | | PEDESTAL OR SIDE BRACKET MOUNTED SIGNAL HEAD WITHOUT BACKPLATE |
| | PULL BOX (ELECTRIC) | | INFRARED DETECTION CAMERA |
| | SIGNAL POLE AND FOUNDATION | | POST MOUNTED SIGN |
| | EMERGENCY VEHICLE PREEMPTIVE SYSTEM | | MAST ARM MOUNTED SIGN |
| | UNDERGROUND CONDUIT | | CLOSED CIRCUIT TELEVISION CAMERA |
| | LUMINAIRE | | ELECTRIC METER |

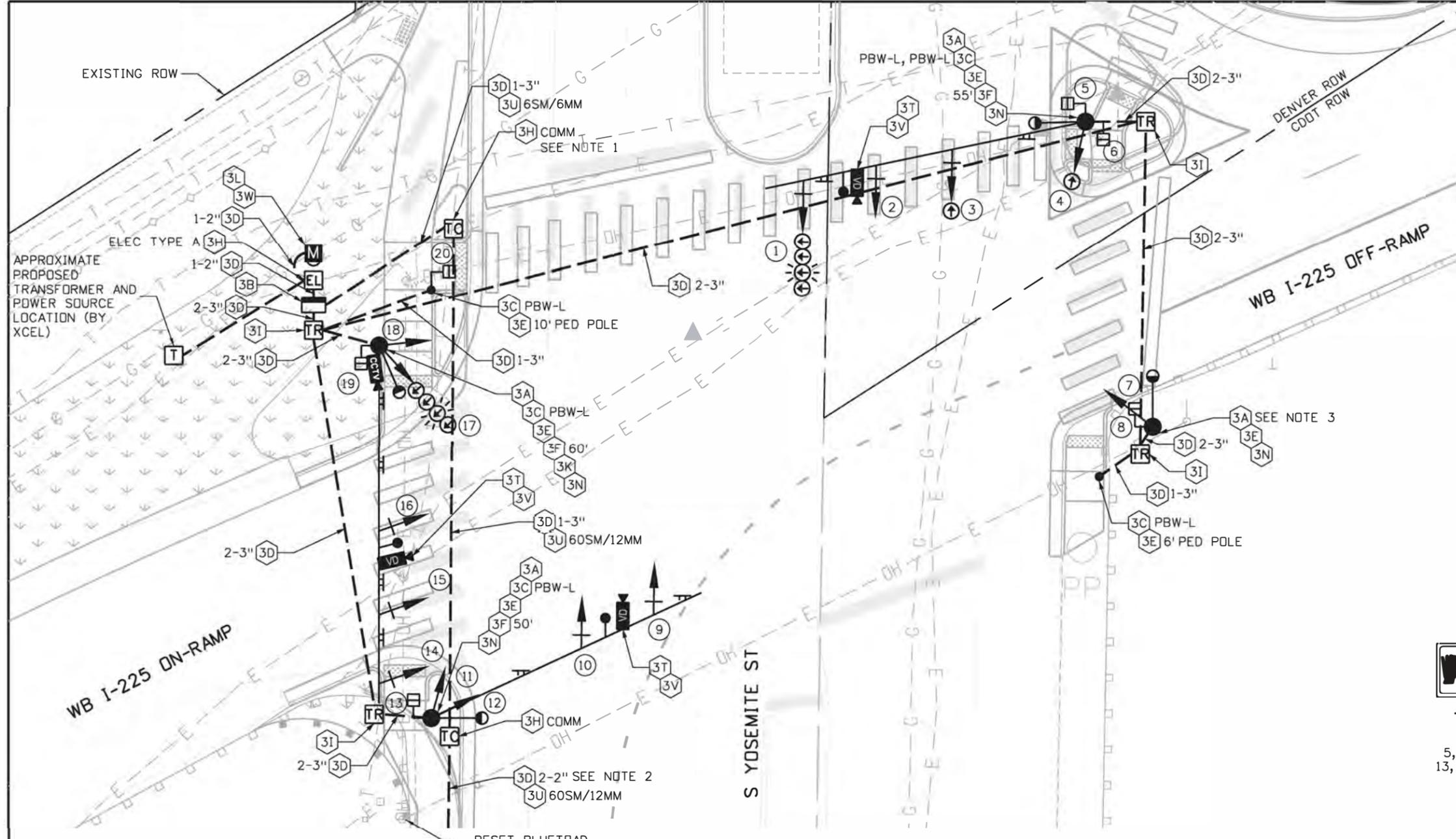
SIGNAL HEAD LEGEND



Print Date: 8/21/2020	Sheet Revisions			<p>Department of Transportation & Infrastructure 201 West Colfax Avenue Denver, CO, 80202</p>	As Constructed	I-225 AT YOSEMITE TRAFFIC SIGNAL PLAN		Project No./Code
File Name: DES_Legend.dgn	Date:	Comments:	Init.		No Revisions:	Designer: T. HURD	Structure Numbers:	SHE M320-125, 22935
Horiz. Scale: N/A Vert. Scale: N/A				Revised:	Detailer: D. HUDSON		2020-PRDJMSTR-0000088	
apexdesign 1675 LARIMER ST, STE 400 PH: 303-339-0440 DENVER, COLORADO 80202 FAX: 303-325-7743				Void:	Subset: TRAFFIC	Subset Sheets: 1 of 3	Sheet Number 42	

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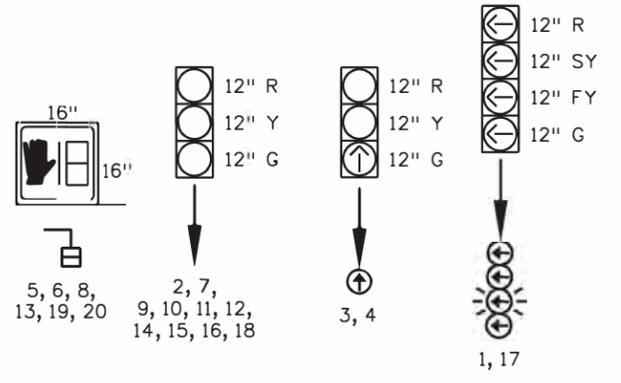


- NOTES:**
- INTERCEPT EXISTING FIBER OPTIC BACKBONE CABLE AND INSTALL SPLICE ENCLOSURE ON NORTHWEST CORNER.
 - 2-2" CONDUIT CONTINUES ACROSS THE BRIDGE (NOT SHOWN) AND CONNECTS TO TRAFFIC COMM PULL BOX ON NEXT SHEET. SEE BRIDGE CONDUIT DETAILS FOR CONDUIT INSTALLATION.
 - CAISSON LOCATION IS OUTSIDE OF PROJECT SURVEY LIMITS. SET CAISSON 3" ABOVE FINAL GRADE.
 - TRAFFIC SIGNAL HEADS SHALL BE CENTERED OVER THE RESPECTIVE APPROACH LANE.

SIGNAL PHASING

1	2	3	4
		N/A	
5	6	7	8
N/A		N/A	N/A

SIGNAL HEAD LEGEND



LOCATION	CDOT STR. NO.	MAST ARM LENGTH	CAISSON DATA				
			DIA.	DEPTH	NORTHING	EASTING	ELEVATION
NW CORNER	225A001331D	60'	48"	17'	357992.47	603585.46	5620.97
SW CORNER	225A001331A	50'	36"	18'	357929.98	603594.33	5620.11
NE CORNER	N/A	55'	36"	18'	358030.09	603704.31	5622.38
SE CORNER	N/A	N/A	-	-	357978.81	603715.63	*

* CAISSON IS OUTSIDE OF SURVEY LIMITS. CONTRACTOR SHALL INSTALL TOP OF CAISSON APPROXIMATELY 3" ABOVE ADJACENT FINAL GRADE.



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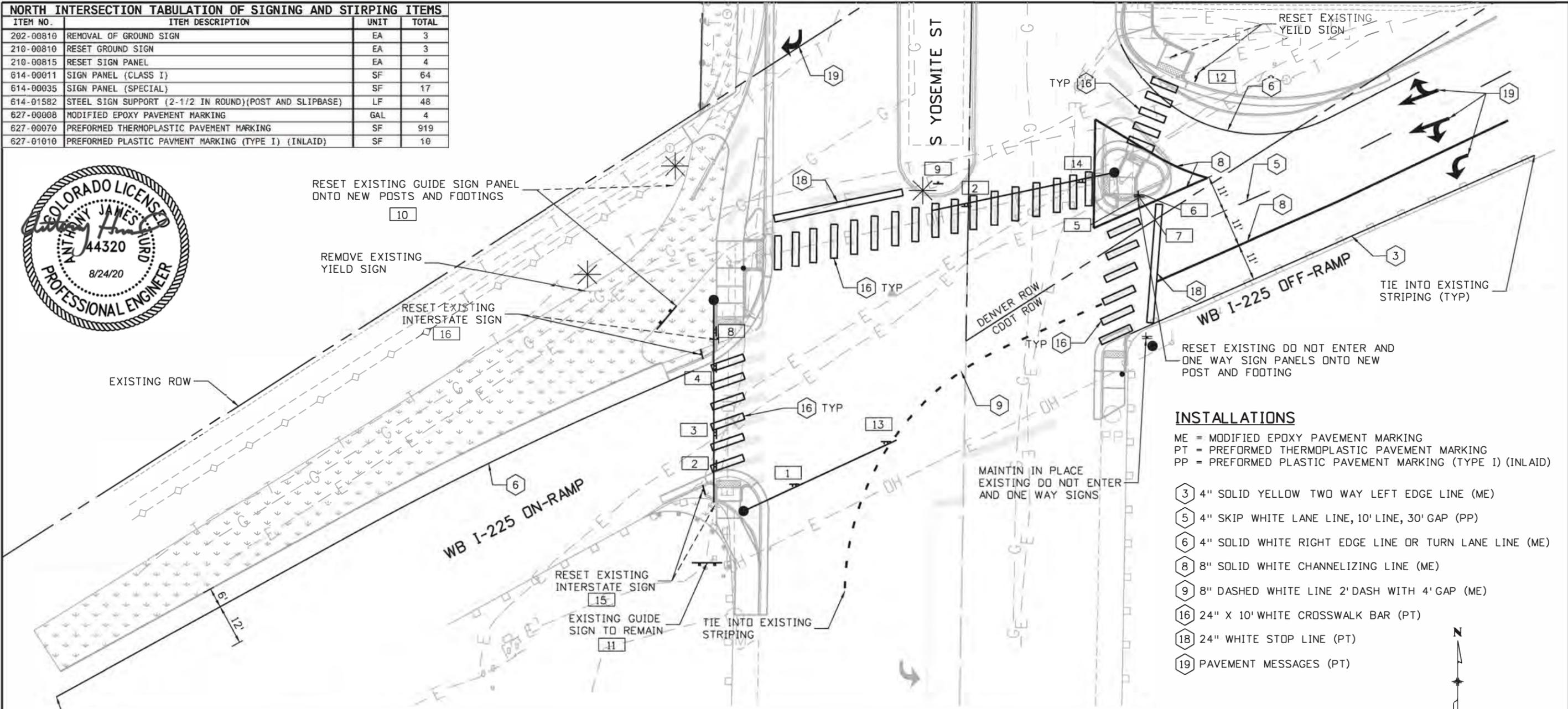
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Revised:
Void:

I-225 AT YOSEMITE TRAFFIC SIGNAL PLAN NORTH INTERSECTION	
Designer:	T. HURD
Detailer:	D. HUDSON
Subset:	TRAFFIC
Structure Numbers:	
Subset Sheets:	2 of 3

Project No./Code
SHE M320-125, 22935
2020-PRDJMSTR-000088
Sheet Number 43

NORTH INTERSECTION TABULATION OF SIGNING AND STRIPING ITEMS			
ITEM NO.	ITEM DESCRIPTION	UNIT	TOTAL
202-00810	REMOVAL OF GROUND SIGN	EA	3
210-00810	RESET GROUND SIGN	EA	3
210-00815	RESET SIGN PANEL	EA	4
614-00011	SIGN PANEL (CLASS I)	SF	64
614-00035	SIGN PANEL (SPECIAL)	SF	17
614-01582	STEEL SIGN SUPPORT (2-1/2 IN ROUND)(POST AND SLIPBASE)	LF	48
627-00008	MODIFIED EPOXY PAVEMENT MARKING	GAL	4
627-00070	PREFORMED THERMOPLASTIC PAVEMENT MARKING	SF	919
627-01010	PREFORMED PLASTIC PAVEMENT MARKING (TYPE I) (INLAID)	SF	10



INSTALLATIONS

ME = MODIFIED EPOXY PAVEMENT MARKING
 PT = PREFORMED THERMOPLASTIC PAVEMENT MARKING
 PP = PREFORMED PLASTIC PAVEMENT MARKING (TYPE I) (INLAID)

- 3 4" SOLID YELLOW TWO WAY LEFT EDGE LINE (ME)
- 5 4" SKIP WHITE LANE LINE, 10' LINE, 30' GAP (PP)
- 6 4" SOLID WHITE RIGHT EDGE LINE OR TURN LANE LINE (ME)
- 8 8" SOLID WHITE CHANNELIZING LINE (ME)
- 9 8" DASHED WHITE LINE 2'DASH WITH 4' GAP (ME)
- 16 24" X 10' WHITE CROSSWALK BAR (PT)
- 18 24" WHITE STOP LINE (PT)
- 19 PAVEMENT MESSAGES (PT)

EXISTING GROUND SIGN REMOVAL

SIGN LEGEND

Know what's below.
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CLASS I

ONLY
30R3-5R
1

CLASS I

ONLY
30R3-5L
2

CLASS I

30R3-6L
3

CLASS I

30R3-6R
4

5
RESET PANEL

6
RESET PANEL

7
RESET PANEL

SPECIAL

8
108" X 22"

9
120M3-L

10
RESET PANEL

11
EXISTING GUIDE SIGN TO REMAIN

12
RESET GROUND SIGN

13
30R3-18

14
30R3-1

15
RESET GROUND SIGN

16
RESET GROUND SIGN



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 Void:

**I-225 AT YOSEMITE
 SIGNING & STRIPING PLAN
 NORTH INTERSECTION**

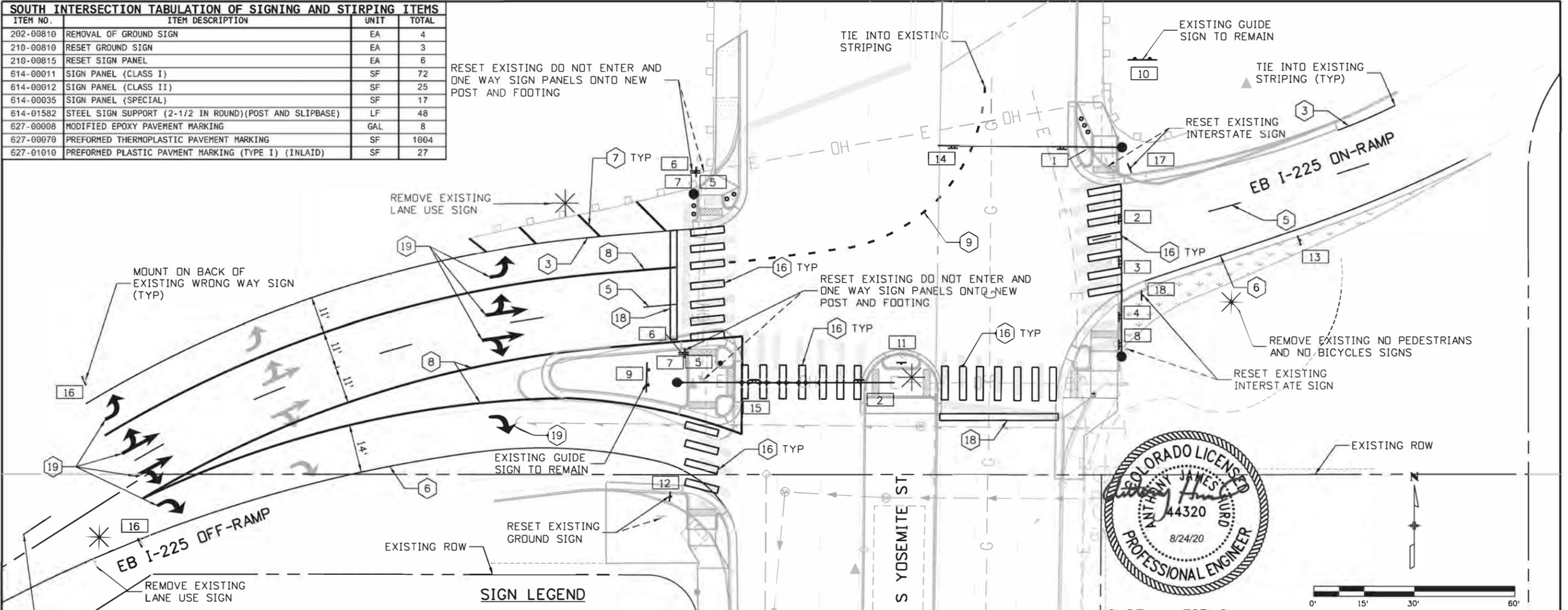
Designer: T. HURD
 Detailer: D. HUDSON
 Subset: S & S

Project No./Code
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 Sheet Number 45

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SOUTH INTERSECTION TABULATION OF SIGNING AND STRIPING ITEMS			
ITEM NO.	ITEM DESCRIPTION	UNIT	TOTAL
202-00810	REMOVAL OF GROUND SIGN	EA	4
210-00810	RESET GROUND SIGN	EA	3
210-00815	RESET SIGN PANEL	EA	6
614-00011	SIGN PANEL (CLASS I)	SF	72
614-00012	SIGN PANEL (CLASS II)	SF	25
614-00035	SIGN PANEL (SPECIAL)	SF	17
614-01582	STEEL SIGN SUPPORT (2-1/2 IN ROUND)(POST AND SLIPBASE)	LF	48
627-00008	MODIFIED EPOXY PAVEMENT MARKING	GAL	8
627-00070	PREFORMED THERMOPLASTIC PAVEMENT MARKING	SF	1004
627-01010	PREFORMED PLASTIC PAVEMENT MARKING (TYPE I) (INLAID)	SF	27

RESET EXISTING DO NOT ENTER AND ONE WAY SIGN PANELS ONTO NEW POST AND FOOTING



SIGN LEGEND

<p>CLASS I</p> <p>30R3-5R 1</p>	<p>CLASS I</p> <p>30R3-5L 2</p>	<p>CLASS I</p> <p>30R3-6L 3</p>	<p>CLASS I</p> <p>30R3-6R 4</p>	<p>CLASS I</p> <p>5 RESET PANEL</p>	<p>CLASS I</p> <p>6 RESET PANEL</p>	<p>CLASS I</p> <p>7 RESET PANEL</p>	<p>SPECIAL</p> <p>108" X 22" 8</p>	<p>CLASS I</p> <p>EXISTING 60"X30" R3-8a (MOD) 16</p>		
<p>EXISTING GROUND SIGN REMOVAL</p>	<p>CLASS I</p> <p>24M3-1 30M1-1a 21M6-1L 12DM3-L 11 EXISTING GUIDE SIGN TO REMAIN</p>	<p>CLASS I</p> <p>30R3-18 14 CLASS I</p>	<p>CLASS I</p> <p>24R9-3 24R5-6 12 RESET GROUND SIGN</p>	<p>CLASS I</p> <p>13</p>	<p>CLASS I</p> <p>30R3-1 15 CLASS I</p>	<p>CLASS II</p> <p>MOUNT BACK TO BACK</p> <p>EXISTING</p>	<p>CLASS I</p> <p>15</p>	<p>CLASS I</p> <p>16</p>	<p>CLASS I</p> <p>17 RESET GROUND SIGN</p>	<p>CLASS I</p> <p>18 RESET GROUND SIGN</p>

INSTALLATIONS

- ME = MODIFIED EPOXY PAVEMENT MARKING
- PT = PREFORMED THERMOPLASTIC PAVEMENT MARKING
- PP = PREFORMED PLASTIC PAVEMENT MARKING (TYPE I) (INLAID)
- 3 4" SOLID YELLOW TWO WAY LEFT EDGE LINE (ME)
- 5 4" SKIP WHITE LANE LINE, 10' LINE, 30' GAP (PP)
- 6 4" SOLID WHITE RIGHT EDGE LINE OR TURN LANE LINE (ME)
- 7 8" SOLID YELLOW 45 DEGREE DIAGONAL CROSSHATCH AT 15' SPACING (PT)
- 8 8" SOLID WHITE CHANNELIZING LINE (ME)
- 9 8" DASHED WHITE LINE 2'DASH WITH 4' GAP (ME)
- 16 24" X 10' WHITE CROSSWALK BAR (PT)
- 18 24" WHITE STOP LINE (PT)
- 19 PAVEMENT MESSAGES (PT)

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I-225 AT YOSEMITE SIGNING & STRIPING PLAN SOUTH INTERSECTION		
Designer:	T. HURD	Structure Numbers
Detailer:	D. HUDSON	
Subset:	S & S	Subset Sheets: 2 of 2

Project No./Code
SHE M320-125, 22935
2020-PRDJMSTR-0000088
Sheet Number 46

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GENERAL NOTES

ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE COLORADO DEPARTMENT OF TRANSPORTATION 2019 STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION AND THE CONTRACT DOCUMENTS.

ALL REINFORCING STEEL SHALL BE UNCOATED UNLESS OTHERWISE NOTED.

(E) DONATES EPOXY-COATED REINFORCING STEEL.

GRADE 60 REINFORCING STEEL IS REQUIRED.

EXPANSION JOINT MATERIAL SHALL MEET AASHTO SPECIFICATION M213.

ALL SAW WATER, CORING WASTE, CONCRETE WASHOUT AND ANY OTHER CONSTRUCTION DEBRIS SHALL BE COLLECTED AND DISPOSED OF OFF SITE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS AT NO ADDITIONAL COST TO THE PROJECT. UNDER NO CIRCUMSTANCES SHALL SUCH MATERIAL BE ALLOWED TO ENTER ANY NATURAL OR MANMADE WATERWAY OR STORM DRAIN.

THE CONTRACTOR IS RESPONSIBLE FOR MAKING HIS OWN DETERMINATION AS TO THE TYPE AND LOCATION OF UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE THERETO. THE CONTRACTOR SHALL CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO AT 811 (1-800-922-1987) AT LEAST THREE BUSINESS DAYS (TWO FULL BUSINESS DAYS IN ADVANCE NOT INCLUDING THE DAY OF NOTIFICATION) PRIOR TO ANY EXCAVATION OR OTHER EARTHWORK.

ANY UTILITIES, STATIONARY OBJECTS OR STRUCTURAL ELEMENTS WITHIN OR ADJACENT TO THE REPAIR AREA SHALL BE PROTECTED IN PLACE. IF ANY OF THESE ARE DAMAGED BY THE CONTRACTOR, THEY SHALL BE REPAIRED OR REPLACED AT ITS ORIGINAL LOCATION TO THE ENGINEER'S SATISFACTION FOR NO ADDITIONAL COST TO THE PROJECT.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE STABILITY AND STRUCTURAL INTEGRITY OF THE STRUCTURES DURING ALL PHASES OF CONSTRUCTION.

UNLESS OTHERWISE NOTED, DIMENSIONS CONTAINED IN THESE PLANS ARE CALCULATED FROM THE "AS CONSTRUCTED PLANS". THESE DIMENSIONS MAY BE ADJUSTED TO MEET THE EXISTING STRUCTURE. THE CONTRACTOR SHALL VERIFY ALL DEPENDENT DIMENSIONS IN THE FIELD BEFORE ORDERING OR FABRICATING ANY MATERIAL.

ALL LONGITUDINAL AND TRANSVERSE DIMENSIONS ARE MEASURED HORIZONTALLY AND INCLUDE NO CORRECTION FOR GRADE.

REMOVAL OF PORTIONS OF PRESENT STRUCTURE GENERAL NOTES

THE CONTRACTOR SHALL SAWCUT EXISTING CONCRETE 3/4" DEEP PRIOR TO REMOVAL OPERATIONS AS DIRECTED BY THE ENGINEER. ALL SAW RESIDUE MATERIAL SHALL BE PROPERLY CONTAINED AND NOT ALLOWED TO RUN OFF.

ALL EXISTING REINFORCING STEEL IS TO REMAIN IN PLACE UNLESS OTHERWISE NOTED IN THE PLANS. REMAINING REINFORCING STEEL SHALL BE CLEANED AND PREPARED IN ACCORDANCE WITH PROJECT SPECIAL PROVISION, SANDBLASTING REINFORCING STEEL. ANY REINFORCING STEEL THAT IS DAMAGED OR CORRODED SHALL BE REPLACED AS DETERMINED BY THE ENGINEER.

CLEAN AND PREPARE EXISTING CONCRETE SURFACES FOR PLACEMENT OF NEW CONCRETE, IN ACCORDANCE WITH SECTIONS 202 AND 601 OF THE SPECIFICATIONS PRIOR TO PLACEMENT OF NEW CONCRETE.

WHERE ROUGHENED JOINTS ARE SHOWN BETWEEN NEW CONCRETE AND EXISTING CONCRETE, THE EXISTING CONCRETE SURFACE SHALL BE ROUGHENED TO "1/4 ± " AMPLITUDE.

THE CONTRACTOR SHALL SUBMIT A METHOD STATEMENT FOR REMOVAL OF PORTIONS OF THE SIDEWALK, IN ACCORDANCE WITH PROJECT SPECIAL PROVISION, REMOVAL OF PORTIONS OF PRESENT STRUCTURE (CLASS 2).

AFTER REMOVAL OF CONCRETE, ALL EXPOSED REBAR SHALL BE CLEANED OF ALL LOOSE CONCRETE BY CHIPPING AND/OR SANDBLASTING, AND THIS SHALL BE INCLUDED IN THE COST OF THE WORK. SANDBLASTING SHALL NOT BE PERFORMED ON EPOXY COATED REINFORCING STEEL.

THE CONTRACTOR SHALL PROTECT PEDESTRIANS AND TRAVELING PUBLIC FROM ANY FALLING DEBRIS DURING THE CONSTRUCTION WORK. ANY DEBRIS WHICH FALLS ON PATHS OR ROADWAYS SHALL BE REMOVED IMMEDIATELY. THIS WORK WILL NOT BE MEASURED AND PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN THE COST OF THE WORK.

REMOVAL OPERATIONS SHALL BE COORDINATED WITH THE ENGINEER AND PERFORMED IN A MANNER AS REQUIRED TO ENSURE THE STRUCTURAL INTEGRITY AND STABILITY OF THE STRUCTURE. THE CONTRACTOR IS RESPONSIBLE FOR THE STRUCTURAL INTEGRITY AND STABILITY DURING ALL PHASES OF CONSTRUCTION.

UNLESS NOTED OTHERWISE, COST OF ALL REMOVALS, SAWCUTTING AND SANDBLASTING OPERATIONS SHALL BE INCLUDED IN THE WORK.

DESIGN DATA

AASHTO STANDARD SPECIFICATION FOR HIGHWAY BRIDGES, SIXTEENTH EDITION, 1996, WITH 1997 INTERIMS FOR BAR SPLICE.

REINFORCED CONCRETE:

CLASS DR CONCRETE: f'c = 4,500 psi

REINFORCING STEEL: fy = 60,000 psi

SUMMARY OF QUANTITIES

ITEM NO.	DESCRIPTION	UNIT	TOTAL
202-00453	REMOVAL OF PORTIONS OF PRESENT STRUCTURE (CLASS 2)	SY	26
601-03057	CONCRETE CLASS DR	CY	5
① 602-00000	REINFORCING STEEL	LB	50
② 613-00207	2 INCH ELECTRICAL CONDUIT (BRIDGE)(SPECIAL)	LF	672

INDEX OF DRAWINGS

- B01 GENERAL INFORMATION
- B02 CONDUIT INSTALLATION DETAILS

ABBREVIATIONS

See Standard Plan No. M-100-2 for abbreviations.

LEGEND

-  Section or Detail Identification
-  Cross Reference Drawing Number (if blank or dash, reference is to same sheet)
-  Denotes keynote reference

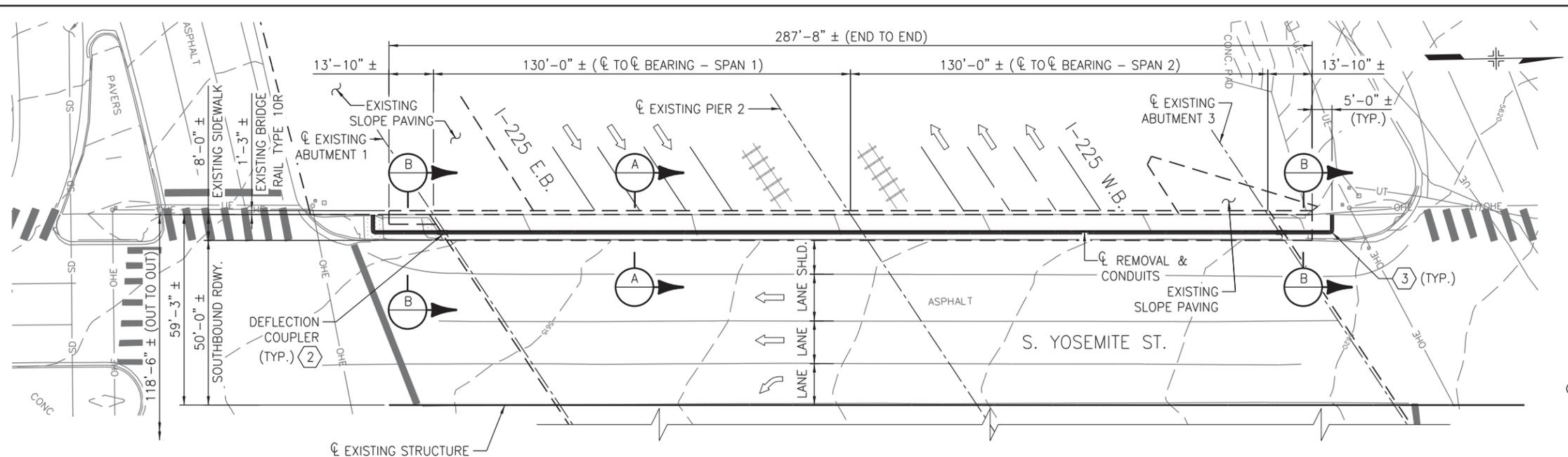
KEY NOTES

- ① ASSUMED 10 LBS PER CY OF CONCRETE.
- ② ITEM INCLUDES COST OF COUPLERS.

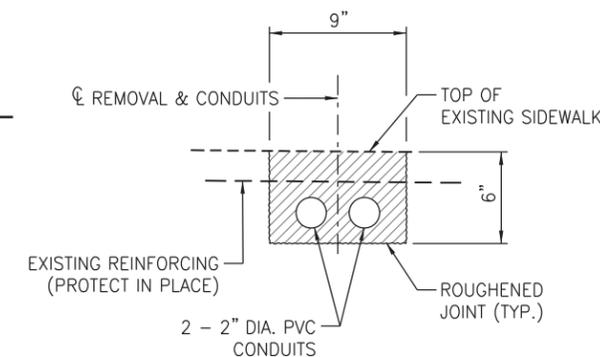


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File Name: 1240071002_sheet-001_gen-info.dgn	Date:	Comments	Init.		No Revisions:	Designer: R. PRASAIN		Structure Numbers		SHE M230-125, 22935	
Horiz. Scale: AS SHOWN Vert. Scale: N.A.					Revised:	Detailer: C. SULLIVAN		F-17-GL		2019-PROJMSTR-0000055	
 					Void:	Subset: BRIDGE		Subset Sheets: B01 of 2		Sheet Number 47	



PARTIAL PLAN



DETAIL 1

LEGEND

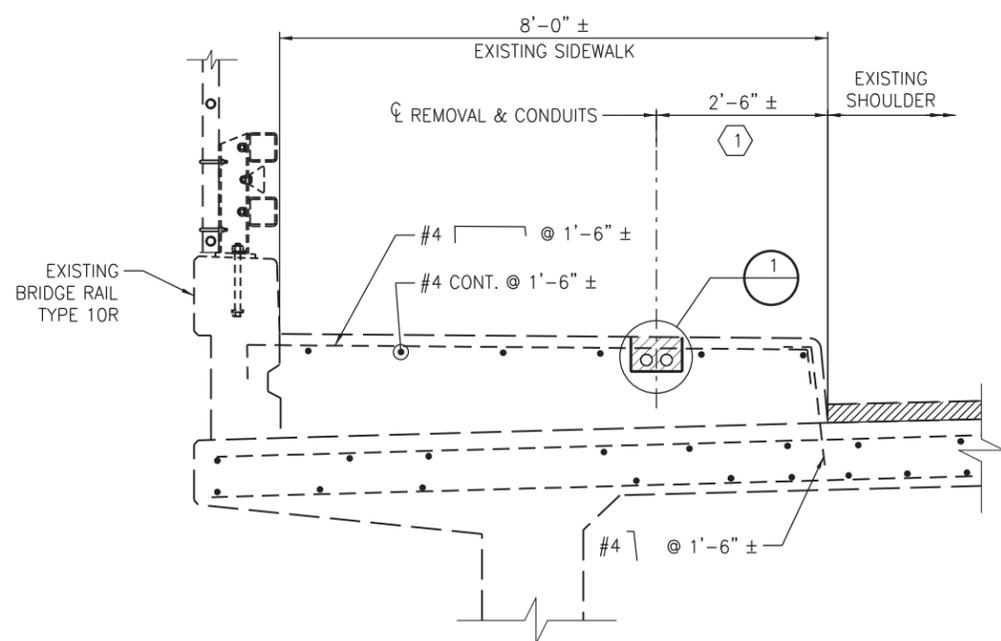
LIMITS OF REMOVAL OF PORTIONS OF PRESENT STRUCTURE (CLASS 2) AND CONCRETE CLASS DR

KEY NOTES

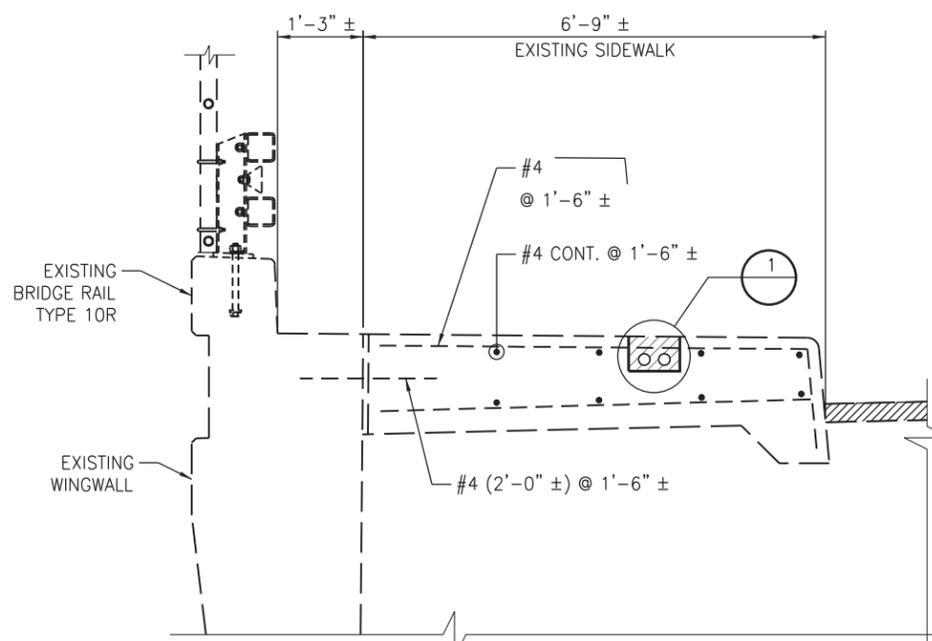
- (1) APPROXIMATE LOCATION. FINAL LOCATION TO BE APPROVED BY ENGINEER IN THE FIELD TO AVOID EXISTING LONGITUDINAL BARS.
- (2) PROVIDE 1/2" EXPANSION JOINTS MATERIAL AND DEFLECTION COUPLERS AT THE 1/2" EXPANSION JOINTS. THE COUPLERS SHALL BE ABLE TO ACCOMMODATE AN ANGULAR MISALIGNMENT OF 10°, A PARALLEL MISALIGNMENT OF 3/4" AND AN EXPANSION OR CONTRACTION OF 3/4".
- (3) PROVIDE 135° ANGLE OR A RADIUS APPROVED BY THE ENGINEER AT THE BENDS.

NOTES

- 1. PROVIDE 1.5" MINIMUM CONCRETE BELOW THE CONDUITS.
- 2. LAP SPLICE LENGTH FOR #4 BAR SHALL BE 1'-1" MINIMUM.
- 3. DENVER UTILITIES SHALL BE PLACED IN THE CONDUITS AND TESTED PRIOR TO CONCRETE POUR.



SECTION A
 (BRIDGE RAIL REINFORCING NOT SHOWN)



SECTION B
 (BRIDGE RAIL REINFORCING NOT SHOWN)

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File Name: 1240071002_sheet-002_conduit_dtlis-A.dgn	
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I-225 AT YOSEMITE CONDUIT INSTALLATION DETAILS			
Designer:	R. PRASAIN	Structure Numbers	F-17-GL
Detailer:	C. SULLIVAN	Subset Sheets:	BO2 of 2
Subset:	BRIDGE		

Project No./Code	SHE M230-125, 22935
2019-PROJMSTR-0000055	Sheet Number 48

SOUTH YOSEMITE STREET AT I-225

SUBSURFACE UTILITY ENGINEERING (SUE) INVESTIGATION

SITUATED IN THE SOUTHEAST 1/4 OF SECTION 4, THE SOUTHWEST 1/4 OF SECTION 3, THE NORTHWEST 1/4 OF SECTION 10 AND THE NORTHEAST 1/4 OF SECTION 9, TOWNSHIP 5 SOUTH, RANGE 67 WEST OF THE 6TH P.M., CITY AND COUNTY OF DENVER AND GREENWOOD VILLAGE, ARAPAHOE COUNTY, STATE OF COLORADO

GENERAL NOTES:

- THE LOCATIONS OF EXISTING SUBSURFACE UTILITIES ARE SHOWN ACCORDING TO THE BEST INFORMATION AVAILABLE, INCLUDING TYPE, SIZE, LOCATION AND NUMBER OF UTILITIES. ABANDONED, NON-DETECTABLE, UNDOCUMENTED OR NEWLY INSTALLED FACILITIES MAY NOT BE SHOWN.
- THIS SUE MAPPING SPECIFICALLY EXCLUDES NON-CONDUCTIVE SUBSURFACE UTILITIES, INCLUDING, BUT NOT LIMITED TO, IRRIGATION SYSTEMS, SEPTIC SYSTEMS, UNDERGROUND STORAGE TANKS, AND TRAFFIC SIGNAL LOOP DETECTION SYSTEMS.
- EXISTING UTILITIES SHOWN HEREON ARE ONLY REPRESENTATIVE OF EXISTING CONDITIONS AT THE TIME OF UTILITY DESIGNATION.
- UTILITY DESIGNATION WAS PERFORMED 10/30/2019, 11/21/2019, AND 5/8/2020. UTILITY SURVEY WAS PERFORMED BETWEEN 11/4/2019 AND 5/12/2020.
- UTILITY LOCATIONS SHOWN OUTSIDE THE PROPOSED EXCAVATION AREA/SUE LIMITS SHALL NOT BE RELIED UPON AND ARE SHOWN FOR INFORMATION ONLY, AND AS NECESSARY TO DEVELOP UTILITY ALIGNMENTS WITHIN THE PROPOSED EXCAVATION AREA/SUE LIMITS.
- ALL UNDERGROUND UTILITY LINES SHOWN HEREON ARE QL-B, UNLESS OTHERWISE NOTED.
- UTILITIES AND APPURTENANCES SHOWN HEREON ARE FOR GRAPHICAL REPRESENTATION ONLY, AND MAY NOT BE DEPICTED TO SCALE.
- UTILITY SIZES AND MATERIALS SHOWN HEREON ARE BASED UPON FIELD CREW OBSERVATIONS AND DATA COLLECTION. MEASUREMENTS ARE OFTEN TAKEN FROM THE GROUND SURFACE AND EXISTING CONDITIONS SUCH AS SEWER FLOW, UTILITY DEPTH, DEBRIS AND/OR SEDIMENT IN PIPE, LIGHTING CONDITIONS, AND TEST HOLE EXCAVATION DIAMETER COULD IMPACT THE ACCURACY OF SUCH DATA.
- IF DIRECTIONAL BORING, THE CONTRACTOR SHALL EXPOSE ALL EXISTING UNDERGROUND FACILITIES AND VISUALLY OBSERVE THE SAFE CROSSING OF SUCH FACILITIES, IN ACCORDANCE WITH DIRECTIONAL BORING BEST PRACTICES.
- THE PROFESSIONAL ENGINEER'S SEAL SHOWN ON THESE DRAWINGS IS SPECIFICALLY LIMITED TO THE SUBSURFACE UTILITY ENGINEERING INVESTIGATION ASSOCIATED WITH THE DATA COLLECTION AND MAPPING OF EXISTING SUBSURFACE UTILITIES WITHIN THE PROPOSED EXCAVATION AREA/SUE LIMITS.
- A PRAGMATIC EFFORT HAS BEEN MADE TO DESIGNATE AND MAP EXISTING UNDERGROUND UTILITIES WITHIN THE SUE LIMITS TO THE EXTENT PRACTICAL FOR THE AUTHORIZED PROJECT BUDGET. EXISTING UTILITY LOCATIONS DEPICTED ARE APPROXIMATE, AND DO NOT SUPERSEDE COLORADO 811 DEMARCATIONS OF UNDERGROUND UTILITIES OR RELIEVE THE CONTRACTOR OF THE LEGAL REQUIREMENT TO CONTACT COLORADO 811 PRIOR TO EXCAVATION.
- HARRIS KOCHER SMITH (HKS) AND THE PROJECT DESIGN ENGINEER SHALL BE NOTIFIED OF ANY DISCREPANCIES BETWEEN SUE UTILITY MAPPING AND UTILITY OWNER DESIGNATION MARKINGS OR ACTUAL UTILITY LOCATIONS, PRIOR TO CONSTRUCTION.

UTILITY DISCREPANCIES, ISSUES, AND RECOMMENDATIONS:

- HKS RECOMMENDS TEST HOLES AT ALL POTENTIAL UTILITY CONFLICTS.
- COMCAST CLEARED THE PROJECT LOCATION IN RESPONSE TO THE 811 SUBSURFACE UTILITY ENGINEERING NOTIFICATION, AND SUBSEQUENTLY PROVIDED MAPS. ALL APPARENT COMCAST FACILITIES WERE DESIGNATED BY FIELD CREWS. HKS RECOMMENDS ADDITIONAL INVESTIGATION AND FACILITIES CONFIRMATION FROM COMCAST ONLY IF WARRANTED BY PROPOSED IMPROVEMENTS.
- THE 30" RCP STORM SEWER RUNNING EAST-WEST ADJACENT TO THE SUE LIMITS ALONG THE SOUTH SIDE I-225 RAMP IS QL-D AND SHOWN BASED UPON GENERAL PIPE DIRECTION OBSERVED AT STORM SEWER MANHOLE #1. AS FIELD CREWS WERE UNABLE TO DESIGNATE THE LINE ELECTROMAGNETICALLY. LOCATION, EXTENTS, AND OWNERSHIP ARE UNKNOWN. HKS RECOMMENDS ADDITIONAL INVESTIGATION.
- THE TRAFFIC INTERCONNECT LINE ALONG THE WEST SIDE OF SOUTH YOSEMITE STREET AT THE SOUTH SIDE I-225 RAMP IS QL-D AND SHOWN BASED UPON 811 DESIGNATION MARKS, AS FIELD CREWS WERE UNABLE TO DESIGNATE THE LINE ELECTROMAGNETICALLY. LOCATION AND EXISTENCE OF THE LINE ARE UNKNOWN. HKS RECOMMENDS ADDITIONAL INVESTIGATION AND TEST HOLES.



VICINITY MAP
APPROXIMATE SCALE: 1" = 300'

SHEET INDEX	
Sheet Number	Sheet Title
1	COVER SHEET
2	YOSEMITE STREET AT I-225, NORTH SIDE
3	YOSEMITE STREET AT I-225, SOUTH SIDE

QUALITY LEVEL DEFINITIONS:

SUBSURFACE UTILITY ENGINEERING (SUE) QUALITY LEVELS D, C, B AND A ARE DEFINED AS FOLLOWS:

QUALITY LEVEL D (QL-D):

INCLUDES RECORDS RESEARCH, REVIEW AND VISUAL INSPECTION FOR EXISTING SUBSURFACE UTILITIES WITHIN THE PROJECT LIMITS.

QUALITY LEVEL C (QL-C):

INCLUDES QL-D EFFORTS, AS WELL AS SURVEYING ALL VISIBLE SURFACE UTILITY APPURTENANCES (REFERENCED TO THE PROJECT SURVEY DATUM) AND CORRELATING SURVEYED EVIDENCE WITH QL-D RECORDS WITHIN THE PROJECT LIMITS.

QUALITY LEVEL B (QL-B):

INCLUDES QL-D AND QL-C EFFORTS, AS WELL AS SURVEYING INFORMATION OBTAINED THROUGH SURFACE GEOPHYSICAL METHODS (UTILITY DESIGNATION) TO DETERMINE THE EXISTENCE AND APPROXIMATE HORIZONTAL POSITION OF SUBSURFACE UTILITIES WITHIN THE PROJECT LIMITS.

QUALITY LEVEL A (QL-A):

INCLUDES QL-D, QL-C, AND QL-B EFFORTS, AS WELL AS THE PRECISE HORIZONTAL AND VERTICAL LOCATION OF SUBSURFACE UTILITIES (REFERENCED TO THE PROJECT SURVEY DATUM), OBTAINED BY THE ACTUAL EXPOSURE AND SUBSEQUENT MEASUREMENT OF UTILITIES AT SPECIFIC LOCATIONS (TEST HOLES).

LEGEND:

SUE LIMITS	FIRE HYDRANT	TELECOMMUNICATIONS PEDESTAL
FIBER OPTIC LINE (QL-B)	WATER METER	TELECOMMUNICATIONS VAULT
UNDERGROUND TELECOMMUNICATIONS (QL-B)	WATER VALVE	TELECOMMUNICATIONS HANDHOLE / PULL BOX
UNDERGROUND TELECOMMUNICATIONS (QL-C)	SANITARY SEWER MANHOLE	TELECOMMUNICATIONS MANHOLE
WATER LINE (QL-B)	STORM MANHOLE	FIBER OPTICS HANDHOLE / PULL BOX
WATER LINE (QL-C)	STORM SEWER INLET	CABLE TV HANDHOLE / PULL BOX
WATER LINE (QL-D)	ELECTRIC HANDHOLE / PULL BOX	ELECTRIC PEDESTAL
SANITARY SEWER LINE (QL-B)	ELECTRIC SWITCH CABINET	TRAFFIC SIGNAL POLE
SANITARY SEWER LINE (QL-C)	ELECTRIC TRANSFORMER	TRAFFIC PEDESTAL / CABINET
SANITARY SEWER LINE (QL-D)	ELECTRIC MANHOLE	TRAFFIC HANDHOLE / PULL BOX
STORM SEWER LINE (QL-B)	ELECTRIC GUY WIRE	
STORM SEWER LINE (QL-C)		
STORM SEWER LINE (QL-D)		
GAS LINE (QL-B)		
UNDERGROUND ELECTRIC LINE (QL-B)		
OVERHEAD ELECTRIC LINE		
UNDERGROUND TRAFFIC LINE (QL-B)		
UNDERGROUND TRAFFIC LINE (QL-C)		
UNDERGROUND TRAFFIC LINE (QL-D)		

ADDITIONAL ABBREVIATIONS	
CA	CEMENT ASBESTOS
EL	ELEVATION
ELEC	ELECTRIC
FL	FLOW LINE
INV	INVERT
PVC	POLYVINYL CHLORIDE
RCP	REINFORCED CONCRETE PIPE
STL	STEEL
TYP	TYPICAL
VCP	VITRIFIED CLAY PIPE

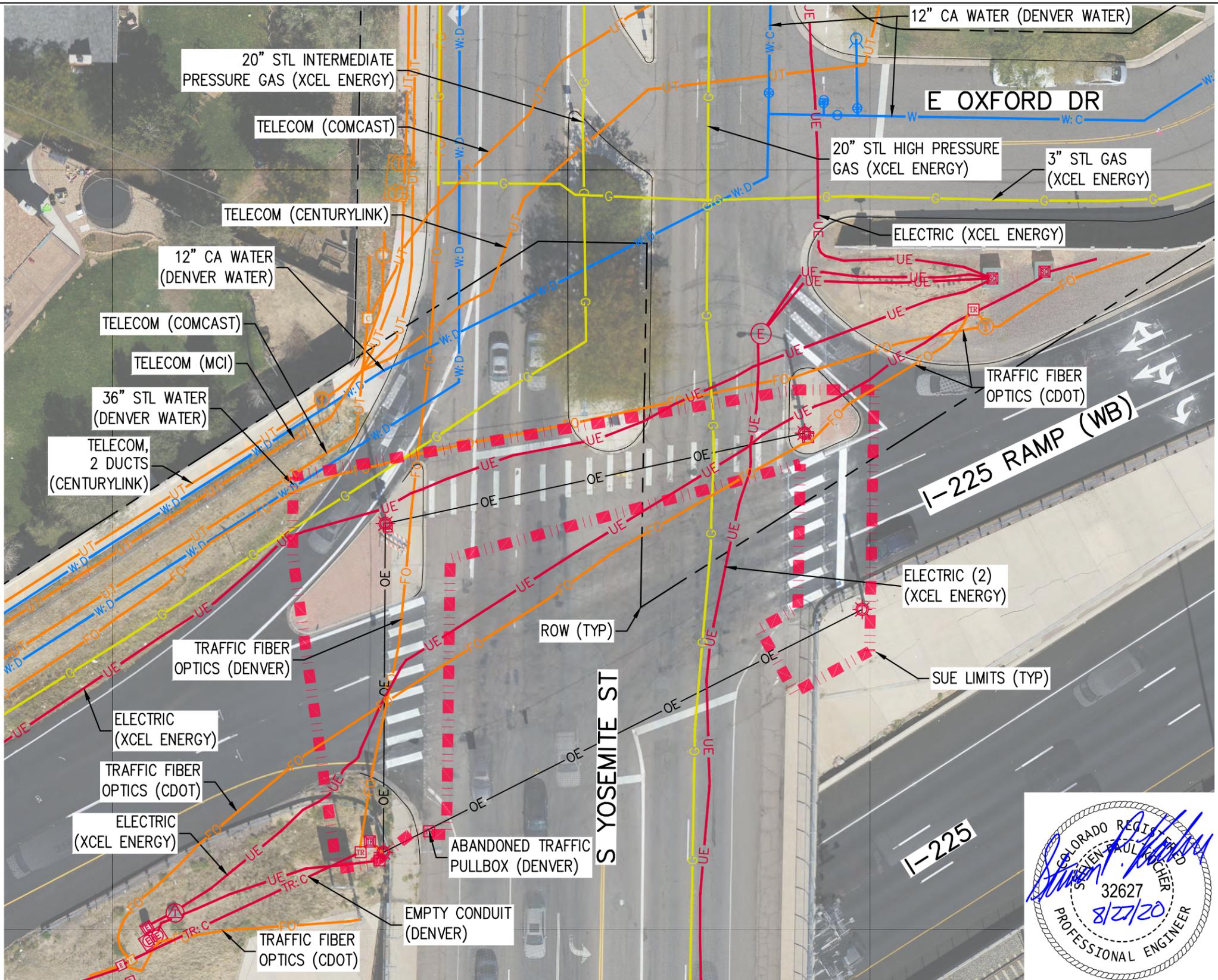


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Print Date: 8/25/2020 11:45:35 AM	Index of Revisions			<p>Department of Transportation & Infrastructure 201 West Colfax Avenue Denver CO 80202</p>	As Constructed	SOUTH YOSEMITE STREET AT I-225 SUE INVESTIGATION COVER SHEET		Project No./Code
Drawing File Name: existing utility plan	Date:	Comments	Init.		No Revisions:	Designer: N/A	Structure Numbers	SHE M320-125, 22935
Horiz. Scale: AS SHOWN					Revised:	Detailer: VCB		2020-PROJMSTR-0000088
<p>1120 Lincoln Street, Suite 1000 P: 303.623.6300 Denver, Colorado 80203 F: 303.623.6311 HarrisKocherSmith.com</p>				Void:	Sheet Subset: UTILITY	Subset Sheet: 1 of 3	Sheet Number 49	

FILEPATH: L:\191002\CAD\EXISTING UTILITY PLAN.DWG LAYOUT: LAYOUT(1)
 5 XREFS: e-base, e-legal, e-util, p-traf-byot, pe-stamp-date
 PLOTTED: THU 08/27/20 1:25:05P BY: CLAIRE BENNETT



UTILITY OWNER INFORMATION	
NAME	PHONE NUMBER
COLORADO DEPARTMENT OF TRANSPORTATION (CDOT)	303-512-5843
CENTURYLINK (AND FORMERLY LEVEL 3)	303-578-5150
COMCAST	303-603-2671
DENVER PUBLIC WORKS TRAFFIC ENGINEERING SERVICES	720-865-4008
DENVER PUBLIC WORKS TRANSPORTATION	720-865-4012
DENVER WATER	303-628-6666
VERIZONBUSINESS / MCI	800-289-3427
XCEL ENERGY	855-286-4227



SCALE: 1" = 30'



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FILEPATH: L:\191002\CAD\EXISTING UTILITY PLAN.DWG LAYOUT: LAYOUT(2)
5 XREFs: e-legal, e-legal, e-util, p-traffic-byot, pe-stamp-date
PLOTTED: THU 08/27/20 1:25:10P BY: CLAIRE BENNETT

Print Date:	8/25/2020 11:45:04 AM
Drawing File Name:	existing utility plan
Horiz. Scale:	AS SHOWN
HKS HARRIS KOCHER SMITH	1120 Lincoln Street, Suite 1000 P: 303.623.6300 Denver, Colorado 80203 F: 303.623.6311 HarrisKocherSmith.com

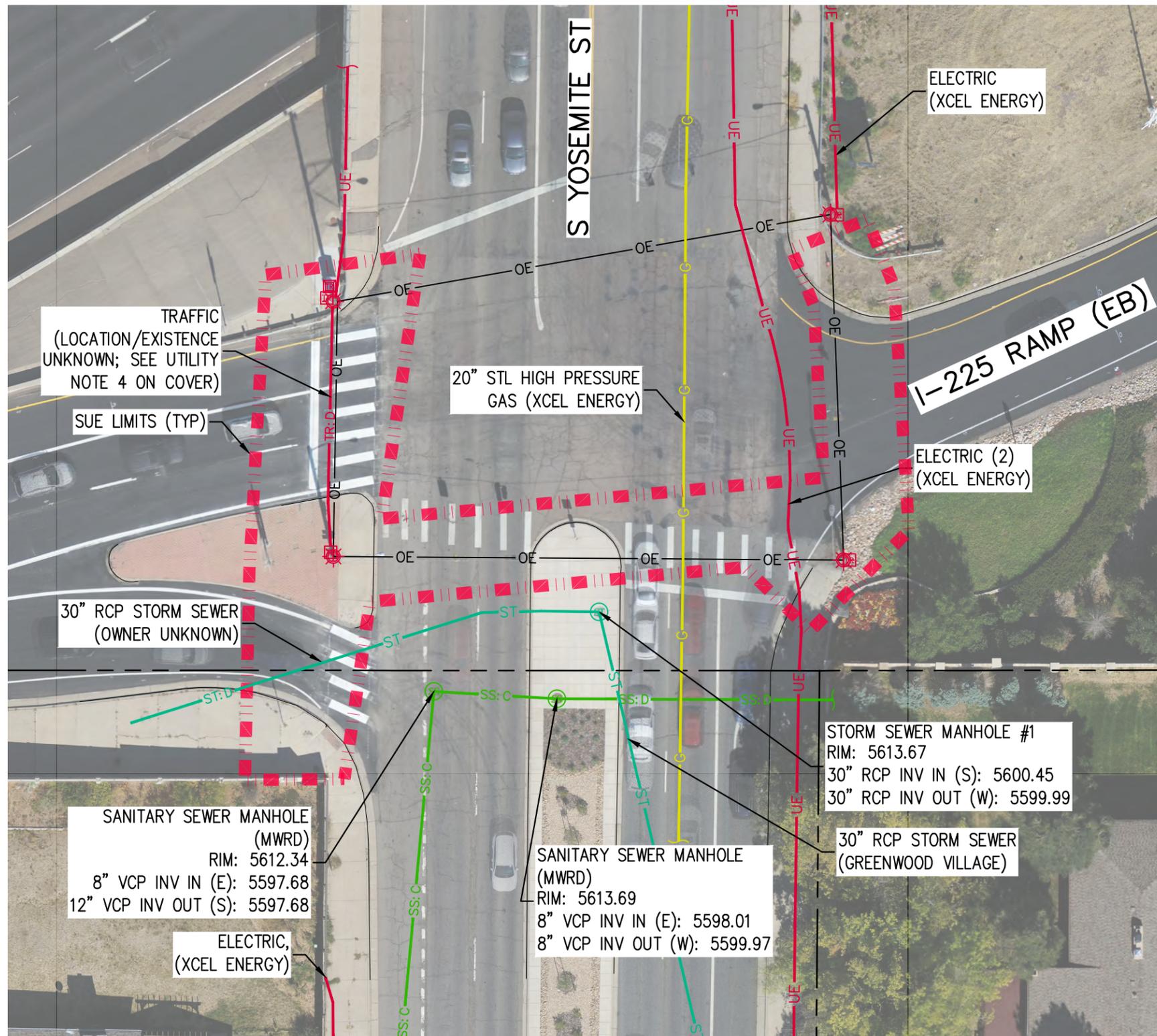
Index of Revisions		
Date:	Comments	Init.

Department of Transportation & Infrastructure
201 West Colfax Avenue
Denver CO 80202

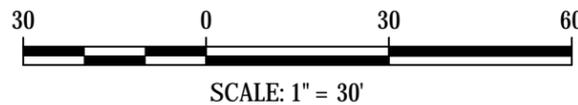
As Constructed
No Revisions:
Revised:
Void:

SOUTH YOSEMITE STREET AT I-225 SUE INVESTIGATION NORTH SIDE	
Designer:	N/A
Detailer:	VCB
Sheet Subset:	UTILITY
Structure Numbers	
Subset Sheet:	2 of 3

Project No./Code	SHE M320-125, 22935
	2020-PROJMSTR-0000088
Sheet Number	50



UTILITY OWNER INFORMATION	
NAME	PHONE NUMBER
GREENWOOD VILLAGE PUBLIC WORKS	303-708-6100
METRO WASTEWATER RECLAMATION DISTRICT (MWRD)	303-286-3432
XCEL ENERGY	855-286-4227



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 PLOTTED: THU 08/27/20 1:25:15P BY: CLAIRE BENNETT

Print Date:	8/25/2020 11:36:37 AM
Drawing File Name:	existing utility plan
Horiz. Scale:	AS SHOWN
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Index of Revisions		
Date:	Comments	Init.

Department of Transportation & Infrastructure
 201 West Colfax Avenue
 Denver CO 80202

As Constructed
No Revisions:
Revised:
Void:

SOUTH YOSEMITE STREET AT I-225 SUE INVESTIGATION SOUTH SIDE		
Designer:	N/A	Structure Numbers
Detailer:	VCB	
Sheet Subset:	UTILITY	Subset Sheet: 3 of 3

Project No./Code	SHE M320-125, 22935
	2020-PROJMSTR-0000088
Sheet Number	51