Resolution No. 15-0431

A RESOLUTION ORDERING CONSTRUCTION OF CERTAIN PUBLIC IMPROVEMENTS, AND FIXING A DATE FOR HEARING THEREON

WHEREAS, it is deemed advisable and necessary to construct certain public improvements described in general as Hickman Road Streetscape Improvements Project, and the City has caused to be prepared plans, specifications and form of contract, together with estimate of cost, which will be on file in the office of the City Clerk for public inspection on April 6, 2015; and

WHEREAS, before the plans, specifications, form of contract and estimate of cost may be adopted, and contract for the construction of the public improvements is entered into, it is necessary, pursuant to Chapter 26 of the Code of Iowa to hold a public hearing and to advertise for bids.

NOW, THEREFORE BE IT HEREBY RESOLVED by the City of Windsor Heights City Council in session this 6th Day of April, 2015, that it is hereby determined that it is necessary and advisable to construct certain public improvements described in general as Hickman Road Streetscape Improvements Project, in the manner set forth in the plans and specifications, and form of contract, above referred to, the cost thereof to be paid in accordance with the provisions as set out in the published Notice of Hearing and Letting, as properly noticed by IaDOT, the public improvements more generally described as follows:

> Construction of the Hickman Road Streetscape Improvements Project – IaDOT Project No. TAP-T-8477(613)—8V-77.

BE IT FURTHER RESOLVED that the amount of the bid security to accompany each bid shall be in an amount which shall conform to the provisions of the notice to bidders approved as properly noticed by IaDOT.

BE IT FURTHER RESOLVED that the City Clerk be and is hereby directed to publish notice to of the hearing once in the Des Moines Register, a legal newspaper, printed wholly in the English language, published at least once weekly and having general circulation in the City. Publication shall be not less than four clear days nor more than forty-five days prior to the 19th of May, 2015, which is hereby fixed as the date for receiving bids.

BE IT FURTHER RESOLVED, that the City Clerk be and is hereby directed to publish notice of hearing once in such newspaper, the publication to be not less than four days nor more than twenty days prior to the date hereinafter fixed as the date for a public hearing on the plans, specifications, form of contract and estimate of costs for the project,

the hearing to be at 6:00 p.m. on April 20, 2015, at 6:00 p.m. at 1133 66th Street, Windsor Heights, Iowa, in Council Chambers.

Passed and Approved this 6th Day of April, 2015.

_____

Diana Willits, Mayor

Attest:

_____

Brett Klein, City Administrator

LETTING DATE
MAY 19, 2015

W. H. STREETSCAPE AND GATEWAY SIGN
PROJECT # TAP-T-8477(613)--8V-77

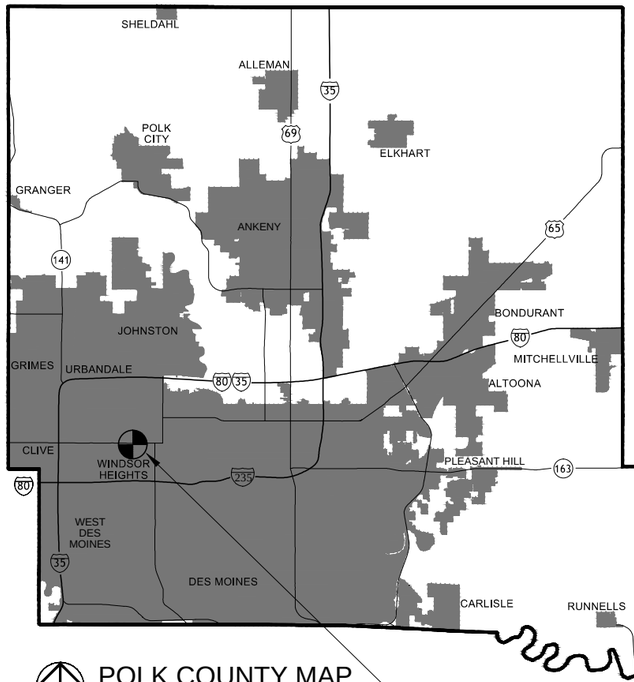
POLK COUNTY

PREPARED FOR:

Windsor Heights
the heart of it all

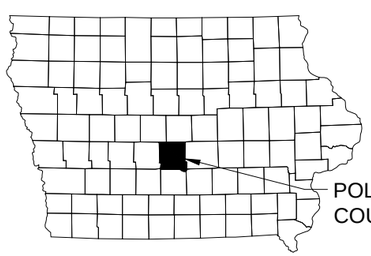
PROJECT TRAFFIC CONTROL PLAN

U.S. HWY 6, WESTOVER BLVD. AND IA HWY 28 WILL REMAIN OPEN TO ONE LANE OF TRAFFIC IN EACH DIRECTION DURING CONSTRUCTION. LOCAL TRAFFIC TO ADJACENT PROPERTIES WILL BE MAINTAINED AS PROVIDED FOR IN ARTICLE 1107.08 OF THE CURRENT STANDING SPECIFICATIONS. TRAFFIC CONTROL DEVICES, PROCEDURES, LAYOUTS, SIGNING, AND PAVEMENT MARKINGS INSTALLED WITHIN THE LIMITS OF THE PROJECT SHALL CONFORM TO THE "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS" AS ADOPTED BY THE DEPARTMENT PER 761 OF THE IOWA ADMINISTRATIVE CODE (IAC) CHAPTER 130.



POLK COUNTY MAP
NO SCALE

PROJECT LOCATION



POLK COUNTY

IOWA STATE MAP
NO SCALE

IOWA DEPARTMENT OF TRANSPORTATION PLANNING,PROGRAMMING AND MODAL DIVISION
PLANS OF PROPOSED IMPROVEMENT ON THE

URBAN ROAD SYSTEM

POLK COUNTY

CITY OF WINDSOR HEIGHTS
LIGHTING & LANDSCAPING
STREETSCAPE IMPROVEMENTS

WINDSOR HEIGHTS HICKMAN ROAD STREETSCAPE AND GATEWAY SIGN

SCALES: As Noted

LOCATION/DESCRIPTION: IN THE CITY OF WINDSOR HEIGHTS, HICKMAN RD: FROM THREE BLOCKS WEST OF 63RD ST TO ONE BLOCK SOUTH OF HICKMAN RD.

REFER TO THE PROPOSAL FORM FOR LIST OF APPLICABLE SPECIFICATONS.

DRAWING APPROVAL

ALL SHOP DRAWINGS AND FALSEWORK DRAWINGS THAT REQUIRE APPROVAL SHALL BE SUBMITTED TO AND APPROVED BY THE CONTRACTOR, WHO SHALL STAMP, CERTIFY OR PROVIDE OTHER SUCH EVIDENCE ON THE DRAWINGS THAT THEY HAVE RECEIVED CONTRACTOR APPROVAL. THE APPROVED DRAWINGS SHALL THEN BE SUBMITTED TO CONFLUENCE FOR REVIEW AND APPROVAL.

ADDRESS: 1300 WALNUT STREET, SUITE 200
DES MOINES, IOWA 50309
TELEPHONE: (515) 288-4875
FAX: (515) 288-8359

SHOP DRAWINGS SHALL BE INDEPENDENT DRAWINGS WITH ADEQUATE DIMENSIONING FOR FABRICATION OF INDIVIDUAL PIECES OF EACH COMPONENT. PHOTOCOPIES OF PLAN DRAWINGS AND NON-CONTRACTOR APPROVED PLANS WILL BE REJECTED.

MILEAGE SUMMARY

STREET	LOCATION	LINEAR FEET	MILES
HICKMAN ROAD	STA. 102+93.92 TO STA. 112+84.82	990.90	0.19
63RD STREET	STA. 630+63.45 TO 631+07.01 AND 631+64.62 TO 631+76.62	55.56	0.01
	TOTAL NET PROJECT LENGTH	1046.46	0.20

UTILITY CONTACTS

SERVICE	CONTACT INFORMATION
DES MOINES WATER WORKS	GENERAL INQUIRIES (515) 283-8700
MIDAMERICAN ENERGY	GENERAL INQUIRIES (800) 329-6261
CENTURYLINK	GENERAL INQUIRIES (877) 348-9007

IOWA ONE CALL
1-800-292-8989
www.iowaonecall.com

CITY OF WINDSOR HEIGHTS
RECOMMENDED FOR LETTING

CITY ENGINEER DATE

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Timothy J. Korpela, PE Date

My license renewal date is: DECEMBER 31, 2016
Sheets covered by this seal: I.12, I.13 AND I.14

LICENSED PROFESSIONAL ENGINEER TIMOTHY J. KORPELA 12119 IOWA

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Signed Date

William J. Weber, P.E.
Iowa License No. 16339 My license renewal date is December 31, 2015

Drawing covered by this seal: M.01

LICENSED PROFESSIONAL ENGINEER William J. Weber No. 16339 IOWA

		TOTAL 48
PROJECT #		
TAP-T-8477(613)--8V-77		

REVISIONS

Preliminary Design Submittal:	12/16/2014
Check Plan Submittal:	01/27/2015
Final Plans Submittal:	02/17/2015

INDEX OF PLAN SHEETS

DRAWING NO.	DESCRIPTION
A.01	COVER SHEET
A.02	LOCATION MAP
A.03	SURVEY LEGEND
A.04 - A.08	SITE SURVEY
C.01 - C.02	ESTIMATED QUANTITIES & ESTIMATED REFERENCE INFO.
D.01 - D.05	DEMO PLAN
E.01 - E.05	GRADING PLAN
G.01	CONTROL POINTS PLAN
I.01 - I.05	LAYOUT PLAN
I.06 - I.10	PLANTING PLAN
I.11 - I.14	DETAILS
M.01	WATER MAIN PLAN
P.01 - P.11	ELECTRICAL PLAN & DETAILS
TC.01	TRAFFIC CONTROL PLAN

NOTE: ALL EXISTING WALKS, CURBS, AND ADA RAMPS TO REMAIN. 'S' SHEETS N.A.

FINAL PLANS

STANDARD ROAD PLANS

THE FOLLOWING STANDARD ROAD PLANS SHALL BE CONSIDERED APPLICABLE TO CONSTRUCTION WORK ON THIS PROJECT.

NUMBER	DATE
EC-501	04-20-10

INDEX OF SEALS

SHEET NO.	NAME	TYPE
00335	CHRIS DELLA VEDOVA	PROJECT LANDSCAPE ARCH
16014	RICHARD K. LARSON	PROJECT ENGINEER
12119	TIMOTHY J. KORPELA	PROJECT ENGINEER
16339	WILLIAM J. WEBER	PROJECT ENGINEER

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Richard K. Larson Date

My license expiration date is: December 31, 2015

Sheets covered by this seal: P.01, P.02, P.03, P.04, P.05, P.06, P.07, P.08, P.09, P.10 AND P.11.

LICENSED PROFESSIONAL ENGINEER RICHARD K. LARSON 16014 IOWA

STATE OF IOWA CHRIS DELLA VEDOVA 00335 PROFESSIONAL LANDSCAPE ARCHITECT

I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF IOWA.

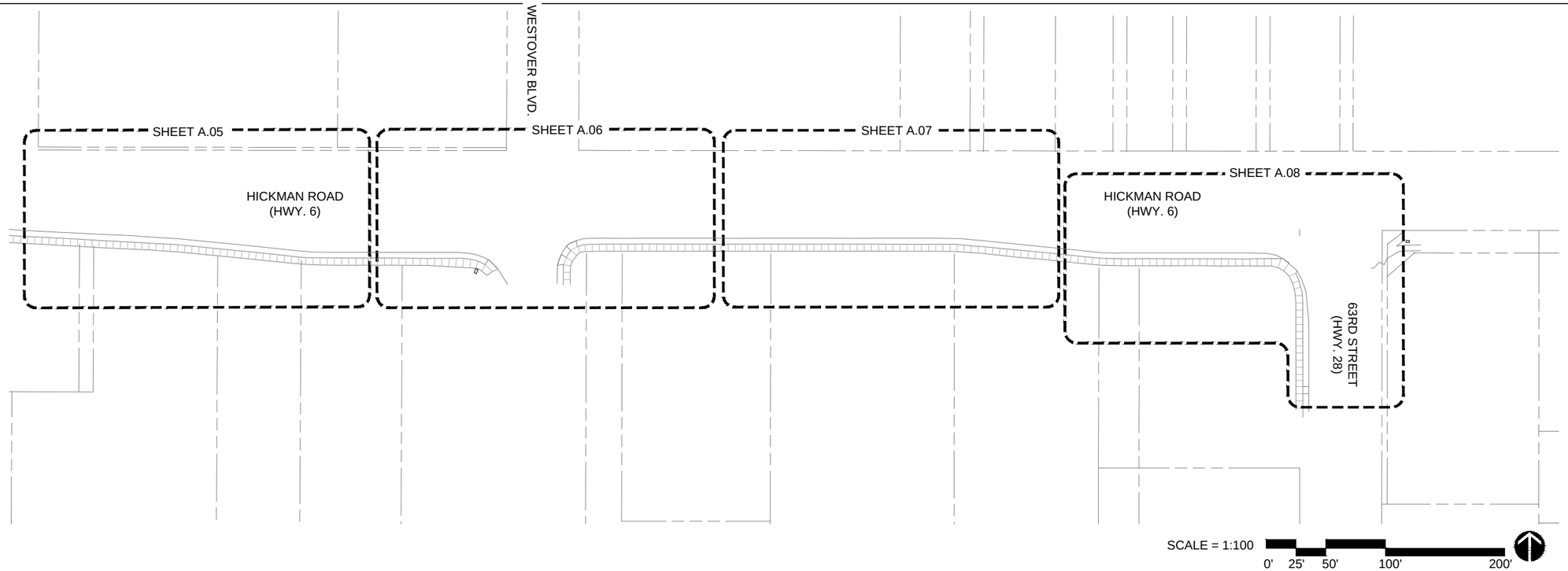
CHRIS DELLA VEDOVA DATE
LICENSE NO. 335
LICENSE RENEWAL DATE: JUNE 30, 2015
SHEETS A.01, A.02, A.03, C.01, C.02, D.01, D.02, D.03, D.04, D.05, E.01, E.02, E.03, E,04, E.05, G.01, I.01, I.02, I.03, I,04, I.05, I.06, I.07, I.08, I.09, I.10, I.11, I.12, 1.13, I.14 AND T.01 ARE COVERED BY THIS SEAL.

PROJECT	HICKMAN ROAD STREETSCAPE	DESIGN TEAM	CONFLUENCE bluestone engineering	COUNTY	POLK	PROJECT NUMBER	TAP-T-8477(613)--8V-77	SHEET TITLE	LOCATION MAP	SHEET NUMBER	A.02

02-17-2015 - FINAL PLANS & PDC - NOT FOR CONSTRUCTION

SURVEY LEGEND

	SURVEY LINE & STATION INDICATOR
	SEWER/MANHOLE
	WATER MAIN
	FORCE MAIN
S	SANITARY SEWER LINE
SS	STORM SEWER LINE
W	WATER MAIN LINE
G	GAS MAIN LINE
UE	UNDERGROUND POWER LINE
T	UNDERGROUND TELEPHONE LINE
	PROPERTY LINE
	PROJECT LIMITS
	PROJECT EASEMENT
S	SANITARY MANHOLE
ST	STORM SEWER MANHOLE
T	TELEPHONE MANHOLE
E	ELECTICAL MANHOLE
E	ELECTICAL HANDHOLE
TR	TRAFFIC CONTROL BOX
	MANHOLE
	HYDRANT
*	WATER VALVE
	GAS VALVE
x	POWER POLE
	STREET LIGHT
BM=#	BENCH MARK
CP=#	CONTROL POINT
DIA.	DIAMETER
INV.	INVERT

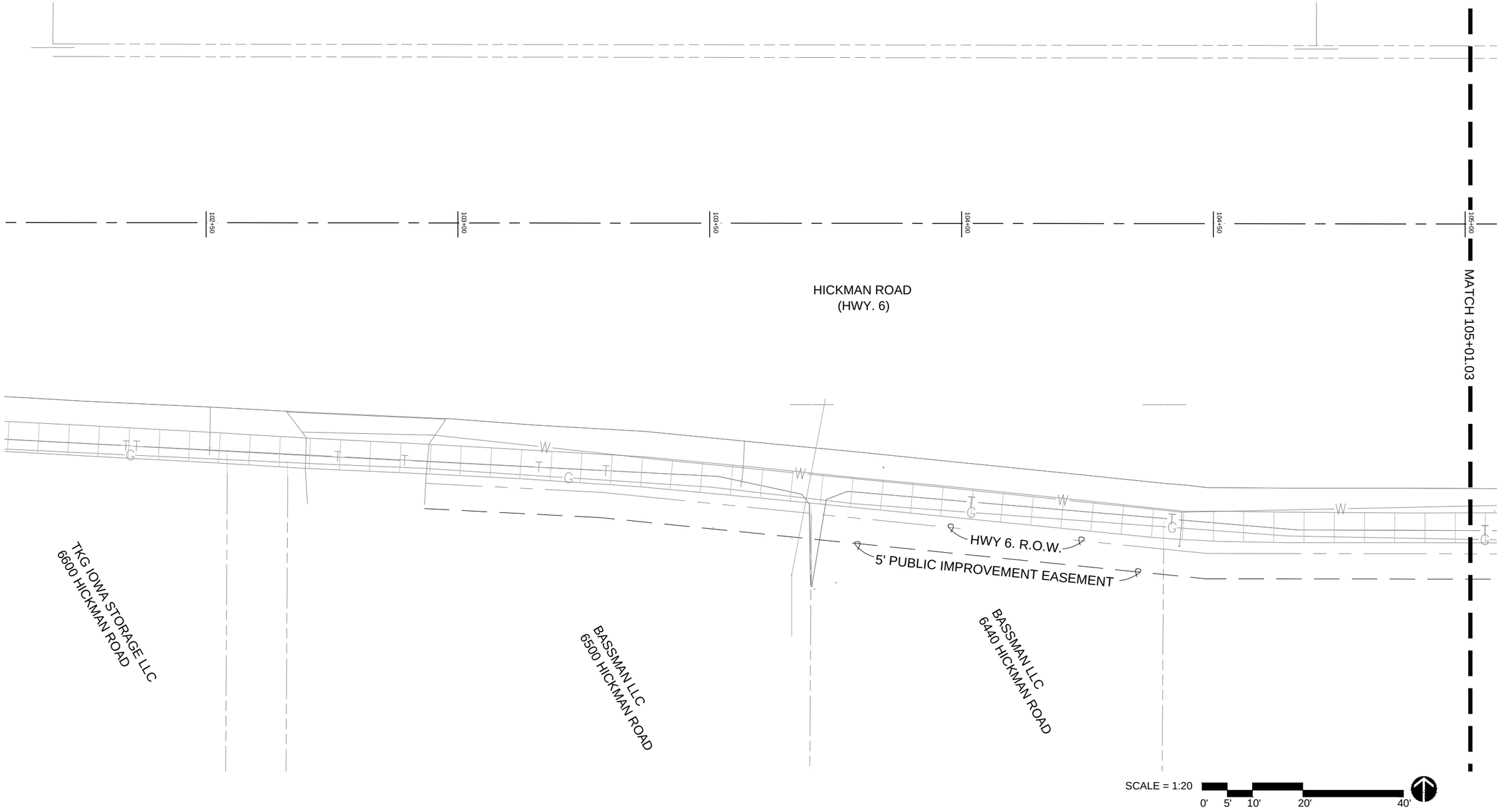


01 KEY PLAN

SITE SURVEY NOTES:

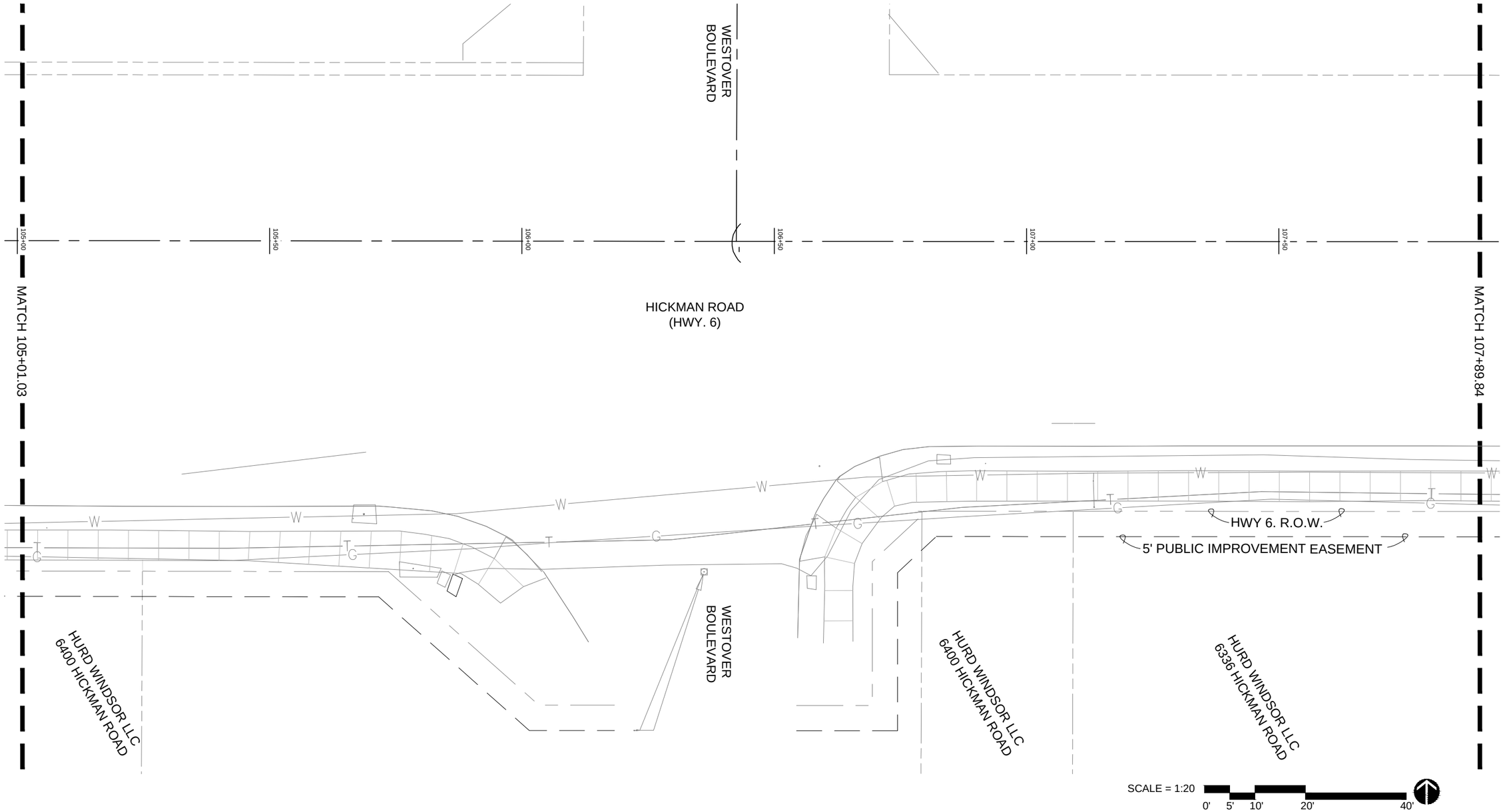
1. BOUNDARY AND TOPOGRAPHIC INFORMATION TAKEN FROM SURVEY ARE PREPARED BY:

   VEENSTRA & KIMM, INC.
   3000 WESTOWN PARKWAY
   WEST DES MOINES, IOWA 50266-1320
   P: 515.225.8000
   800.241.8000
   F: 515.225.7848



01 SURVEY PLAN

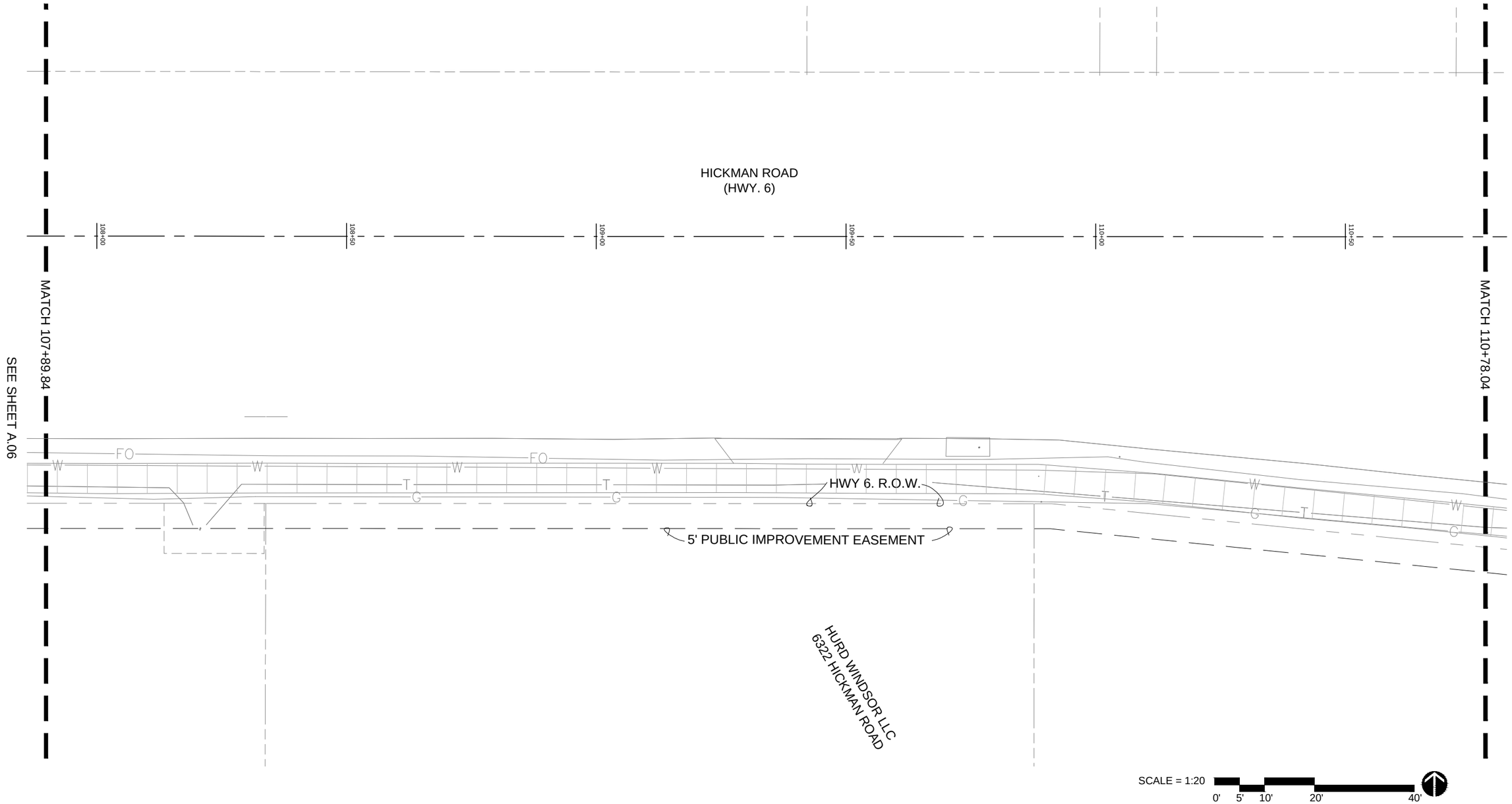
PROJECT	HICKMAN ROAD STREETSCAPE	DESIGN TEAM	CONFLUENCE bluestone engineering	COUNTY	POLK	PROJECT NUMBER	TAP-T-8477(613)--8V-77	SHEET TITLE	SURVEY	SHEET NUMBER	A.05



01 SURVEY PLAN

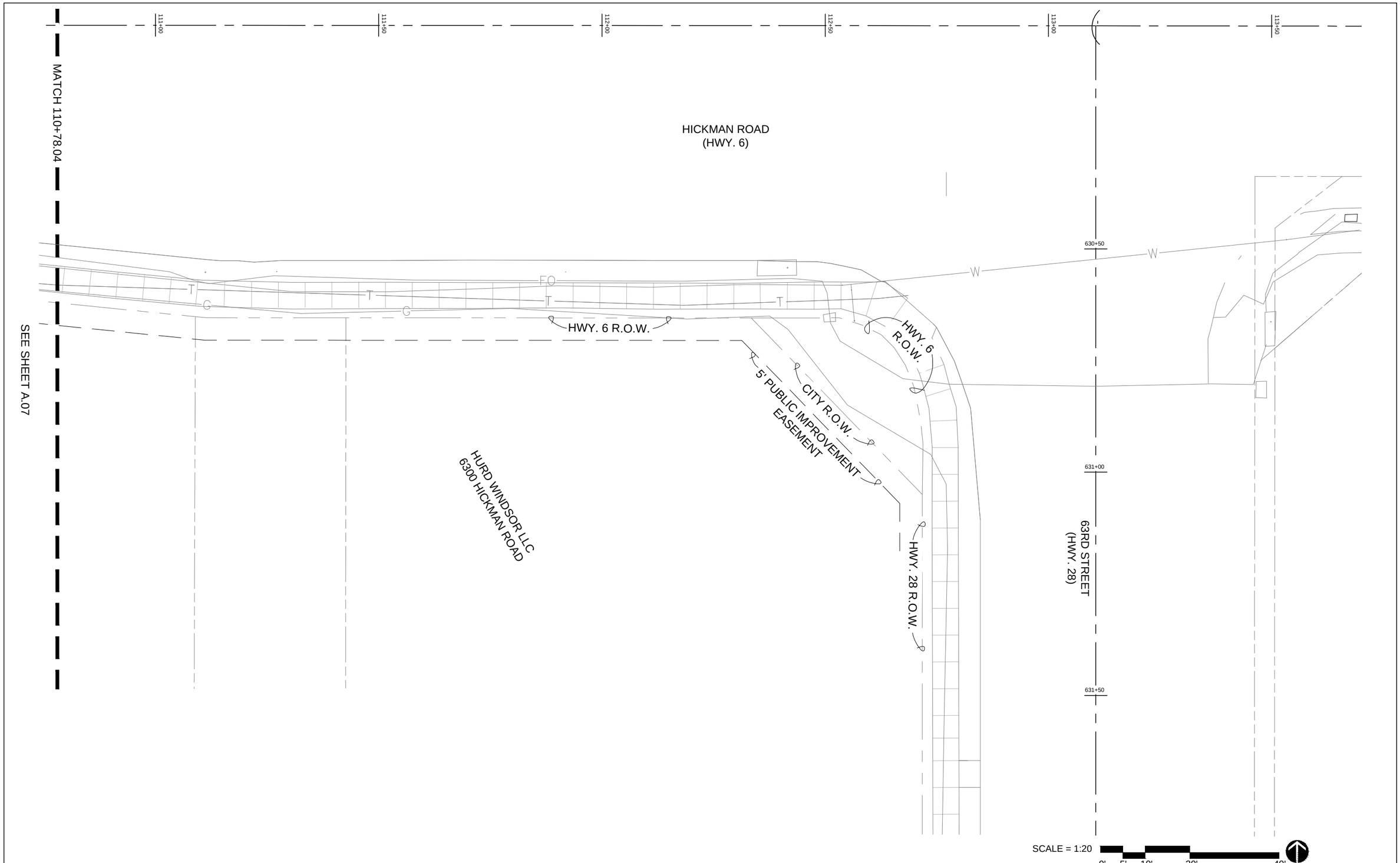
PROJECT	HICKMAN ROAD STREETSCAPE	DESIGN TEAM	CONFLUENCE bluestone engineering	COUNTY	POLK	PROJECT NUMBER	TAP-T-8477(613)--8V-77	SHEET TITLE	SURVEY	SHEET NUMBER	A.06

02-17-2015 - FINAL PLANS & PDC - NOT FOR CONSTRUCTION



01 SURVEY PLAN

PROJECT	HICKMAN ROAD STREETSCAPE	DESIGN TEAM	CONFLUENCE bluestone engineering	COUNTY	POLK	PROJECT NUMBER	TAP-T-8477(613)--8V-77	SHEET TITLE	SURVEY	SHEET NUMBER	A.07



01 SURVEY PLAN

PROJECT	HICKMAN ROAD STREETSCAPE	DESIGN TEAM	CONFLUENCE bluestone engineering	COUNTY	POLK	PROJECT NUMBER	TAP-T-8477(613)--8V-77	SHEET TITLE	SURVEY	SHEET NUMBER	A.08

02-17-2015 - FINAL PLANS & PDC - NOT FOR CONSTRUCTION

ESTIMATED ROADWAY QUANTITIES **Run Date: 2/17/2015**

Project Number: TAP-T-8477(613)--8V-77

Item No.	Item Code	Item	Unit	Quantity
1	2101-0850001	CLEARING AND GRUBBING	ACRE	0.2
2	2111-8174100	GRANULAR SUBBASE	SY	37
3	2401-7207010	REMOVAL OF CONCRETE	SY	24
4	2511-7526006	SIDEWALK, P.C. CONCRETE, 6 IN.	SY	30
5	2523-0000100	LIGHTING POLES	EACH	21
6	2523-0000400	CONTROL CABINET	EACH	1
7	2526-8285000	CONSTRUCTION SURVEY	LS	1
8	2528-8445110	TRAFFIC CONTROL	LS	1
9	2533-4980005	MOBILIZATION	LS	1
10	2599-9999003	('CUBIC YARDS' ITEM) CONCRETE FOOTING	CY	10
11	2599-9999003	('CUBIC YARDS' ITEM) GATEWAY SIGN FOOTING EXCAVATION	CY	10
12	2599-9999003	('CUBIC YARDS' ITEM) PLANTING SOIL MIX	CY	4
13	2599-9999005	('EACH' ITEM) BENCH	EACH	1
14	2599-9999005	('EACH' ITEM) CABINET FOUNDATION	EACH	1
15	2599-9999005	('EACH' ITEM) DISCONNECT SWITCH	EACH	1
16	2599-9999005	('EACH' ITEM) ELECTRICAL ENCLOSURE	EACH	1
17	2599-9999005	('EACH' ITEM) GROUND ROD	EACH	22
18	2599-9999005	('EACH' ITEM) HANDHOLE	EACH	2
19	2599-9999005	('EACH' ITEM) POLE BASE	EACH	21
20	2599-9999005	('EACH' ITEM) RELOCATE FIRE HYDRANT	EACH	1
21	2599-9999005	('EACH' ITEM) S2 FIXTURE TYPE	EACH	3
22	2599-9999005	('EACH' ITEM) S3 FIXTURE TYPE	EACH	9
23	2599-9999005	('EACH' ITEM) SOLAR PANEL ASSEMBLY	EACH	1
24	2599-9999005	('EACH' ITEM) TRASH RECEPTACLE	EACH	1
25	2599-9999009	('LINEAR FEET' ITEM) 1 1/4" PVC CONDUIT	LF	945
26	2599-9999009	('LINEAR FEET' ITEM) 1" PVC CONDUIT	LF	945
27	2599-9999009	('LINEAR FEET' ITEM) 2" PVC CONDUIT	LF	27
28	2599-9999009	('LINEAR FEET' ITEM) 3/4" RIGID METAL CONDUIT	LF	30
29	2599-9999009	('LINEAR FEET' ITEM) 6" PCC CONCRETE, EDGER	LF	85
30	2599-9999009	('LINEAR FEET' ITEM) BORE	LF	160
31	2599-9999009	('LINEAR FEET' ITEM) ELECTRICAL CIRCUITS - #2 THWN COPPER CON	LF	27
32	2599-9999009	('LINEAR FEET' ITEM) ELECTRICAL CIRCUITS - #4 THWN COPPER CON	LF	2730
33	2599-9999009	('LINEAR FEET' ITEM) ELECTRICAL CIRCUITS - #6 THWN COPPER CON	LF	2836
34	2599-9999009	('LINEAR FEET' ITEM) ELECTRICAL CIRCUITS - #8 THWN COPPER CON	LF	2730
35	2599-9999009	('LINEAR FEET' ITEM) TRENCH	LF	785
36	2599-9999010	('LUMP SUM' ITEM) DECORATIVE MASONRY PANEL	LS	1
37	2599-9999010	('LUMP SUM' ITEM) METAL SIGNAGE LETTERS	LS	1
38	2599-9999010	('LUMP SUM' ITEM) SITE CLEANUP	LS	1
39	2599-9999014	('SQUARE FEET' ITEM) BRICK VENEER	SF	150
40	2599-9999014	('SQUARE FEET' ITEM) MASONRY CAPSTONE	SF	75
41	2599-9999014	('SQUARE FEET' ITEM) PAVERS	SF	200
42	2599-9999014	('SQUARE FEET' ITEM) STONE VENEER	SF	115
43	2599-9999018	('SQUARE YARDS' ITEM) PAVER SUBBASE	SY	7
44	2601-2639010	SODDING	SQ	77
45	2601-2643110	WATERING FOR SOD, SPECIAL DITCH CONTROL, OR SLOPE PROTECTION	MGAL	45
46	2610-0000120	TREES	EACH	9
47	2610-0000180	FLOWERS, AS PER PLAN	LS	1
48	2610-0000212	MULCH, SHREDDED BARK	CY	2
49	2611-0000100	SHRUBS, FURNISHED AND INSTALLED (WITH WARRANTY)	EACH	6

ESTIMATE REFERENCE INFORMATION **Run Date: 2/17/2015**

Data listed below is for informational purposes only and shall not constitute a basis for any extra work orders.

No ITEM NUMBER **DESCRIPTION**

1 2101-0850001 CLEARING AND GRUBBING

Includes all labor, materials and associated costs to properly clear and grub the construction limits for the project. Any items cleared as a result of the contractors actions that are not included in the plans for removal are done so at his own risk. See 'D' sheets for limits of removal.

---

2 2111-8174100 GRANULAR SUBBASE

Includes all labor, materials, and excavation necessary for the granular subbase under all new walks, footings, and PCC Edger. See 'I' Sheets for location, typical detail references, and notes.

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3 2401-7207010 REMOVAL OF CONCRETE

Include all labor, materials, excavation, haul-away and disposal of existing concrete drive. Approximately 6" thick. Method of measurement and basis-of-payment shall be per square yard of existing concrete removed.

---

4 2511-7526006 SIDEWALK, P.C. CONCRETE, 6 IN.

Includes all labor, material, certified plant inspections, excavation to furnish and install the new PCC walks. Reference 'I' Sheets for locations, detail references, and notes.

---

5 2523-0000100 LIGHTING POLES

4" diameter pole with decorative base cover. 10' height with decorative LED post top fixture. Refer to E series drawings for additional information.

---

6 2523-0000400 CONTROL CABINET

---

7 2526-8285000 CONSTRUCTION SURVEY

Includes all work necessary for the layout and staking of all site improvements.

---

8 2528-8445110 TRAFFIC CONTROL

For the placement and removal of all traffic and pedestrian control devices. Traffic control devices, procedures, layouts, signing, and pavement markings installed within the limits of this project shall conform to the "Manual of Uniform Traffic control Devices for Streets and Highways" as adopted by the department per 761 of the Iowa Administrative Code (IAC) Chapter 130.

---

9 2533-4980005 MOBILIZATION

---

10 2599-9999003 ('CUBIC YARDS' ITEM) CONCRETE FOOTING

Includes all labor, materials, and associated costs to install the cast-in-place concrete footing for the gateway sign. See 'I' Sheets for location, typical detail references, and notes. Method of measurement and basis-of-payment shall be per cubic yard of footing.

---

11 2599-9999003 ('CUBIC YARDS' ITEM) GATEWAY SIGN FOOTING EXCAVATION

Includes all labor, materials and associated costs to excavate for the footing of the gateway sign. See 'I' Sheets for location, typical detail references, and notes. Method of measurement and basis-of-payment shall per cubic yard of soil excavated.

---

12 2599-9999003 ('CUBIC YARDS' ITEM) PLANTING SOIL MIX

Includes all labor, materials, and associated costs, to furnish and install the amended planting soils. See 'I' Sheets for location, typical detail references, soil mix design, and notes. Method of measurement and basis-of-payment shall per cubic yard of planting soil installed.

---

13 2599-9999005 ('EACH' ITEM) BENCH

Includes all labor, materials, and associated costs, to furnish and install a bench. See 'I' Sheets for location. All work and hardware necessary to affix the bench to the concrete will be considered incidental. Method of measurement and basis-of-payment shall be per bench installed. Available bench manufacturers:

Scarborough bench ,backed, 72 inches, strap, surface mounted, Color: Black, manufactured by Landscapeforms Inc.

Chamber Bench, 72 inch, aluminum slats, surface mount, Color: Black as manufactured by Forms and Surfaces Inc.

Bench160, 72" long, surface mount, Color: Black, as manufactured by Dumor Inc.

---

14 2599-9999005 ('EACH' ITEM) CABINET FOUNDATION

Includes all materials and labor for installation of controls cabinet foundation. Base to be constructed following installation instructions from the controls cabinet manufacturer. Conduit to stubbed up through concrete base into the controls cabinet. Refer to detail drawings in the E series for additional information Method of measurement and basis-of-payment shall per cabinet foundation installed.

---

15 2599-9999005 ('EACH' ITEM) DISCONNECT SWITCH

Nema 3R enclosure 30A disconnect switch. Switch to be labeled to indicate that it is a disconnect means to isolate the PV system. Disconnect switch to be mounted so that it has 24 hour accessibility. Method of measurement and basis-of-payment shall per disconnect switch installed.

---

16 2599-9999005 ('EACH' ITEM) ELECTRICAL ENCLOSURE

20"X16"X6" NEMA 4 rated steel enclosure. Includes lockabel handle. Enclosure is recessed into brick monument. Hinged door.

---

17 2599-9999005 ('EACH' ITEM) GROUND ROD

5/8" x 8' ground rod Method of measurement and basis-of-payment shall per ground rod installed.

---

18 2599-9999005 ('EACH' ITEM) HANDHOLE

11"x17" minimum in-grade handhole. Method of measurement and basis-of-payment shall per handhole installed.

---

19 2599-9999005 ('EACH' ITEM) POLE BASE

Concrete pole base, includes reinforcing steel. Conduit to be stubbed up through pole base foundation into pole. Method of measurement and basis-of-payment shall per pole base installed.

---

20 2599-9999005 ('EACH' ITEM) RELOCATE FIRE HYDRANT

Provide all material, labor, and equipment to relocate existing fire hydrant, including 6" DI, piping fittings as required, tracer wire with receptacle post, excavation, pipe bedding, polyethylene encasement, thrust restraint as necessary, backfill, compaction, pressure testing, and disinfection in accordance with Special Provisions for Water Main. The engineer will count the number of fire hydrants relocated. The contractor will be paid the contract unit price for each fire hydrant relocated.

---

21 2599-9999005 ('EACH' ITEM) S2 FIXTURE TYPE

4' linear in grade fixture. Refer to P Sheets for additional information. Method of measurement and basis-of-payment shall per S2 Fixture installed.

---

22 2599-9999005 ('EACH' ITEM) S3 FIXTURE TYPE

LED linear strip fixture. Remote driver to be mounted in enclosure on back of monument. Refer to P Sheets for additional information. Method of measurement and basis-of-payment shall per S3 Fixture installed.

---

23 2599-9999005 ('EACH' ITEM) SOLAR PANEL ASSEMBLY

Assembly to include solar array, inverter, and custom racking. All electrical components are to be fully concealed and protected by a wire mesh enclosure. Solar panel is to be facing Southwest at a 35 degree angle. Coordinate installation with architect. Refer to E series drawings for additional information. Method of measurement and basis-of-payment shall per solar panel assembly installed.

---

24 2599-9999005 ('EACH' ITEM) TRASH RECEPTACLE

Includes all labor, materials, and associated costs, to furnish and install the trash receptacle See 'I' Sheets for location, typical detail references, and notes. All work and hardware necessary to affix the trash receptacle to the concrete will be considered incidental. Method of measurement and basis-of-payment shall per trash receptacle installed .

Available trash receptacle manufactures:

Scarborough Trash Receptacle, surface mount, Color: Black, as manufactured by Landscape Forms Inc.

Dispatch Litter a & Recycling Receptacle, surface mount, Color: Black, as manufactured by Forms and Surfaces Inc.

Receptacle 107, surface mount, Color: Black, as manufactured by Dumor Inc.

---

25 2599-9999009 ('LINEAR FEET' ITEM) 1 1/4" PVC CONDUIT

1 1/4" Schedule 40 PVC conduit. (Schedule 80 required under all road and commercial driveway crossings. Method of measurement and basis-of-payment shall per lineal foot of 1 1/4" PVC conduit installed.

---

26 2599-9999009 ('LINEAR FEET' ITEM) 1" PVC CONDUIT

1" Schedule 40 PVC conduit. (Schedule 80 required under all road and commercial driveway crossings. Method of measurement and basis-of-payment shall per lineal foot of 1" PVC conduit installed.

---

27 2599-9999009 ('LINEAR FEET' ITEM) 2" PVC CONDUIT

2" Schedule 40 PVC conduit. (Schedule 80 required under all road and commercial driveway crossings. Method of measurement and basis-of-payment shall per lineal foot of 2" PVC conduit installed.

---

28 2599-9999009 ('LINEAR FEET' ITEM) 3/4" RIGID METAL CONDUIT

Include fittings and junction boxes. Method of measurement and basis-of-payment shall per lineal foot of 3/4" rigid metal conduit installed.

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29 2599-9999009 ('LINEAR FEET' ITEM) 6" PCC CONCRETE, EDGER

Includes all work necessary for the installation of new PCC edger. Includes all locations around pavers and behind gateway sign. Reference 'I' Sheets for locations, detail references, and notes. Method of measurement and basis-of-payment shall per lineal foot of concrete edger installed.

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30 2599-9999009 ('LINEAR FEET' ITEM) BORE

Bore 2" conduit under existing streets and driveways. Minimum 24" depth. Coordinate with local utilities to prevent damaging existing lines. Include tracer wire and caution tape. Method of measurement and basis-of-payment shall per lineal foot of bore installed.

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31 2599-9999009 ('LINEAR FEET' ITEM) ELECTRICAL CIRCUITS - #2 THWN COPPER CON

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32 2599-9999009 ('LINEAR FEET' ITEM) ELECTRICAL CIRCUITS - #4 THWN COPPER CON

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33 2599-9999009 ('LINEAR FEET' ITEM) ELECTRICAL CIRCUITS - #6 THWN COPPER CON

- -

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34 2599-9999009 ('LINEAR FEET' ITEM) ELECTRICAL CIRCUITS - #8 THWN COPPER CON

- -

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35 2599-9999009 ('LINEAR FEET' ITEM) TRENCH

Minimum 24" depth trench for 2" PVC conduit. Coordinate with local utilities to prevent damaging existing lines. Include tracer wire and caution tape. Method of measurement and basis-of-payment shall per lineal foot of trenching completed.

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36 2599-9999010 ('LUMP SUM' ITEM) DECORATIVE MASONRY PANEL

Includes all labor, materials, and associated costs, to furnish, and install the decorative masonry panel. See 'I' Sheets for location, typical detail references, and notes. Decorative Masonry Panel to be designed and fabricated by RDG Dahlquist Art Studio, 316 SW 5th Street, Des Moines, IA 50309. Contact: Don Scandrett 515-284-1675. Method of measurement and basis-of-payment shall be lump sum per Decorative Masonry Panel installed. Decorative Masonry Panel lighting is a separate bid item but coordination with this item will be required.

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37 2599-9999010 ('LUMP SUM' ITEM) METAL SIGNAGE LETTERS

Includes all labor, materials, and associated costs, to furnish and install the stainless steel signage letters. See 'I' Sheets for location, typical detail references, and notes. See Special Provisions for metal letter specifications. Method of measurement and basis-of-payment shall be lump sum for the installation of all metal letters.

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38 2599-9999010 ('LUMP SUM' ITEM) SITE CLEANUP

Includes all labor and material for power washing, cleaning, re-seeding of all PCC sidewalks, gateway sign, and paver areas. To be completed upon completion of the project by Contractor. Method of measurement and basis-of-payment shall be lump sum for the entire site cleanup per the Owners satisfaction.

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39 2599-9999014 ('SQUARE FEET' ITEM) BRICK VENEER

Includes all labor, materials, and associated costs, to furnish and install the brick veneer on the gateway sign. See 'I' Sheets for location, typical detail references, and notes. See Special Provisions for available brick manufacturers. All CMU core construction, reinforcing, mortar, fasteners, weather proofing considered incidental to the work. Method of measurement and basis-of-payment shall per square foot of brick installed.

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40 2599-9999014 ('SQUARE FEET' ITEM) MASONRY CAPSTONE

Includes all labor, materials, and associated costs, to furnish and install the limestone capstones for the gateway sign. See 'I' Sheets for location, typical detail references, and notes. See Special Provisions for available cut stone manufacturers. Method of measurement and basis-of-payment shall per square foot of masonry capstone installed.

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41 2599-9999014 ('SQUARE FEET' ITEM) PAVERS

Includes all labor, materials, excavation, and associated costs, to furnish and install the decorative pavers. See 'I' Sheets for location, typical detail references, and notes. See Special Provisions for available paver manufacturers. Polymeric sand considered incidental to the installation. Method of measurement and basis-of-payment shall per square foot of pavers installed.

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42 2599-9999014 ('SQUARE FEET' ITEM) STONE VENEER

Includes all labor, materials, and associated costs, to furnish and install the limestone stone veneer for the gateway sign. See 'I' Sheets for location, typical detail references, and notes. See Special Provisions for available cut stone veneer manufacturers. Method of measurement and basis-of-payment shall per square foot of stone veneer installed.

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43 2599-9999018 ('SQUARE YARDS' ITEM) PAVER SUBBASE

Includes all labor, materials, excavation, and associated costs, to furnish and install the paver subbase. See 'I' Sheets for location, typical detail references, and notes. Method of measurement and basis-of-payment shall per square yard of sub base installed.

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44 2601-2639010 SODDING

For the placement of sod. All disturbed areas shall be sodded upon completion of grading operations to prevent soil erosion. Sod mixture shall be as follows: Bluegrass, Kentucky 70%; Ryegrass, Perennial (Fine leaf Variety) 10%; Fescue, Creeping Red; 20%. Area calculated by measuring disturbed areas within construction limits. Method of payment will be based on per square basis. All work and materials necessary to install sod as well as prep work will be considered incidental.

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45 2601-2643110 WATERING FOR SOD, SPECIAL DITCH CONTROL, OR SLOPE PROTECTION

For the watering of sod. Quantity assumes three (4) separate watering's at 300 gallons per square per watering.

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46 2610-0000120 TREES

Kind, size, and quality of plant material shall conform to the American Standard for Nursery Stock, ANSI Z60.1 - 2004, or most recent edition. See 'I' Sheets for plant schedule and plant locations. Method of measurement and basis of payment shall be per plant installed and includes plant pit excavation, backfill material, amended planting soils, mulch, and fertilizer. Refer to standard road plan IC 501 for installation details. All Plants to have one year warranty.

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47 2610-0000140 FLOWERS, AS PER PLAN

Kind, size, and quality of plant material shall conform to the American Standard for Nursery Stock, ANSI Z60.1 - 2004, or most recent edition. See 'I' Sheets for plant schedule and plant locations. Method of measurement and basis of payment shall be lump sum and includes plants, plant pit excavation, backfill material, amended planting soils, and fertilizer. Refer to standard road plan IC-501 for installation details. All Plants to have a one year warranty.

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48 2610-0000212 MULCH, SHREDDED BARK

Includes all labor, and materials to mulch the perennial planting bed adjacent to the gateway sign. Method of measurement and basis-of-payment shall be per square feet of mulch installed. See 'I' Sheets for location, typical detail references and notes.

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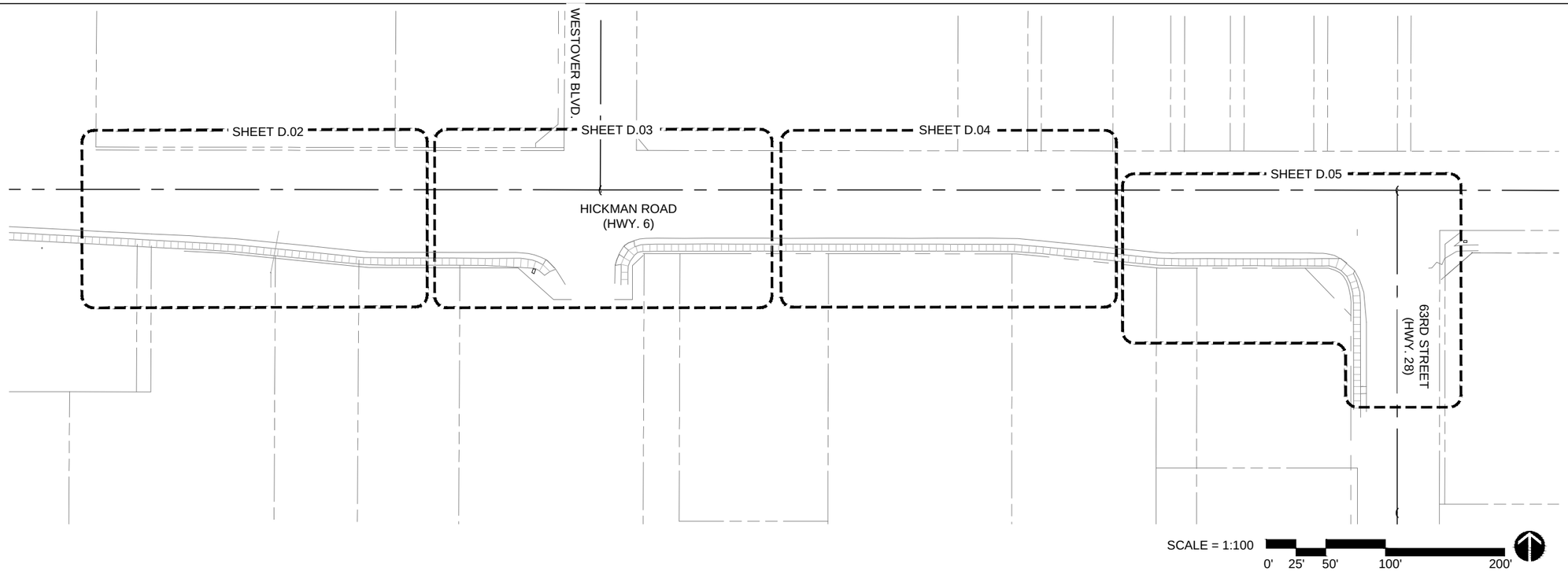
49 2611-0000100 SHRUBS, FURNISHED AND INSTALLED (WITH WARRANTY)

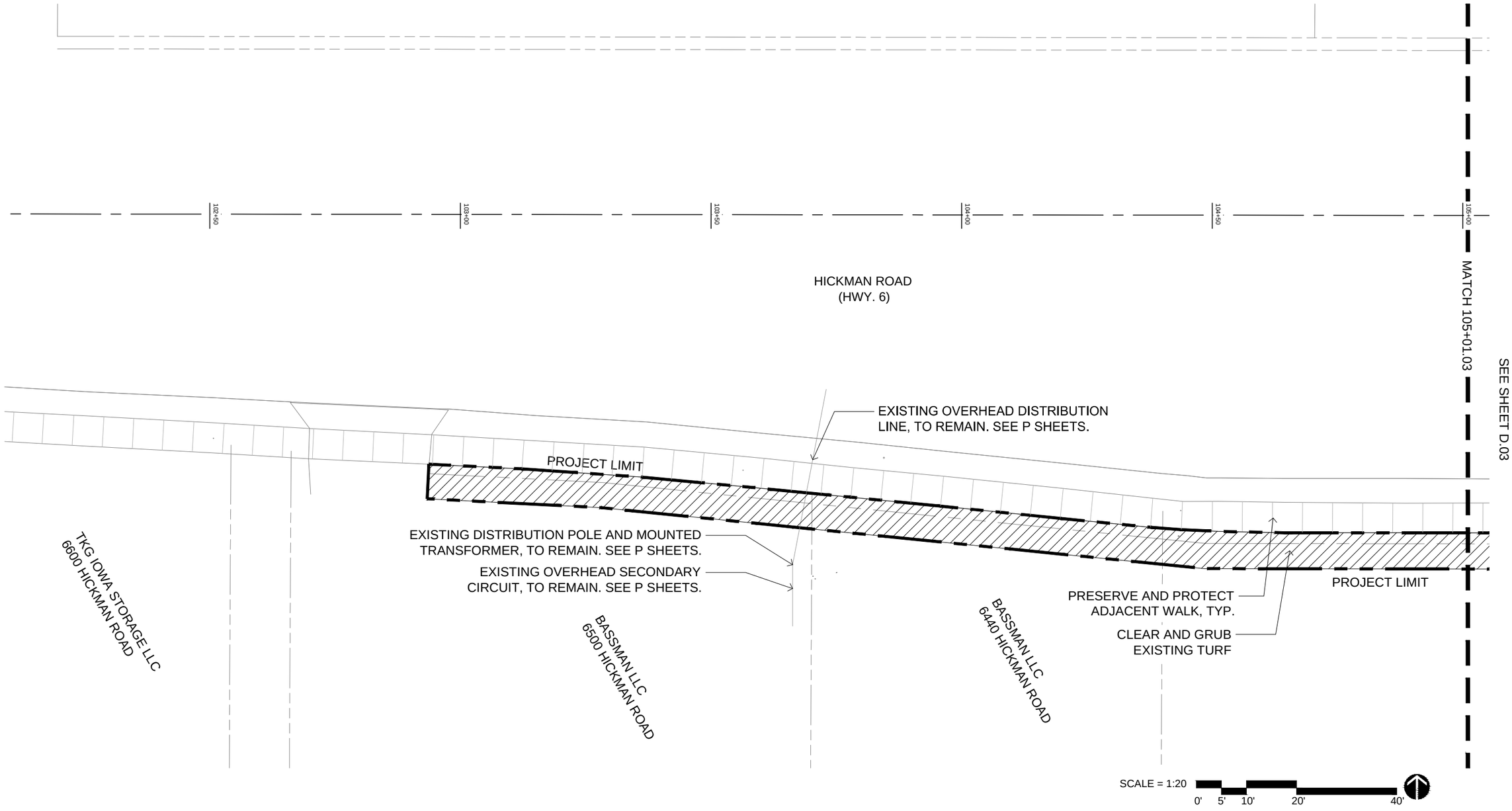
Kind, size, and quality of plant material shall conform to the American Standard for Nursery Stock, ANSI Z60.1 - 2004, or most recent edition. See 'I' Sheets for plant schedule and plant locations. Method of measurement and basis of payment shall be per plant installed and includes plant pit excavation, backfill material, amended planting soils, mulch, and fertilizer. Refer to standard road plan IC-501 for installation details. All Plants to have one year warranty per Iowa Department of Transportation Specifications.



01 KEY PLAN

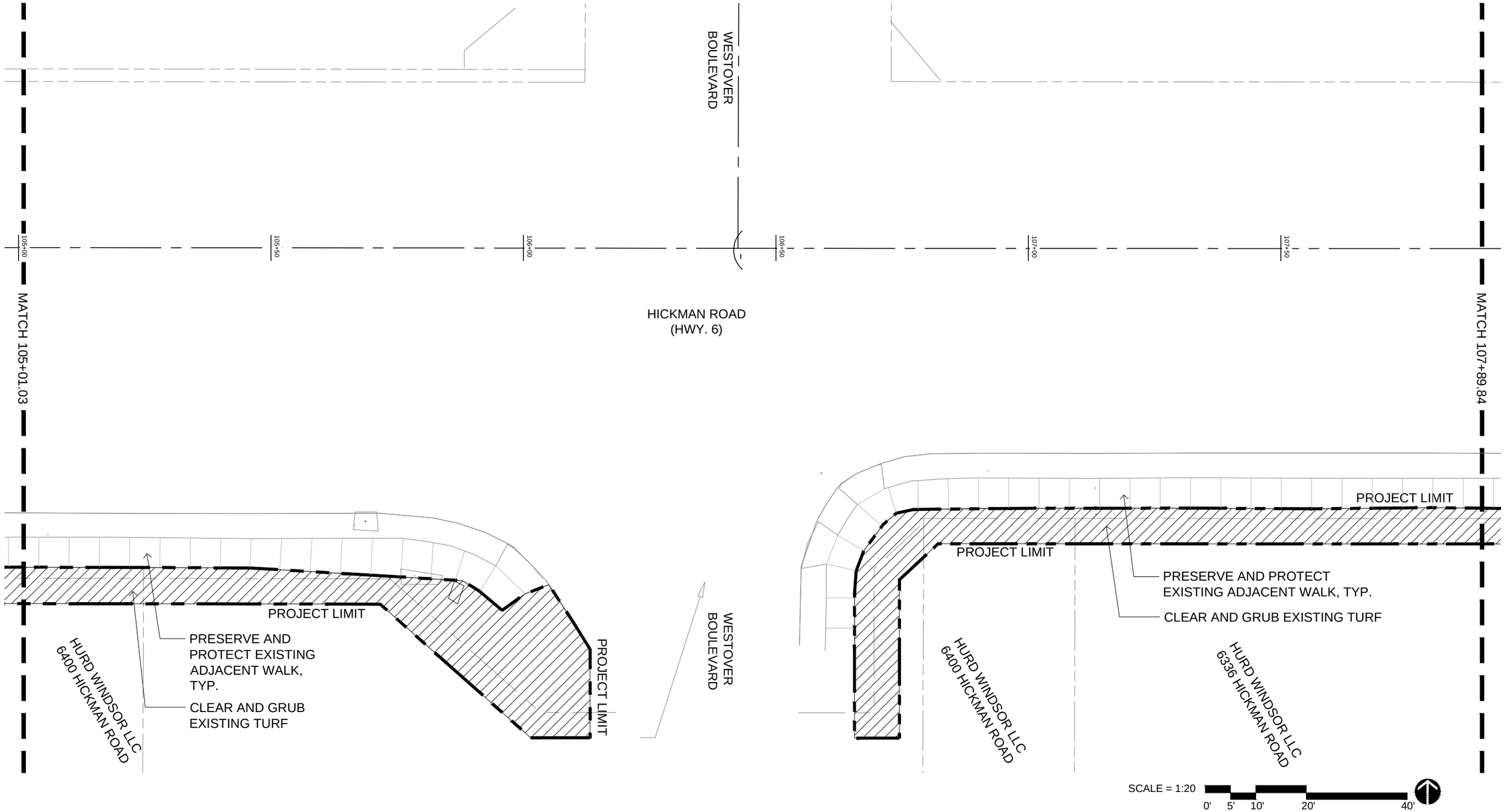
GENERAL DEMO NOTES:

1. CONTRACTOR TO COORDINATE REMOVAL AND/OR STORAGE AND REPLACEMENT OF BARRICADES WITH THE CITY OF WINDSOR HEIGHTS.
2. PRIOR TO ANY EXCAVATION AT THE SITE, CONTRACTOR SHALL EXAMINE ANY APPLICABLE DRAWINGS AVAILABLE FROM THE OWNER AND/OR THE LANDSCAPE ARCHITECT, AND CONSULT WITH OWNER'S PERSONNEL AND UTILITY COMPANIES REPRESENTATIVES TO DETERMINE POSSIBLE UTILITY LOCATIONS AND DEPTHS. NO COMPENSATION WILL BE ALLOWED FOR DAMAGE RESULTING FROM FAILURE TO COMPLY WITH THIS REQUIREMENT.
3. CONTRACTOR TO FIELD ADJUST ALL EXISTING SITE UTILITIES TO NEW FINISH GRADES IF NECESSARY. EXISTING UTILITIES INCLUDE, BUT ARE NOT LIMITED TO FIRE HYDRANTS, MANHOLE RIMS, INLETS, WATER VALVES AND LIGHT BASES.
4. THE CONTRACTOR SHALL VERIFY THE LOCATION AND PROTECT ALL UTILITIES, CONDUIT, LINES, POLES, TREES, PAVING, BUILDING AND OTHER SITE STRUCTURES PRIOR TO DEMOLITION OR CONSTRUCTION AND IMMEDIATELY INFORM THE LANDSCAPE ARCHITECT OF ANY DISCREPANCIES.
5. PRIOR TO REMOVING ANY PLANT MATERIAL NOT INDICATED TO BE PROTECTED OR REMOVED CONTACT THE LANDSCAPE ARCHITECT.
6. PROTECT ALL ITEMS WITHIN CONTRACT LIMITS NOT INDICATED TO BE REMOVED. NOTIFY THE LANDSCAPE ARCHITECT OF ANY DISCREPANCIES.
7. REPORT TO OWNER'S REPRESENTATIVE ANY DAMAGE TO EXISTING UTILITIES PRIOR TO REPAIR.
8. ALL WORK SHALL BE IN ACCORDANCE WITH OSHA CODES AND STANDARDS. NOTHING INDICATED ON THESE DRAWINGS SHALL RELIEVE THE CONTRACTOR FROM COMPLYING WITH ANY APPROPRIATE SAFETY REGULATIONS.



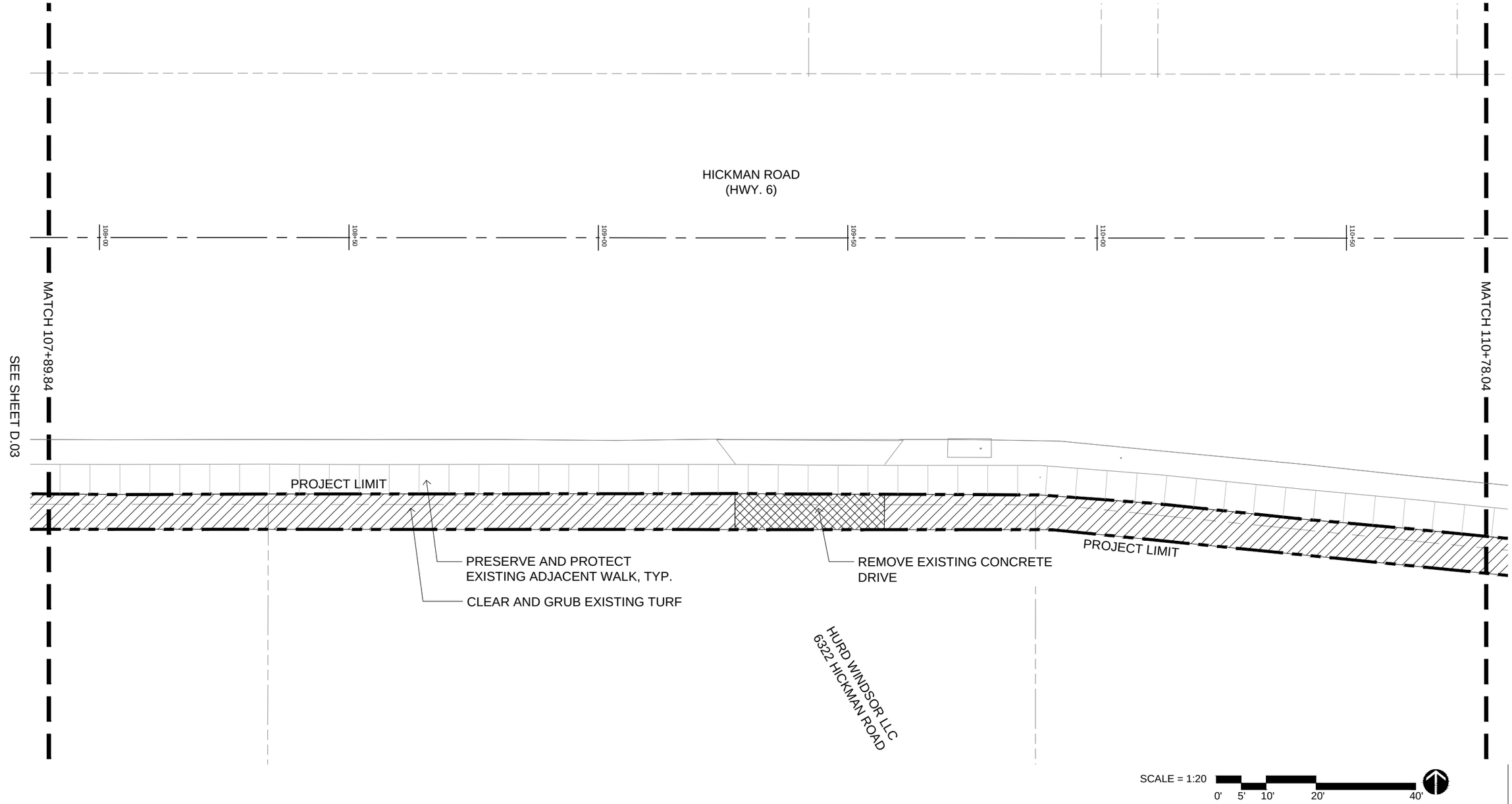
01 DEMO PLAN

PROJECT	HICKMAN ROAD STREETSCAPE	DESIGN TEAM	CONFLUENCE bluestone engineering	COUNTY	POLK	PROJECT NUMBER	TAP-T-8477(613)--8V-77	SHEET TITLE	DEMO PLAN	SHEET NUMBER	D.02



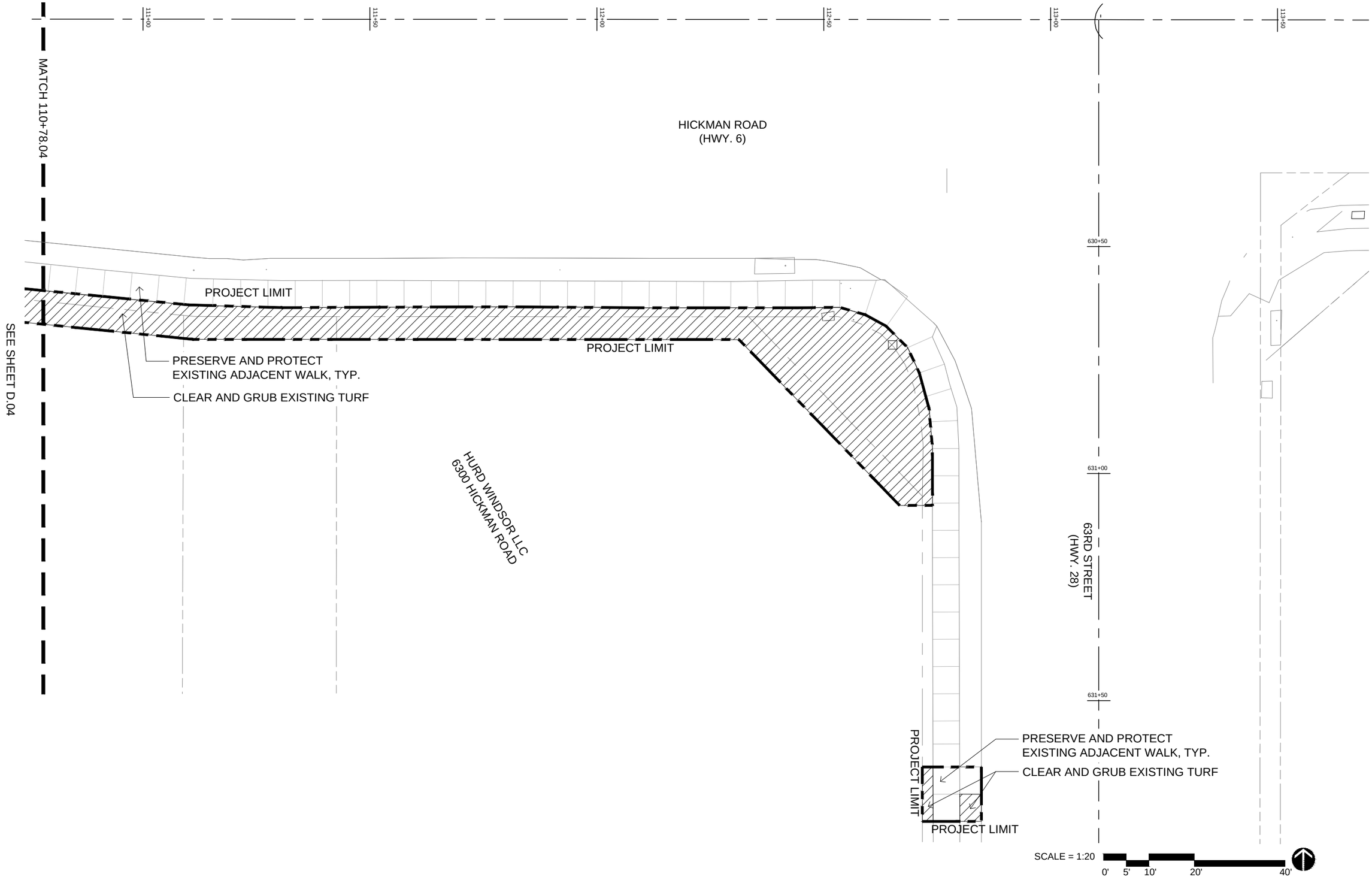
01 DEMO PLAN

PROJECT	HICKMAN ROAD STREETSCAPE	DESIGN TEAM	CONFLUENCE bluestone engineering	COUNTY	POLK	PROJECT NUMBER	TAP-T-8477(613)--8V-77	SHEET TITLE	DEMO PLAN	SHEET NUMBER	D.03



01 DEMO PLAN

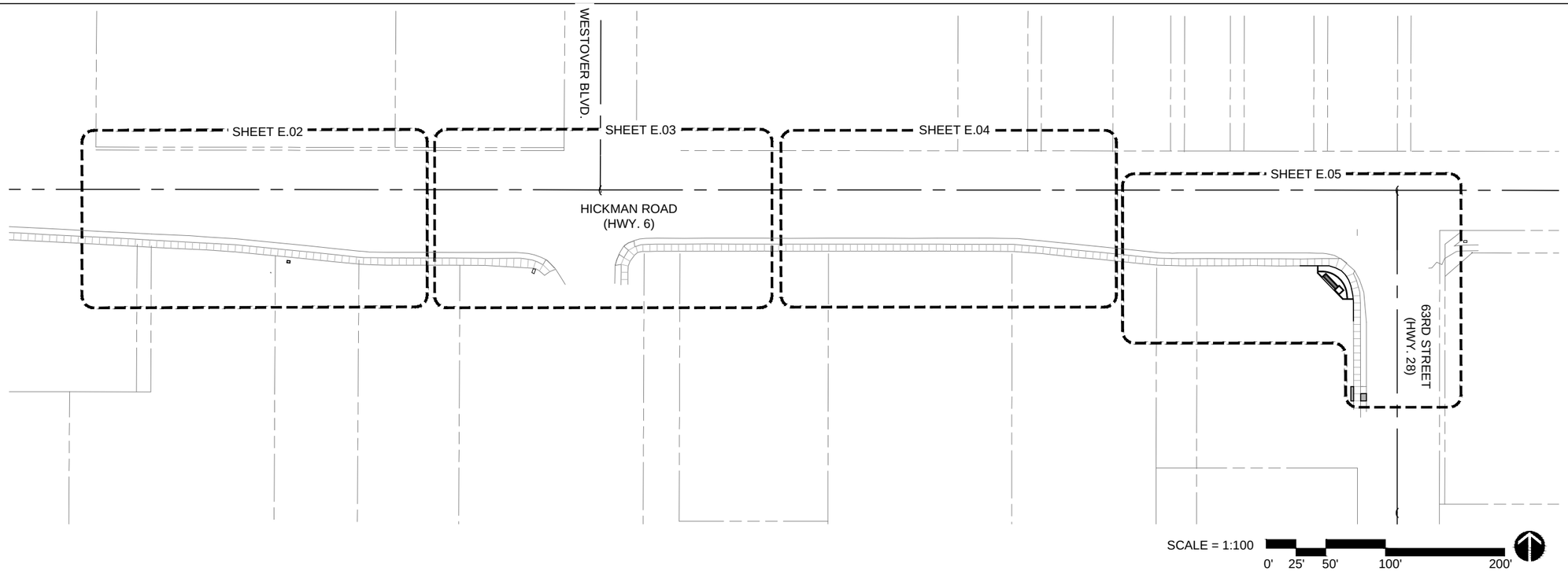
PROJECT	HICKMAN ROAD STREETSCAPE	DESIGN TEAM	CONFLUENCE bluestone engineering	COUNTY	POLK	PROJECT NUMBER	TAP-T-8477(613)--8V-77	SHEET TITLE	DEMO PLAN	SHEET NUMBER	D.04



01 DEMO PLAN

PROJECT	HICKMAN ROAD STREETSCAPE	DESIGN TEAM	CONFLUENCE bluestone engineering	COUNTY	POLK	PROJECT NUMBER	TAP-T-8477(613)--8V-77	SHEET TITLE	DEMO PLAN	SHEET NUMBER	D.05

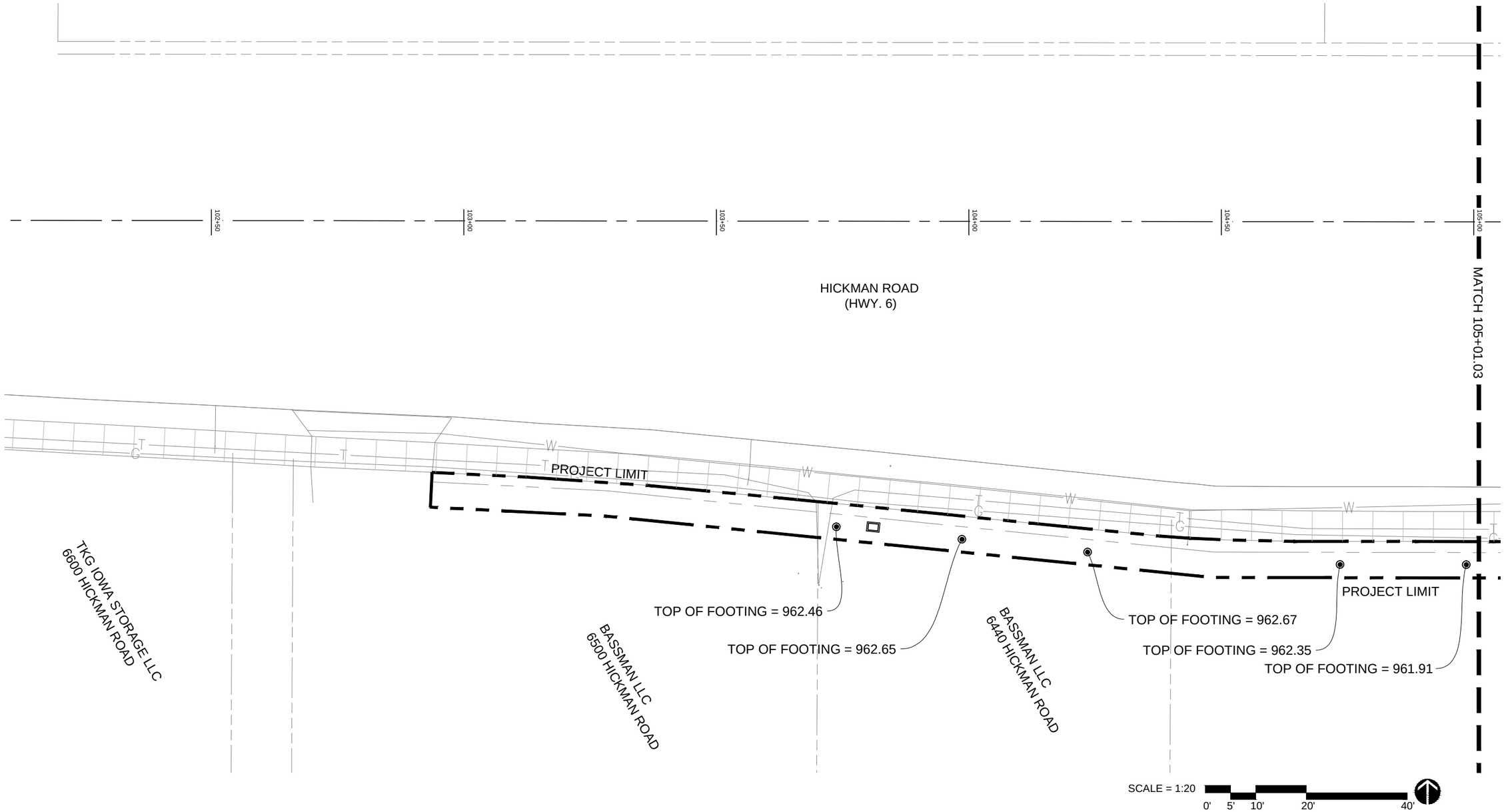
02-17-2015 - FINAL PLANS & PDC - NOT FOR CONSTRUCTION



01 KEY PLAN

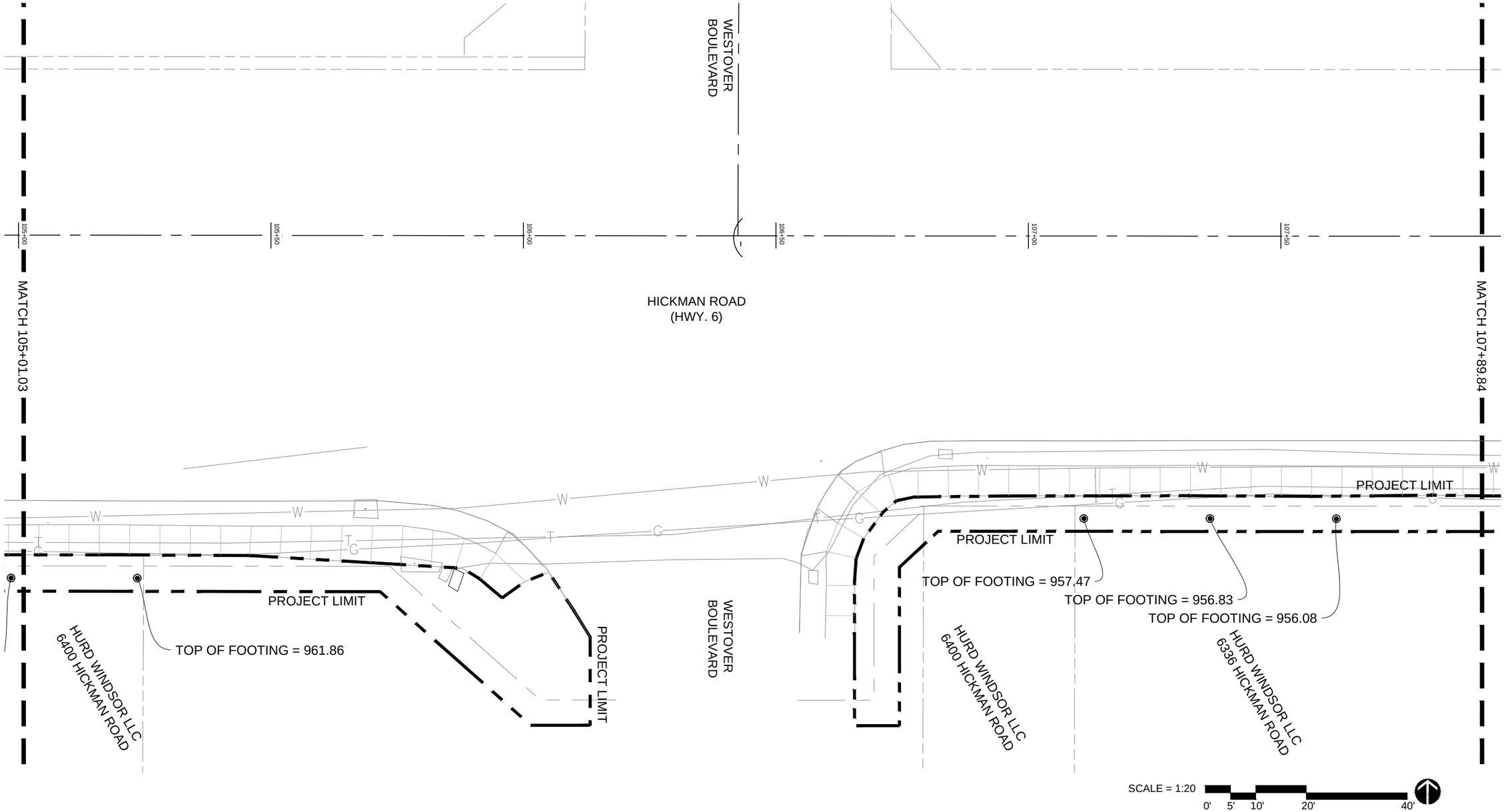
GRADING NOTES

1. ALL SPOT ELEVATIONS ARE AT THE TOP OF FINISHED SURFACES. SPOT ELEVATIONS SHOWN IN PARKING ARE AT THE BOTTOM OF CURB.
2. PRIOR TO ANY SITE EXCAVATION, THE CONTRACTOR SHALL EXAMINE ANY APPLICABLE DRAWINGS AVAILABLE FROM THE OWNER AND/ OR LANDSCAPE ARCHITECT, AND CONSULT WITH OWNER'S REPRESENTATIVES TO DETERMINE POSSIBLE UTILITY LOCATIONS AND DEPTHS. NO COMPENSATION WILL BE ALLOWED FOR DAMAGE RESULTING FROM FAILURE TO COMPLY WITH THIS REQUIREMENT.
3. INSTALL SILT FENCE AT PERMANENT STORM SEWER INLETS AND SOD ALL SLOPES FOR EROSION CONTROL. SILT FENCE SHALL BE MAINTAINED UNTIL ESTABLISHMENT OF PERMANENT GROUND COVER OR EROSION CONTROL MEASURE.
4. ALL DEBRIS SPILLED ON THE R.O.W. SHALL BE PICKED UP BY THE CONTRACTOR AT THE END OF EACH WORK DAY.
5. BACK FILL TO TOP OF CURB.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR POSITIVE SURFACE DRAINAGE IN ALL AREAS, UNLESS OTHERWISE NOTED. ALL NEWLY GRADED GROUND SURFACES SHALL BE FINISHED TO UNIFORM GRADES AND SLOPED IN SUCH A MANNER TO BE FREE OF DEPRESSIONS THAT CAUSE AREAS OF STANDING WATER. THE CONTRACTOR SHALL REPORT ANY CONFLICTS WITH THIS REQUIREMENT TO THE LANDSCAPE ARCHITECT FOR RESOLUTION PRIOR TO FINAL GRADING OPERATIONS.
7. WHERE PROPOSED GRADES MEET EXISTING, BLEND GRADES TO PROVIDE A SMOOTH TRANSITION BETWEEN THE NEW WORK AND EXISTING WORK. PONDING AT JOINTS WILL NOT BE ACCEPTED.
8. CONTRACTOR RESPONSIBLE FOR ALL PRIVATE LOCATES NOT COVERED BY THE IOWA ONE CALL SYSTEM.



01 GRADING PLAN

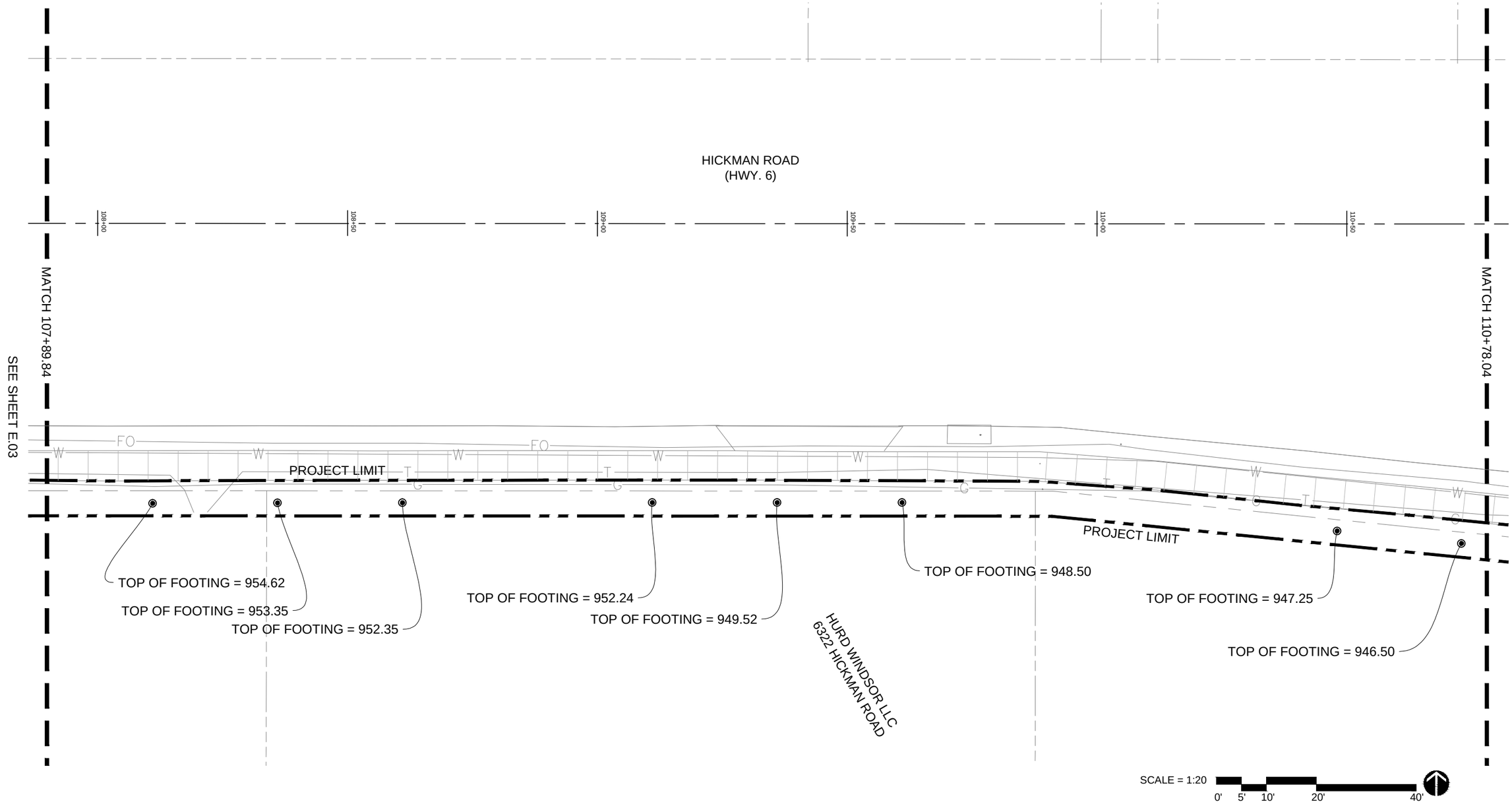
PROJECT	HICKMAN ROAD STREETSCAPE	DESIGN TEAM	CONFLUENCE bluestone engineering	COUNTY	POLK	PROJECT NUMBER	TAP-T-8477(613)--8V-77	SHEET TITLE	GRADING PLAN	SHEET NUMBER	E.02



01 GRADING PLAN

PROJECT	HICKMAN ROAD STREETSCAPE	DESIGN TEAM	CONFLUENCE bluestone engineering	COUNTY	POLK	PROJECT NUMBER	TAP-T-8477(613)--8V-77	SHEET TITLE	GRADING PLAN	SHEET NUMBER	E.03

02-17-2015 - FINAL PLANS & PDC - NOT FOR CONSTRUCTION



01 GRADING PLAN

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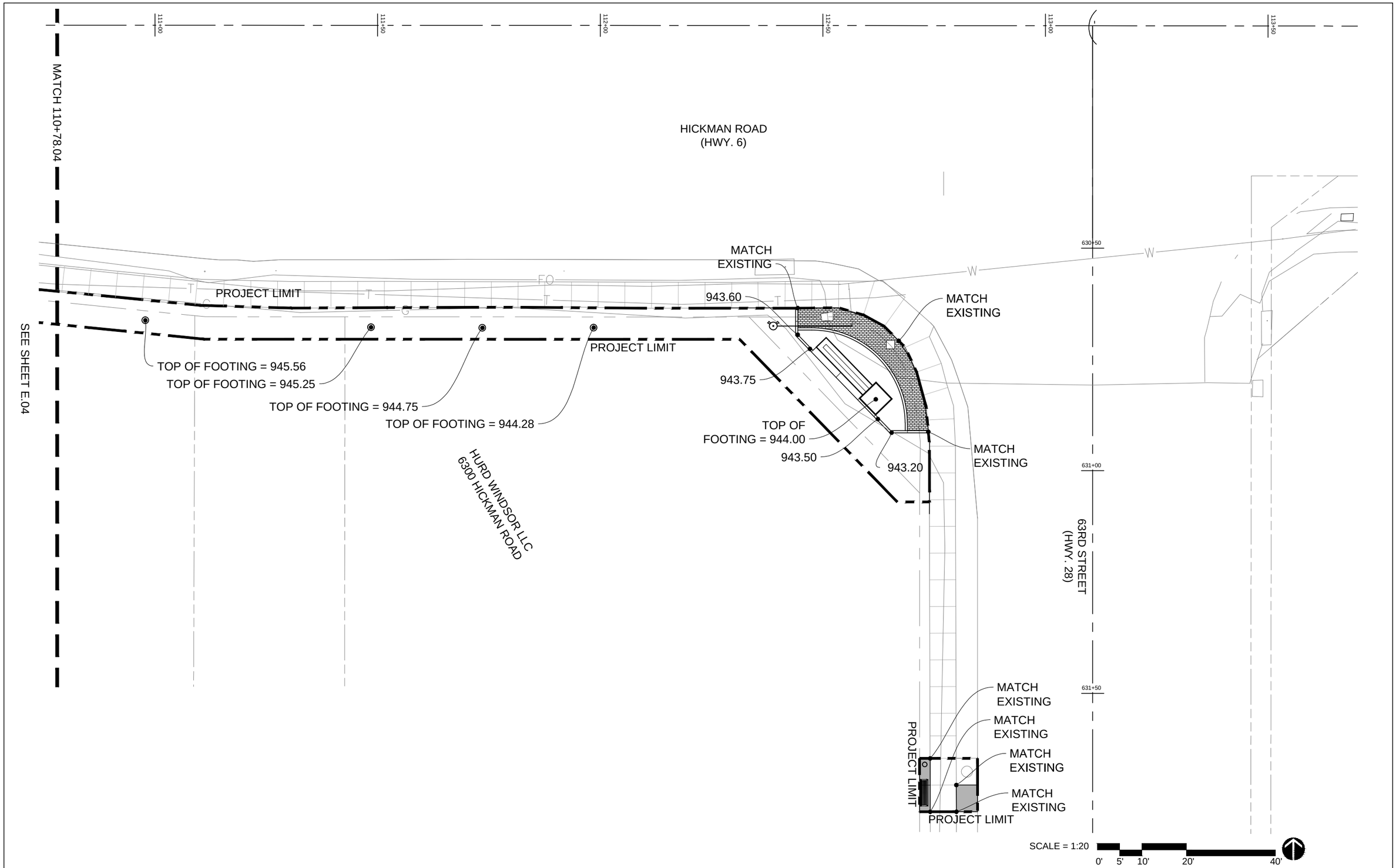

01 GRADING PLAN

PROJECT	HICKMAN ROAD STREETSCAPE	DESIGN TEAM	CONFLUENCE bluestone engineering	COUNTY	POLK	PROJECT NUMBER	TAP-T-8477(613)--8V-77	SHEET TITLE	GRADING PLAN	SHEET NUMBER	E.05

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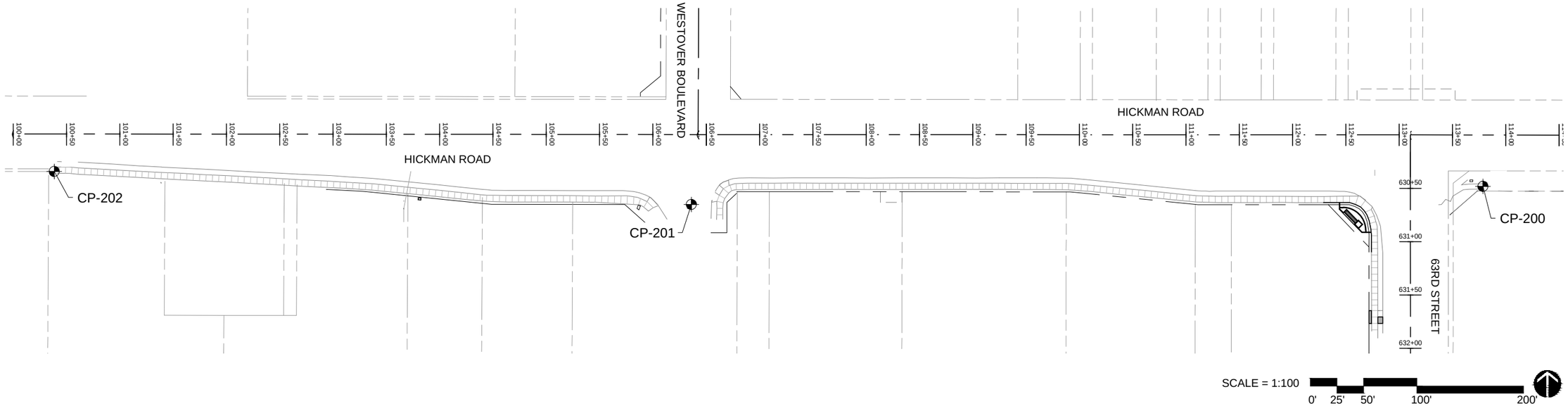


01 KEY PLAN

GENERAL STAKING NOTES:

1. CONTRACTOR TO CONFIRM PROJECT BENCHMARKS, ELEVATIONS, AND ALL EXISTING CONDITIONS WITHIN THE PROJECT AREA PRIOR TO COMMENCING FIELD ACTIVITIES. CONTACT THE LANDSCAPE ARCHITECT FOR DIRECTION IF SIGNIFICANT DISCREPANCIES ARE DISCOVERED.

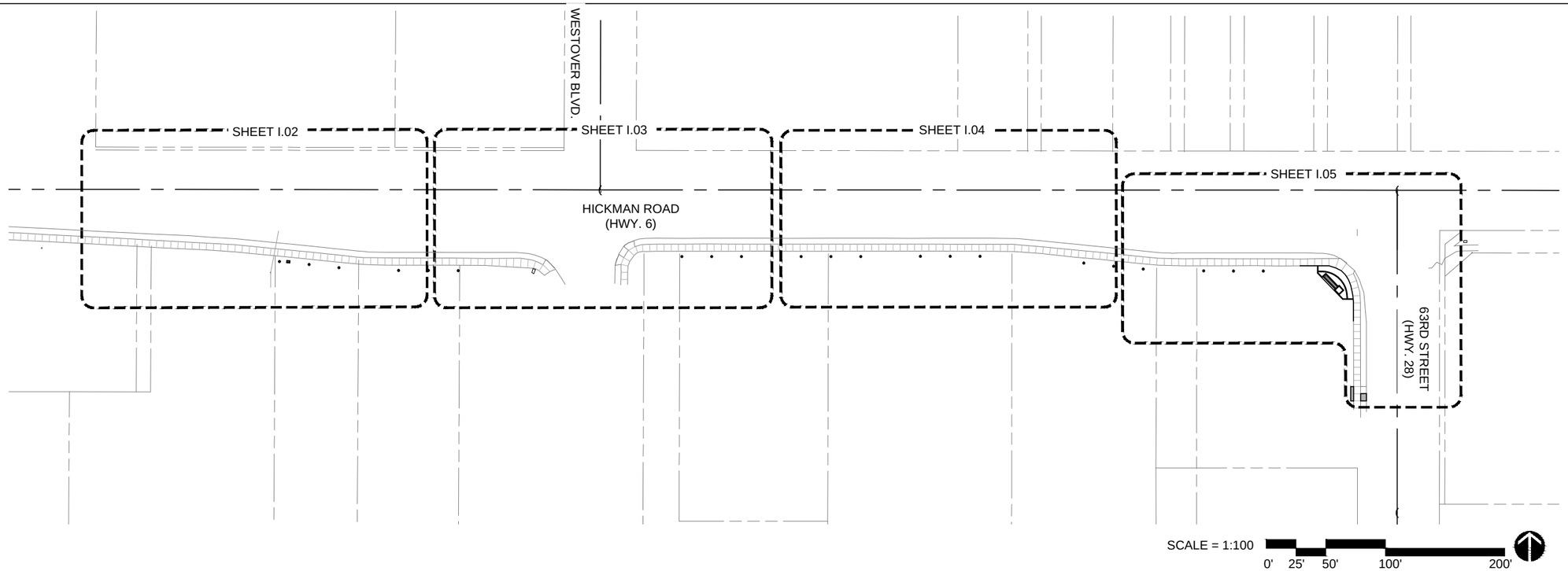
2. EXISTING BURIED UTILITIES SHOWN ON THE SURVEY ARE SHOWN IN ACCORDANCE WITH THE AVAILABLE RECORDS AND FIELD INFORMATION AVAILABLE TO THE LANDSCAPE ARCHITECT. OTHER UTILITIES MAY ALSO BE PRESENT. IT IS ANTICIPATED THAT NUMEROUS BURIED UTILITY LINES ARE LIKELY TO BE ENCOUNTERED DURING CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD LOCATING AND COORDINATING WITH THE OWNERS OF THE EXISTING UTILITIES TO DETERMINE THE LOCATION OF THEIR BURIED FACILITIES. THE CONTRACTOR SHALL LOCATE IN PLAN AND ELEVATION ALL UTILITIES WHICH MAY IMPACT THE PROJECT WORK SUFFICIENTLY IN ADVANCE OF CONSTRUCTION ACTIVITIES IN ORDER TO DETERMINE IF REVISIONS TO THE PROPOSED WORK ARE NEEDED AND TO PROVIDE TIME FOR THE UTILITY OWNERS TO RELOCATE THEIR FACILITIES. DELAY OF CONSTRUCTION CLAIMS WILL NOT BE APPROVED WHICH RESULT FROM FAILURE TO PROPERLY IDENTIFY UTILITIES IN PLAN AND ELEVATION SUFFICIENTLY IN ADVANCE OF CONSTRUCTION ACTIVITIES.

3. ALL EXISTING UTILITY SERVICES SHALL REMAIN IN OPERATION DURING CONSTRUCTION UNLESS ALTERNATE SERVICE IS PROVIDED OR UNTIL NEW REPLACEMENT SERVICES ARE INSTALLED AND READY TO BE PLACED INTO OPERATION.

CONTROL POINTS

POINT	DESCRIPTION	NORTHING	EASTING	ELEVATION
CP-200	FIELD VERIFY	8380.61	4768.01	943.61
CP-201	FIELD VERIFY	8363.62	4025.51	958.56
CP-202	FIELD VERIFY	8394.50	3427.83	956.96

SOURCE: VEENSTRA & KIMM SURVEY FIELD NOTES RECEIVED 09/17/2014



01 KEY PLAN

GENERAL LAYOUT NOTES:

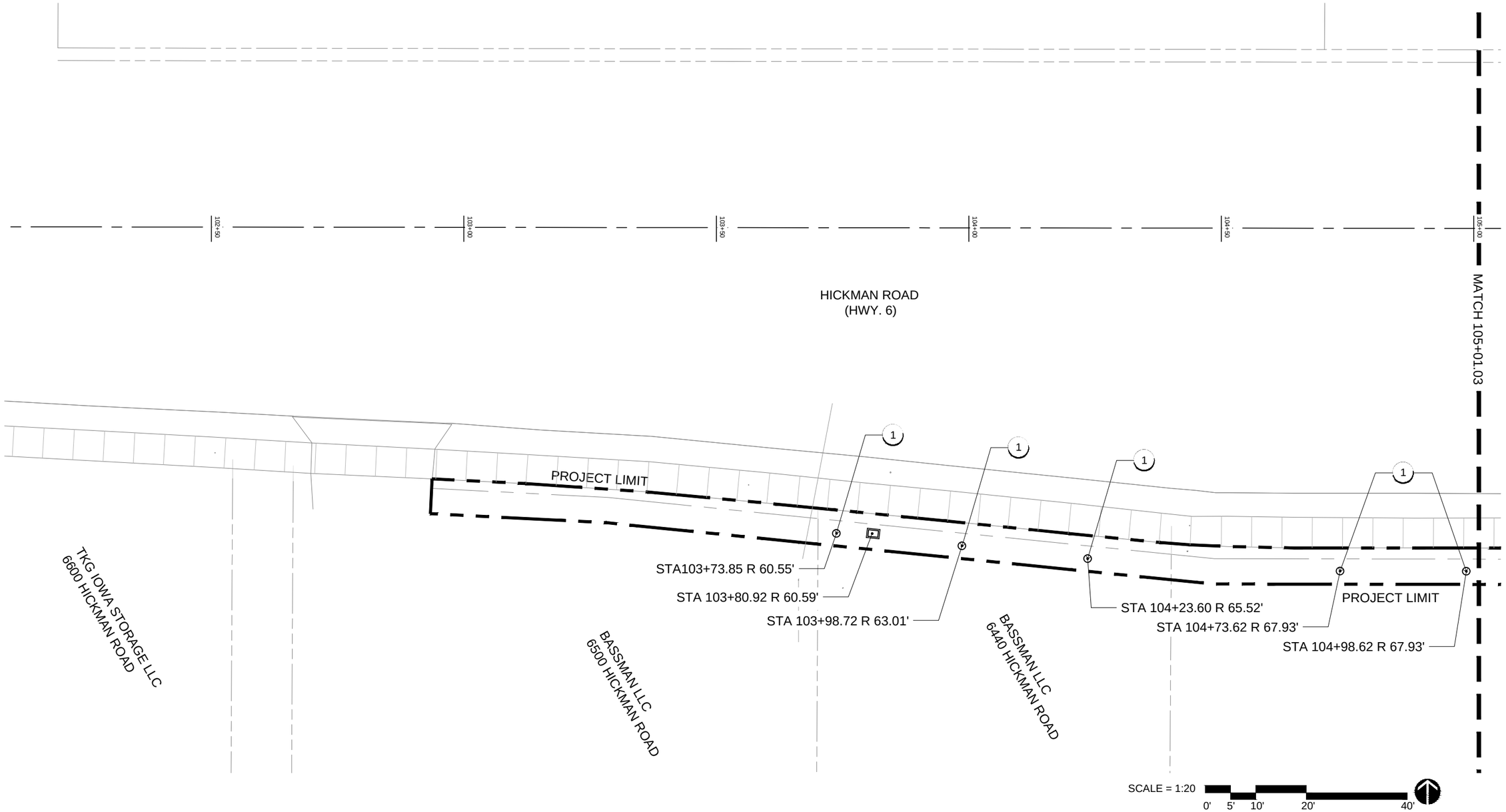
1. PAVING DIMENSIONS ARE TO BACK OF CURB UNLESS OTHERWISE NOTED.

2. BOUNDARY AND TOPOGRAPHIC INFORMATION TAKEN FROM SURVEY ARE PREPARED BY:
   VEENSTRA & KIMM, INC.
   3000 WESTOWN PARKWAY
   WEST DES MOINES, IOWA 50266-1320
   P: 515.225.8000
   800.241.8000
   F: 515.225.7848

3. ALL WORK SHALL BE IN ACCORDANCE WITH OSHA CODES AND STANDARDS. NOTHING INDICATED ON THESE DRAWINGS SHALL RELIEVE THE CONTRACTOR FROM COMPLYING WITH ANY APPROPRIATE SAFETY REGULATIONS.

4. VERIFY COORDINATES PRIOR TO CONSTRUCTION.

5. CONTRACTOR TO SUPPLY AND INSTALL ALL NECESSARY SLEEVES UNDER PAVING AND WALKS.

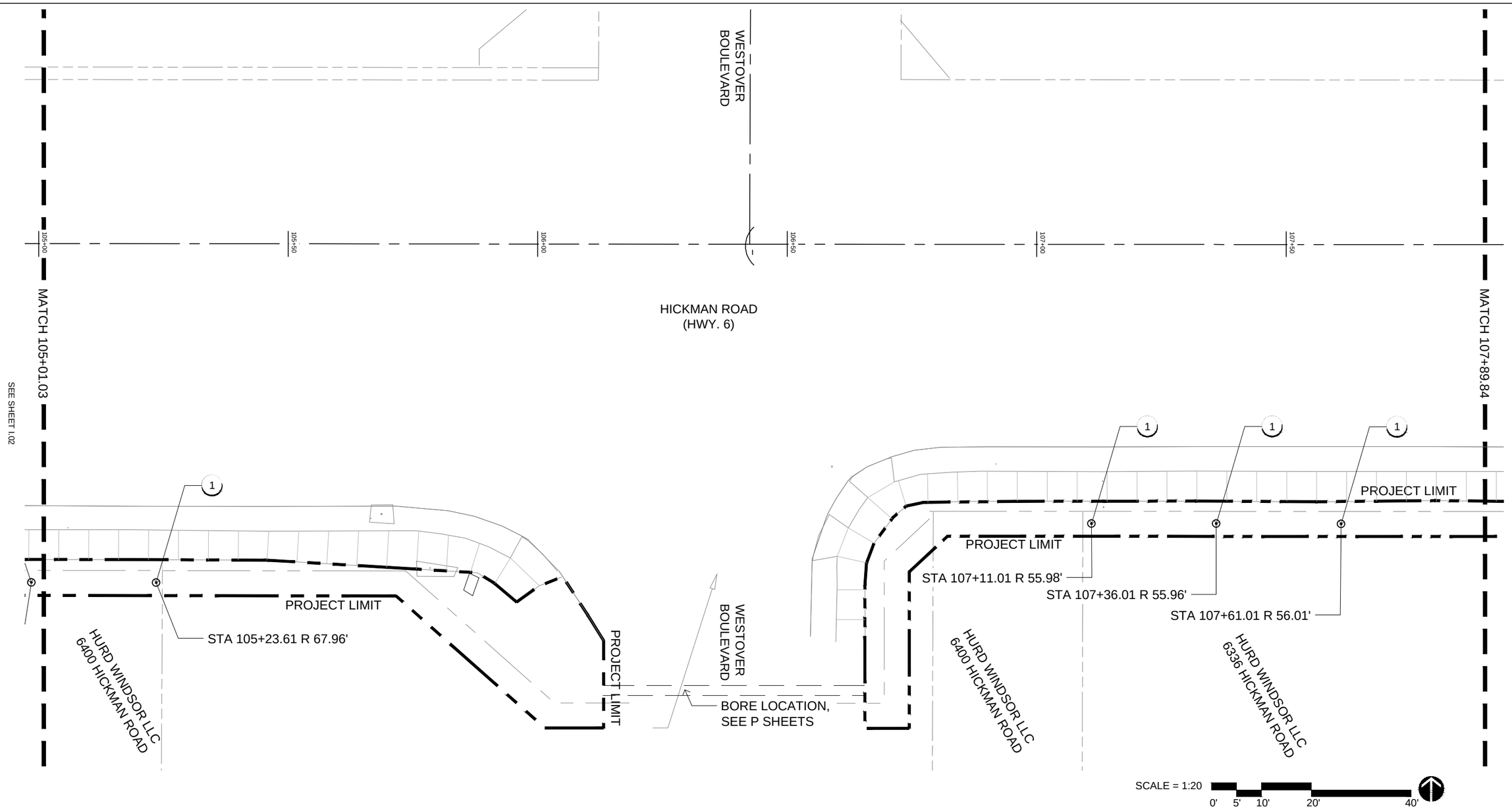


01 LAYOUT PLAN

KEYNOTES:

1. SITE LUMINAIRE, AS SPECIFIED.
2. RELOCATED HYDRANT, SEE M SHEETS.
3. BENCH, AS SPECIFIED.
4. TRASH RECEPTACLE, AS SPECIFIED.
5. 6" PCC PAVING, SEE DETAIL 06/I.11
6. UNIT PAVING, SEE DETAIL 05/I.11
7. PCC EDGER, SEE DETAIL 04/I.11
8. GATEWAY SIGN

PROJECT	HICKMAN ROAD STREETSCAPE	DESIGN TEAM	CONFLUENCE bluestone engineering	COUNTY	POLK	PROJECT NUMBER	TAP-T-8477(613)--8V-77	SHEET TITLE	LAYOUT PLAN	SHEET NUMBER	I.02



01 LAYOUT PLAN

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6. UNIT PAVING, SEE DETAIL 05/I.11
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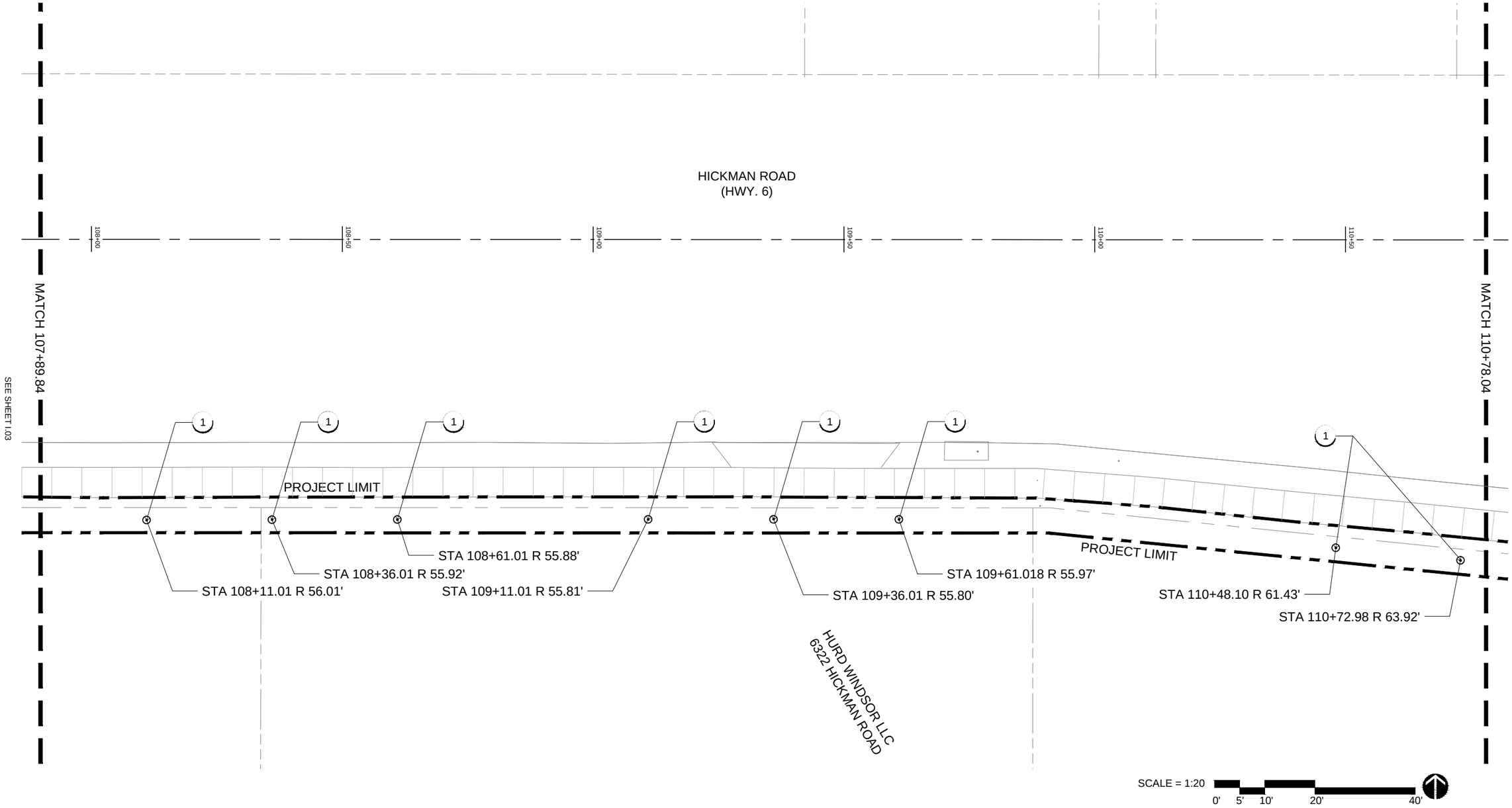
PROJECT	HICKMAN ROAD STREETSCAPE	DESIGN TEAM	CONFLUENCE bluestone engineering	COUNTY	POLK	PROJECT NUMBER	TAP-T-8477(613)--8V-77	SHEET TITLE	LAYOUT PLAN	SHEET NUMBER	I.03



01 LAYOUT PLAN

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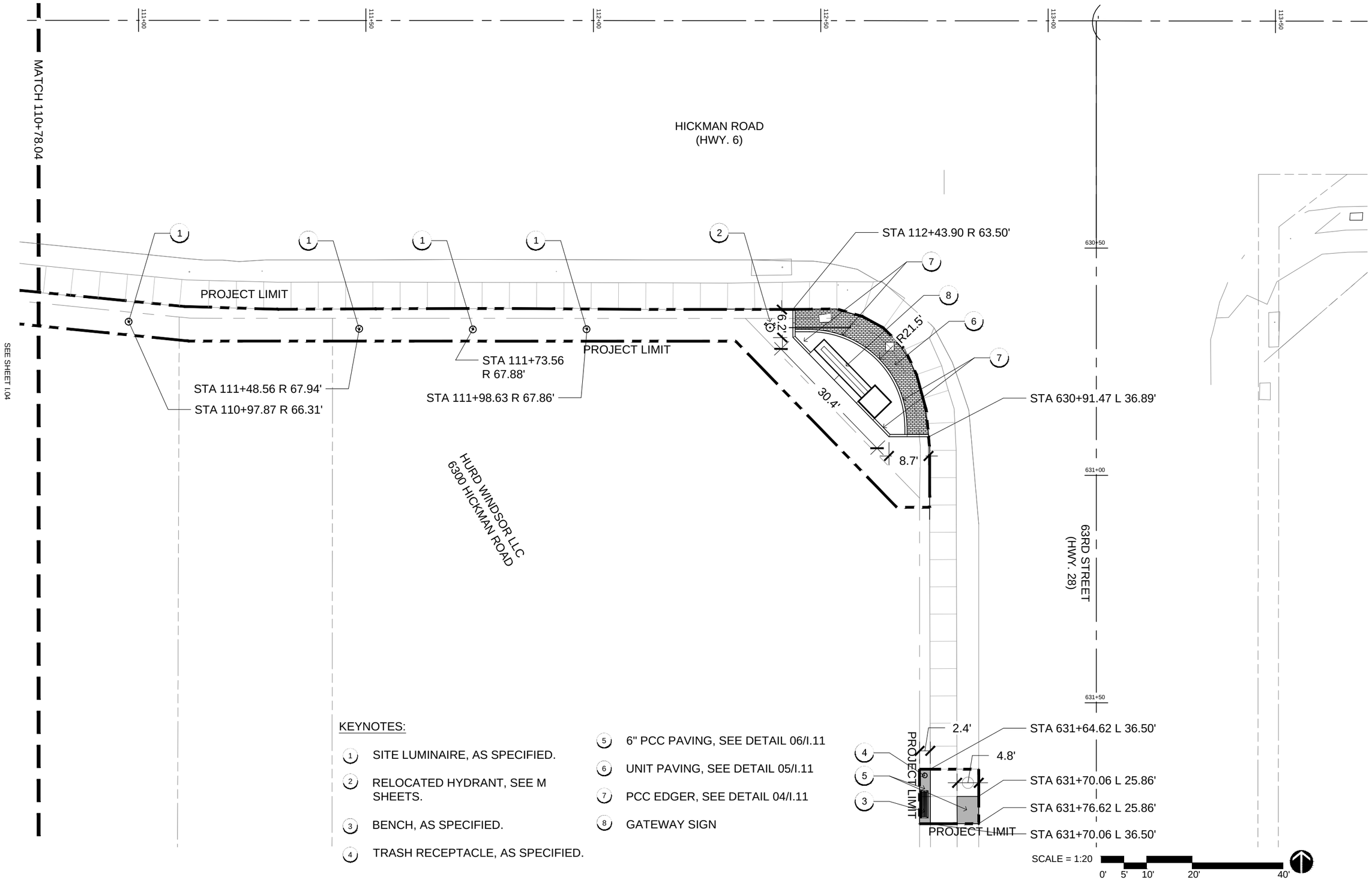

KEYNOTES:

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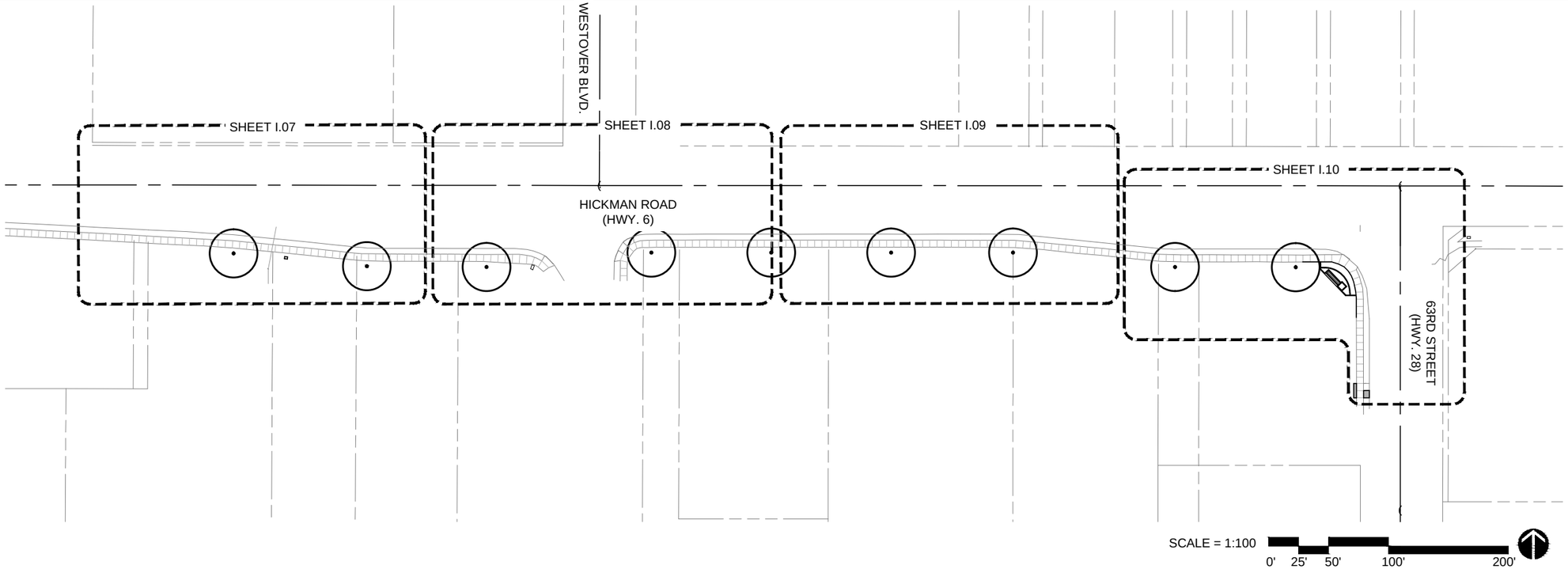
01 LAYOUT PLAN

PROJECT	HICKMAN ROAD STREETSCAPE	DESIGN TEAM	CONFLUENCE bluestone engineering	COUNTY	POLK	PROJECT NUMBER	TAP-T-8477(613)--8V-77	SHEET TITLE	LAYOUT PLAN	SHEET NUMBER	I.05



01 KEY PLAN

GENERAL PLANTING NOTES:

1. CONTRACTOR SHALL LOCATE AND VERIFY ALL EXISTING UTILITY LINES PRIOR TO PLANTING AND SHALL REPORT ANY CONFLICTS TO THE LANDSCAPE ARCHITECT.

2. CONTRACTOR SHALL COORDINATE LOCATION OF ALL UTILITIES (LINES, CONDUITS, SLEEVES, FOOTINGS, ETC.) WITH LOCATIONS OF PROPOSED LANDSCAPE ELEMENTS (TREE ROOTBALLS, ETC.). CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO LANDSCAPE ARCHITECT PRIOR TO CONTINUING WORK.

3. ALL WORK SHALL BE COORDINATED WITH THE WORK OF OTHER TRADES.

4. IF DISCREPANCIES EXIST BETWEEN THE NUMBER OF PLANTS DRAWN ON THE PLANTING PLAN AND THE NUMBER OF PLANTS IN THE SCHEDULE, THE PLANTING PLAN SHALL GOVERN.

5. ALL PLANT MATERIAL MUST CONFORM TO AMERICAN STANDARDS FOR NURSERY STOCK ANSI Z 60.1, OR LATEST EDITION PUBLISHED BY THE AMERICAN ASSOCIATE OF NURSERYMEN, WASHINGTON D.C. LARGER SIZED PLANT MATERIALS OF THE SPECIES LISTED MAY BE USED IF STOCK CONFORMS TO THE A.S.N.S.

6. ANY PROPOSED SUBSTITUTIONS OF PLANT SPECIES SHALL BE MADE WITH PLANTS OF EQUIVALENT OVERALL FORM, HEIGHT, BRANCHING HABIT, FLOWER, LEAF, COLOR, FRUIT AND CULTURE, AND ONLY AFTER WRITTEN APPROVAL OF THE LANDSCAPE ARCHITECT.

7. OWNER RESERVES THE RIGHT TO SUBSTITUTE PLANT MATERIAL TYPE, SIZE, AND/OR QUANTITY.

8. STAKE LOCATION OF ALL PROPOSED PLANTING FOR APPROVAL BY LANDSCAPE ARCHITECT A MINIMUM OF 48 HOURS PRIOR TO THE COMMENCEMENT OF PLANTING.

9. CONTRACTOR IS RESPONSIBLE FOR ALL DAMAGE DUE TO OPERATIONS INSIDE AND OUTSIDE OF THE CONTRACT LIMIT LINE. ANY AREAS OUTSIDE THE LIMIT OF WORK THAT ARE DISTURBED SHALL BE RESTORED TO ITS ORIGINAL CONDITION AT NO ADDITIONAL COST TO THE OWNER.

10. PROVIDE SHREDDED HARDWOOD MULCH, NATURAL COLOR, IN ALL PLANT SAUCERS AND PLANTING BEDS TO A 3-INCH MINIMUM DEPTH. APPLY PRE-EMERGENT TO ALL PLANTING BEDS PRIOR TO MULCHING.

11. PLANTING SOIL TO BE A MIX OF 8 PARTS TOPSOIL, ONE PART SAND, AND 3 PARTS COMPOST. COMPOST SHALL BE FROM METRO WASTE AUTHORITY OR APPROVED EQUAL.

12. THE CONTRACTOR SHALL REPORT SUBSURFACE SOIL OR DRAINAGE PROBLEMS TO THE LANDSCAPE ARCHITECT.

13. THE CONTRACTOR SHALL SHOW PROOF OF PROCUREMENT, SOURCES, QUANTITIES AND VARIETIES FOR ALL PLANT MATERIAL WITHIN 21 DAYS FOLLOWING THE AWARD OF THE CONTRACT. TIMELY PROCUREMENT OF ALL PLANT MATERIAL IS ESSENTIAL TO THE SUCCESSFUL COMPLETION AND INITIAL ACCEPTANCE OF THE PROJECT.

14. ALL PLANT MATERIAL SHALL BE NURSERY GROWN, SOUND, HEALTHY, VIGOROUS AND FREE FROM INSECTS, DISEASE AND INJURIES, WITH HABIT OF GROWTH THAT IS NORMAL FOR THE SPECIES. SIZE SHALL BE EQUAL TO OR EXCEEDING SIZES INDICATED ON THE PLANT SCHEDULE. THE CONTRACTOR SHALL SUPPLY PLANTS IN QUANTITY AS SHOWN ON THE DRAWINGS.

PLANTING LEGEND:

OVERSTORY TREE

SOD

SHRUB

PERENNIAL

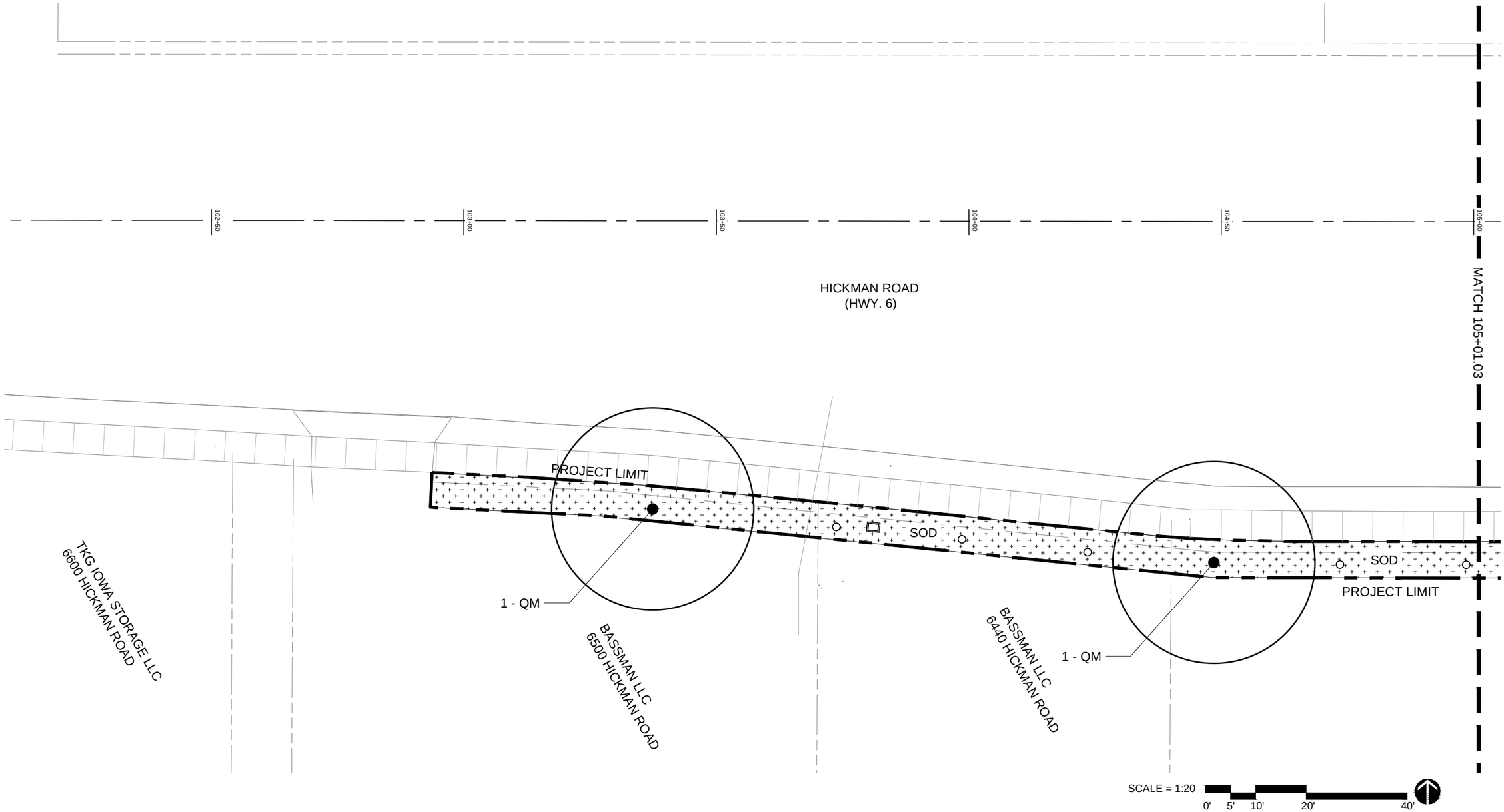
GENERAL PLANTING NOTES:

1. PLANTING SOIL MIX SHALL CONSIST OF THE FOLLOWING:

   50-60% SAND (2.0-.05MM)
   25-35% SILT (.05-.002MM)
   LESS THAN 15% CLAY AND
   5-15% ORGANIC MATTER

PLANT SCHEDULE

KEY	QTY.	BOTANICAL NAME	COMMON NAME	SIZE	ROOT	SPACING & REMARKS
			OVERSTORY TREES			
QM	6	Quercus melanocarpa	BUR OAK	2" CAL.	B&B	SPECIMEN QUALITY
QR	3	Quercus rubrum	RED OAK	2" CAL.	B&B	SPECIMEN QUALITY
			SHRUBS			
RO	6	Rosa 'radrazz' knock out	KNOCK OUT ROSE	#1 GAL.		
			GRASSES			
SH	30	Sporobolus heterolepis	PRAIRIE DROPSEED	#1 GAL.		



01 PLANTING PLAN

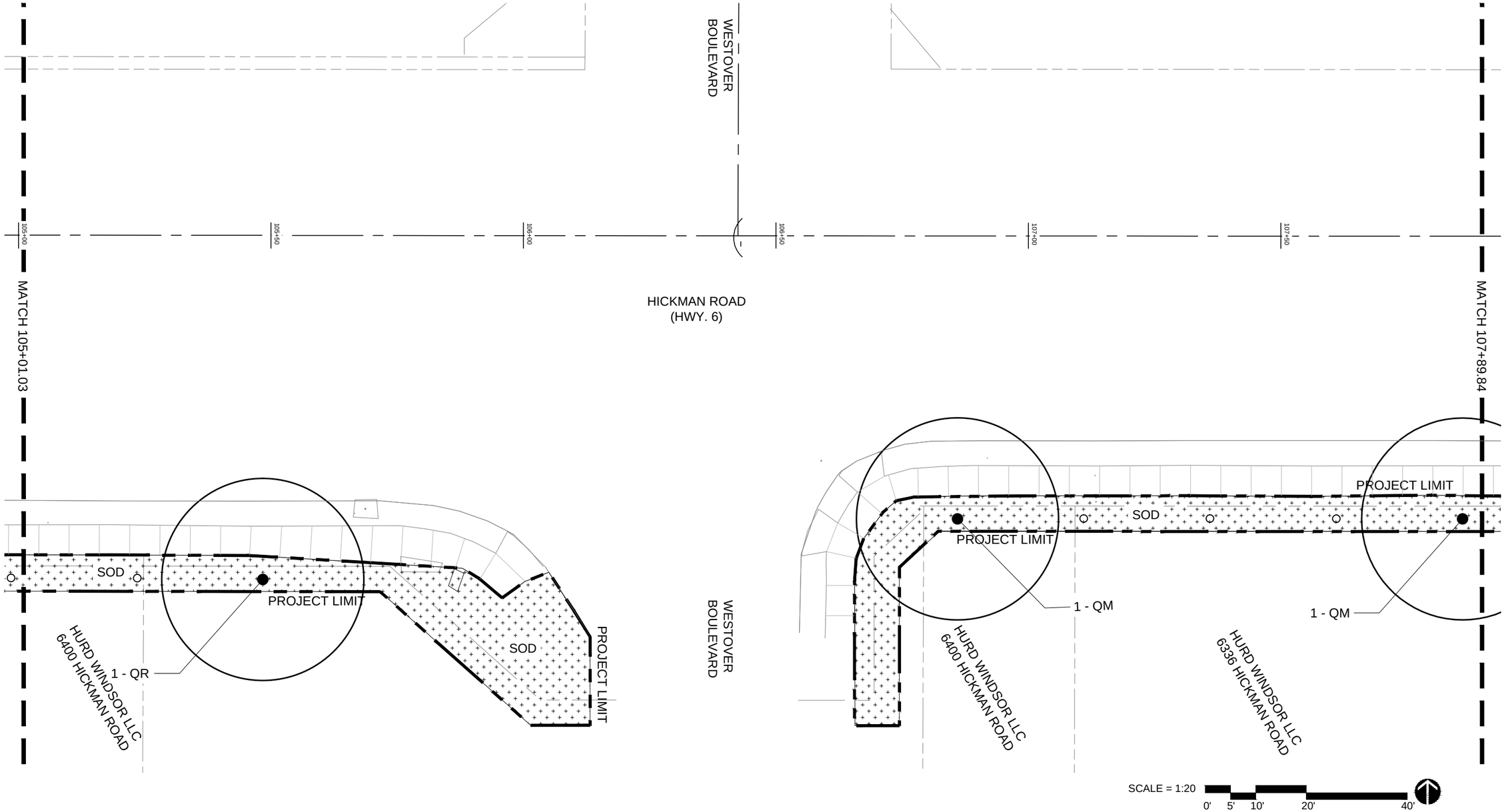
HATCH LEGEND:

SOD

SHRUB

PERENNIAL

PROJECT	HICKMAN ROAD STREETSCAPE	DESIGN TEAM	CONFLUENCE bluestone engineering	COUNTY	POLK	PROJECT NUMBER	TAP-T-8477(613)--8V-77	SHEET TITLE	PLANTING PLAN	SHEET NUMBER	I.07



01 PLANTING PLAN

HATCH LEGEND:

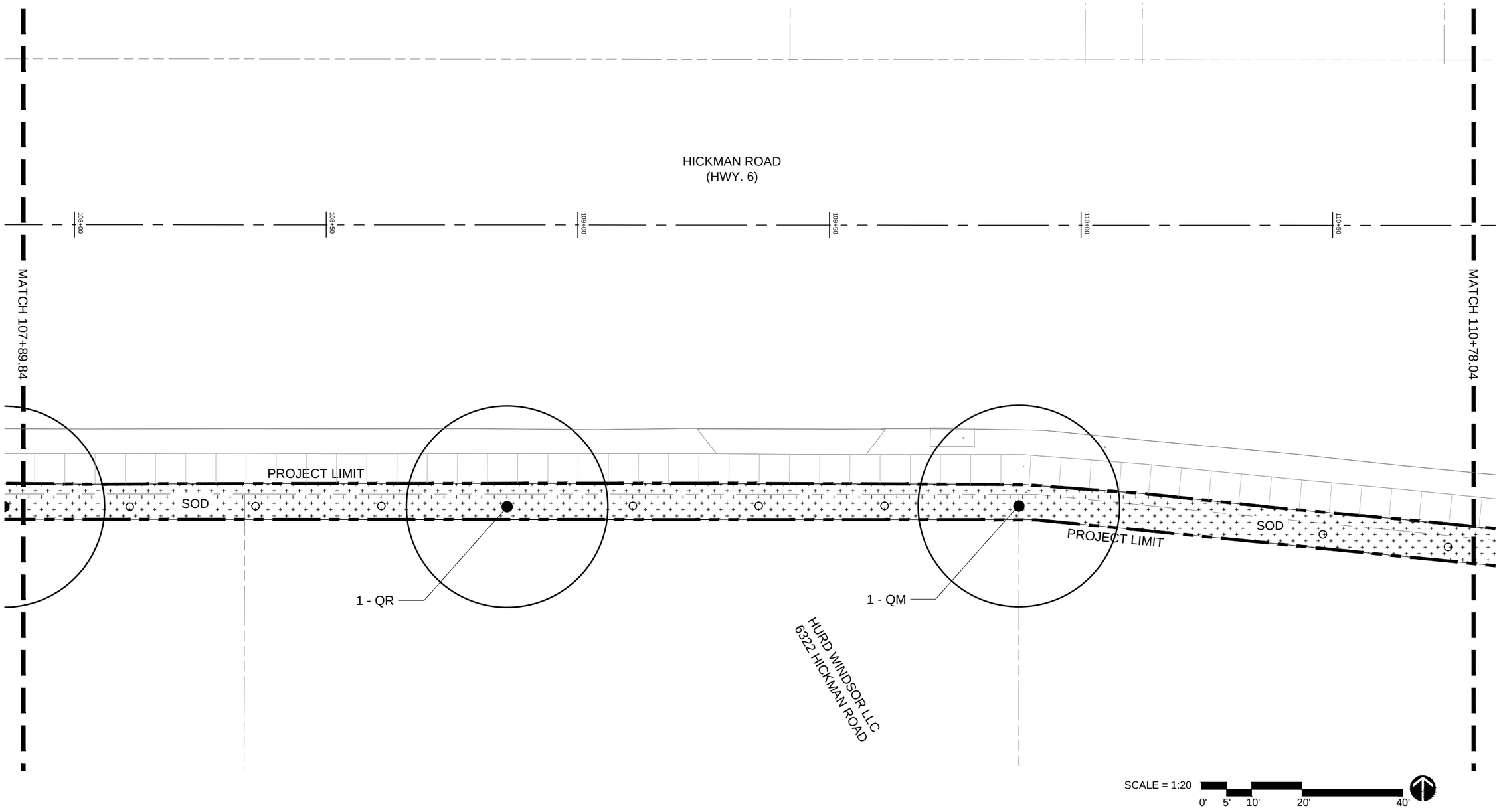
SOD

SHRUB

PERENNIAL

PROJECT	HICKMAN ROAD STREETSCAPE	DESIGN TEAM	CONFLUENCE bluestone engineering	COUNTY	POLK	PROJECT NUMBER	TAP-T-8477(613)--8V-77	SHEET TITLE	PLANTING PLAN	SHEET NUMBER	I.08

02-17-2015 - FINAL PLANS & PDC - NOT FOR CONSTRUCTION



01 PLANTING PLAN

HATCH LEGEND:

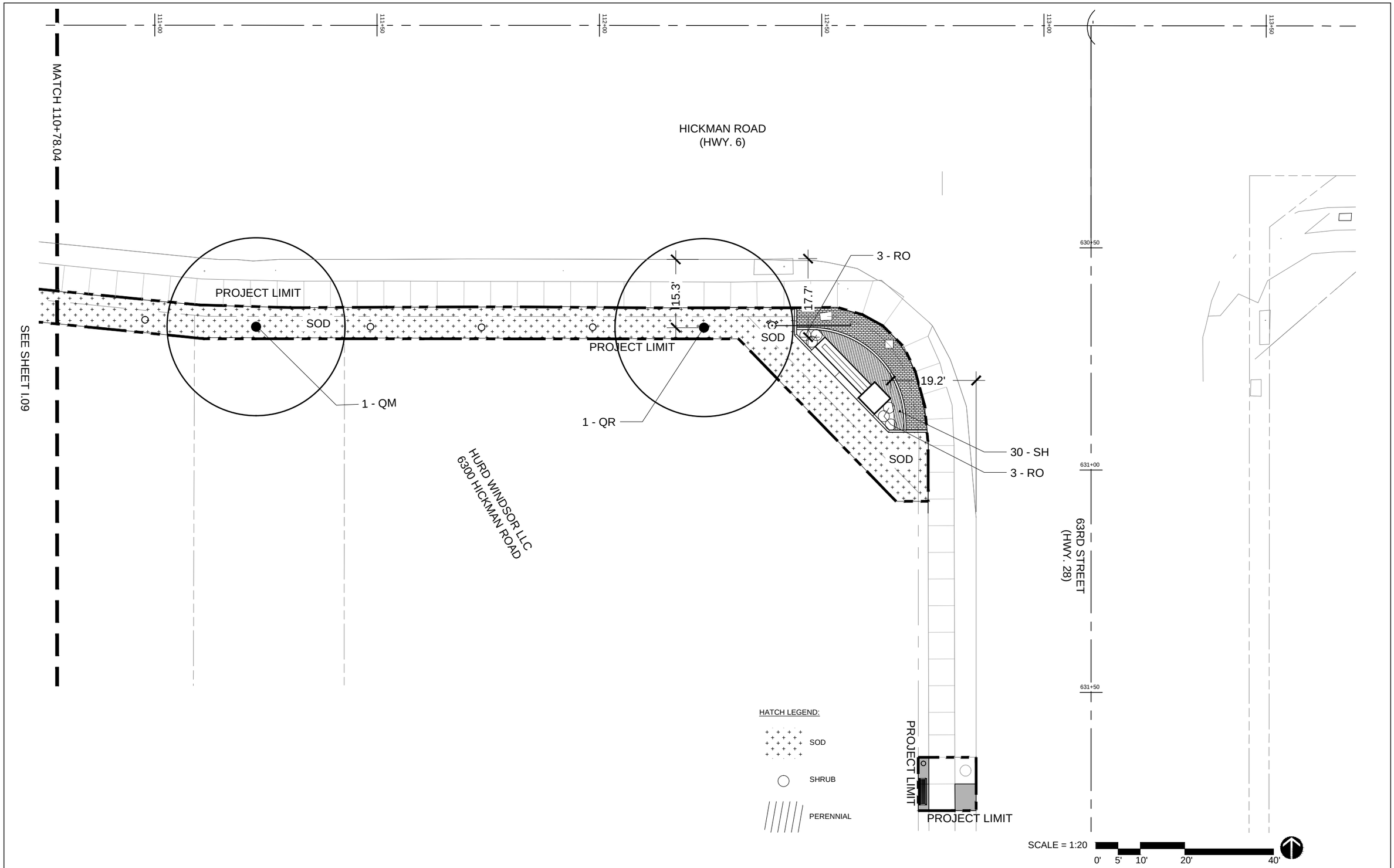
SOD

SHRUB

PERENNIAL

PROJECT	HICKMAN ROAD STREETSCAPE	DESIGN TEAM	CONFLUENCE bluestone engineering	COUNTY	POLK	PROJECT NUMBER	TAP-T-8477(613)--8V-77	SHEET TITLE	PLANTING PLAN	SHEET NUMBER	I.09

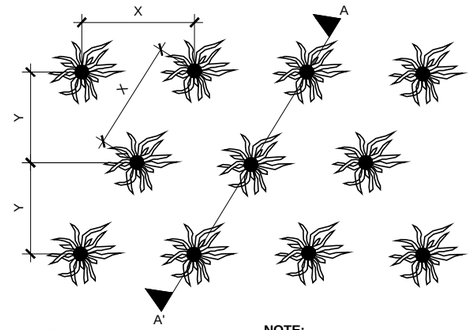
02-17-2015 - FINAL PLANS & PDC - NOT FOR CONSTRUCTION



01 PLANTING PLAN

PROJECT	HICKMAN ROAD STREETSCAPE	DESIGN TEAM	CONFLUENCE bluestone engineering	COUNTY	POLK	PROJECT NUMBER	TAP-T-8477(613)--8V-77	SHEET TITLE	PLANTING PLAN	SHEET NUMBER	I.10

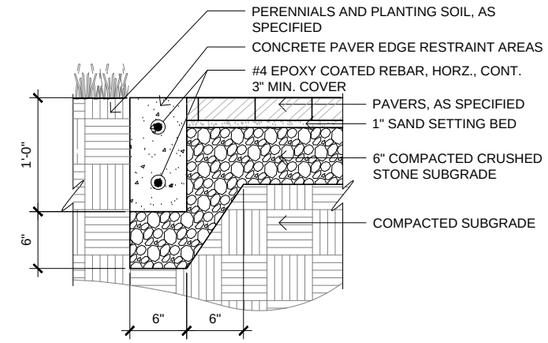
02-17-2015 - FINAL PLANS & PDC - NOT FOR CONSTRUCTION



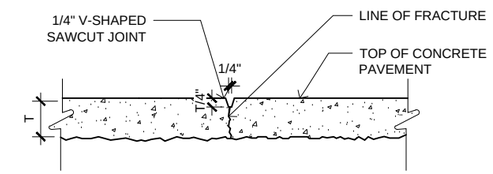
PLAN

NOTE:
X = DISTANCE SPECIFIED WITHIN PLANT SCHEDULE
Y = DISTANCE 'X' MULTIPLIED BY .866

09 I.11	NOT USED	N.T.S

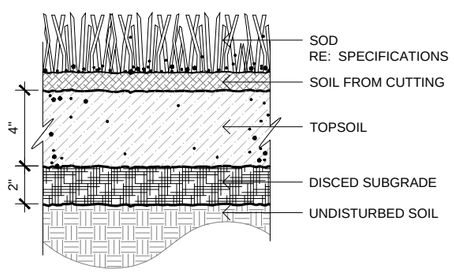


04 I.11	SECTION: CONCRETE PAVER RESTRAINT	N.T.S

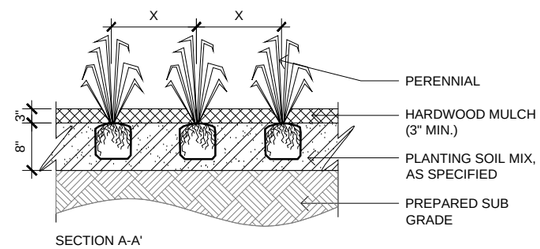


T = THICKNESS OF PAVEMENT

01 I.11	SECTION: CONTROL JOINT, TYP.	N.T.S

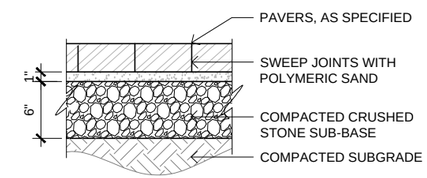


10 I.11	SECTION: SOD PLANTING, TYP.	N.T.S

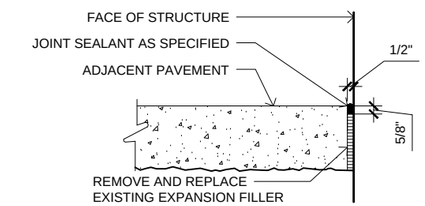


SECTION A-A'

07 I.11	PLAN/SECTION: PERENNIAL PLANTING, TYP.	N.T.S



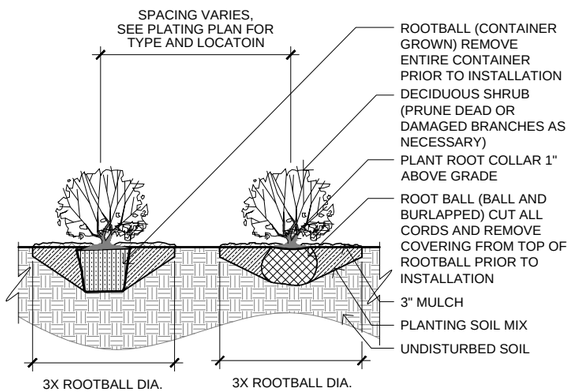
05 I.11	SECTION: UNIT PAVER ON SAND AND AGGREGATE SUB-BASE	N.T.S



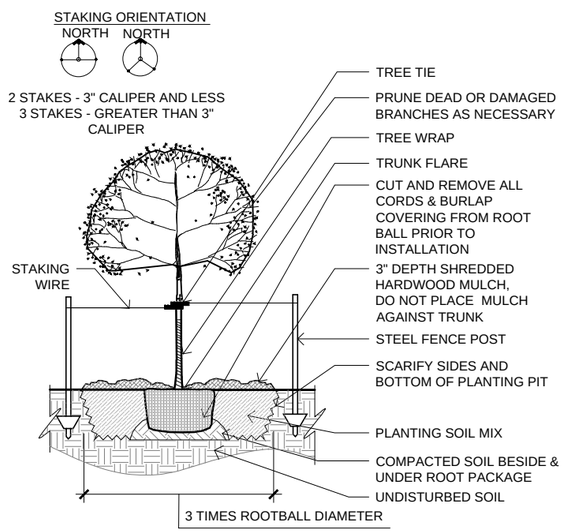
NOTE:

1. PLACE ISOLATION JOINTS BETWEEN PAVEMENT AND ADJACENT FIXED OBJECTS

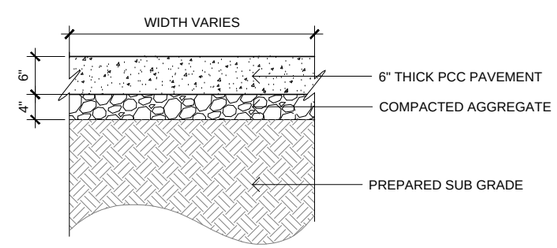
02 I.11	SECTION: ISOLATION JOINT, TYP.	N.T.S



11 I.11	SECTION: SHRUB PLANTING, TYP.	N.T.S



08 I.11	SECTION: TREE PLANTING, TYP.	N.T.S

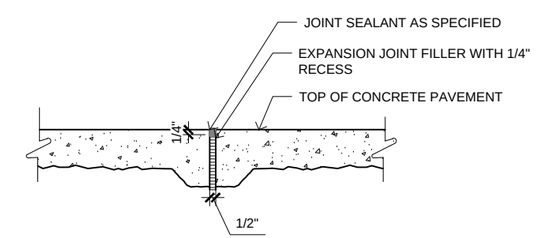


06 I.11	SECTION: 6" PCC PAVING	N.T.S

NOTE:

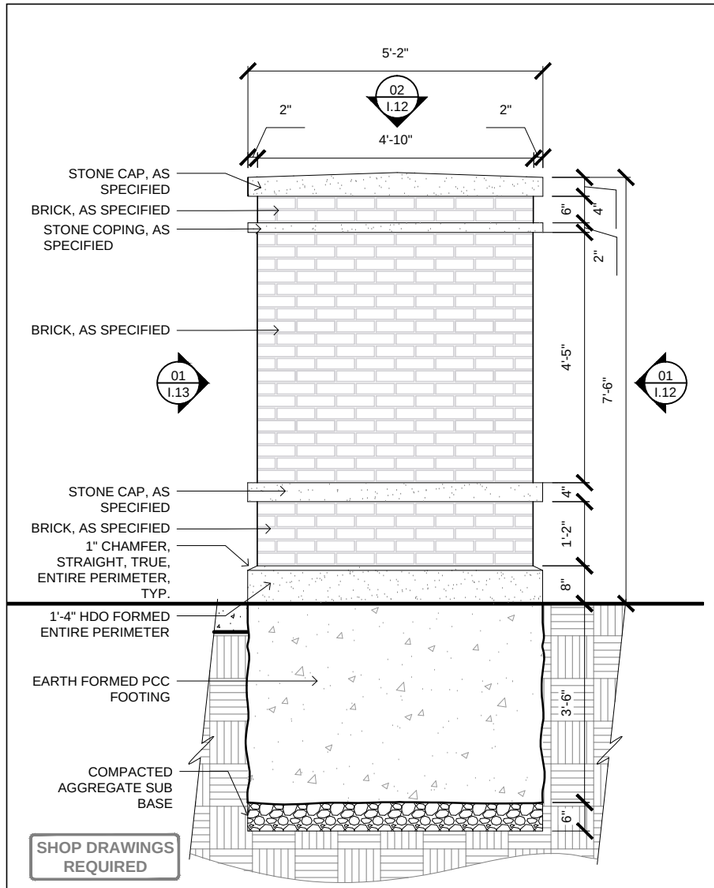
1. SPACE EXPANSION JOINTS NOT TO EXCEED 35' IN CONCRETE WALKS. LOCATE EXPANSION JOINTS WHERE INDICATED ON PLAN.

2. MODIFIED SUDAS EXPANSION JOINT, 'E'



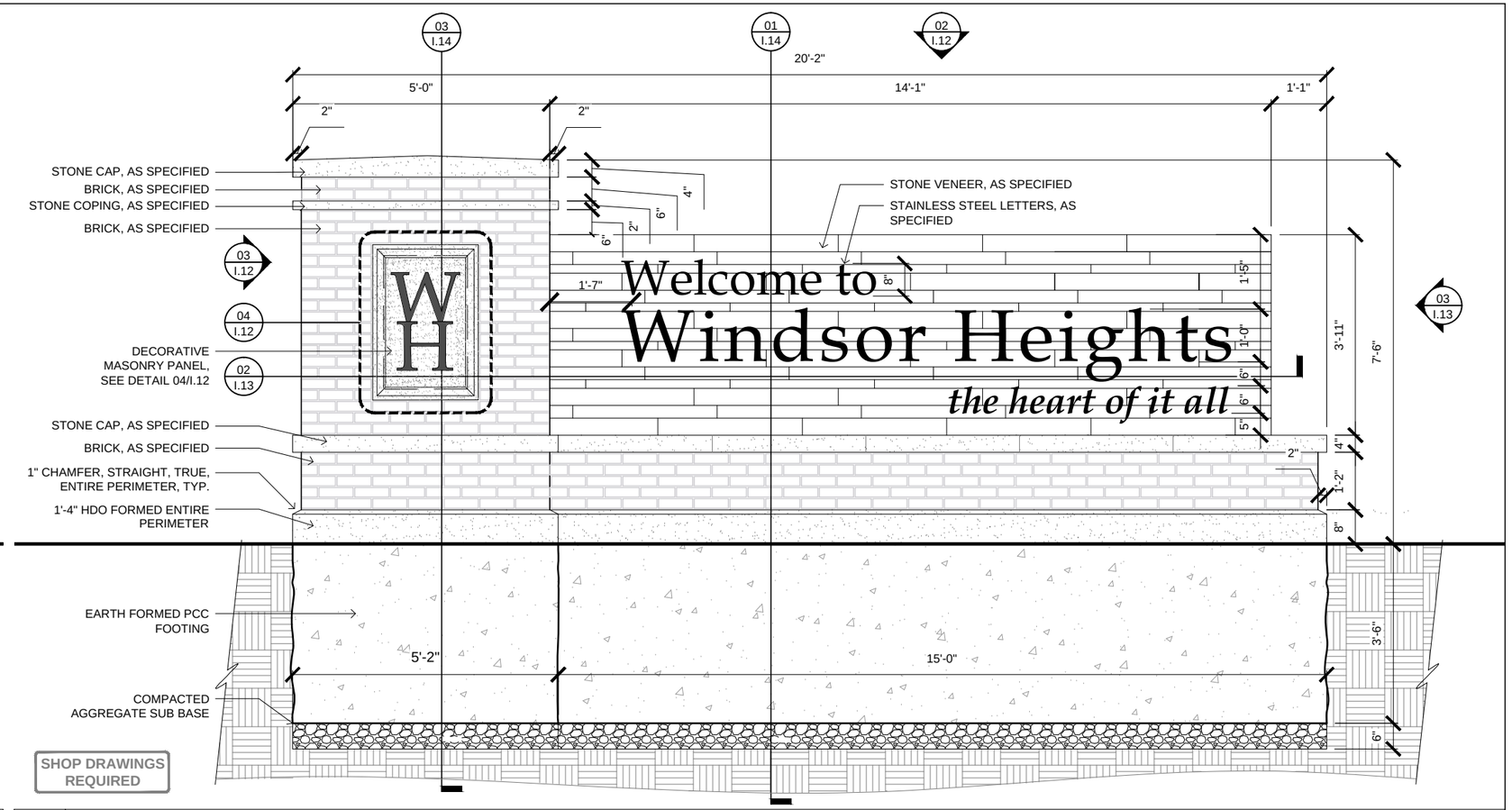
T = THICKNESS OF PAVEMENT

03 I.11	SECTION: EXPANSION JOINT	N.T.S



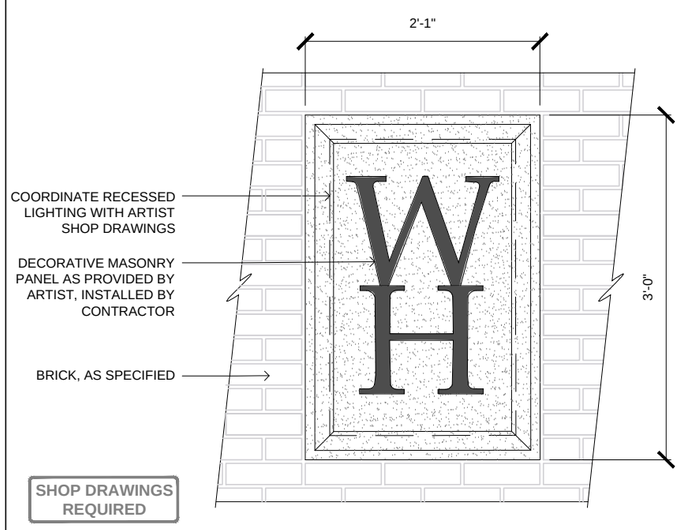
03 I.12 ELEVATION: GATEWAY SIGN, SIDE

N.T.S



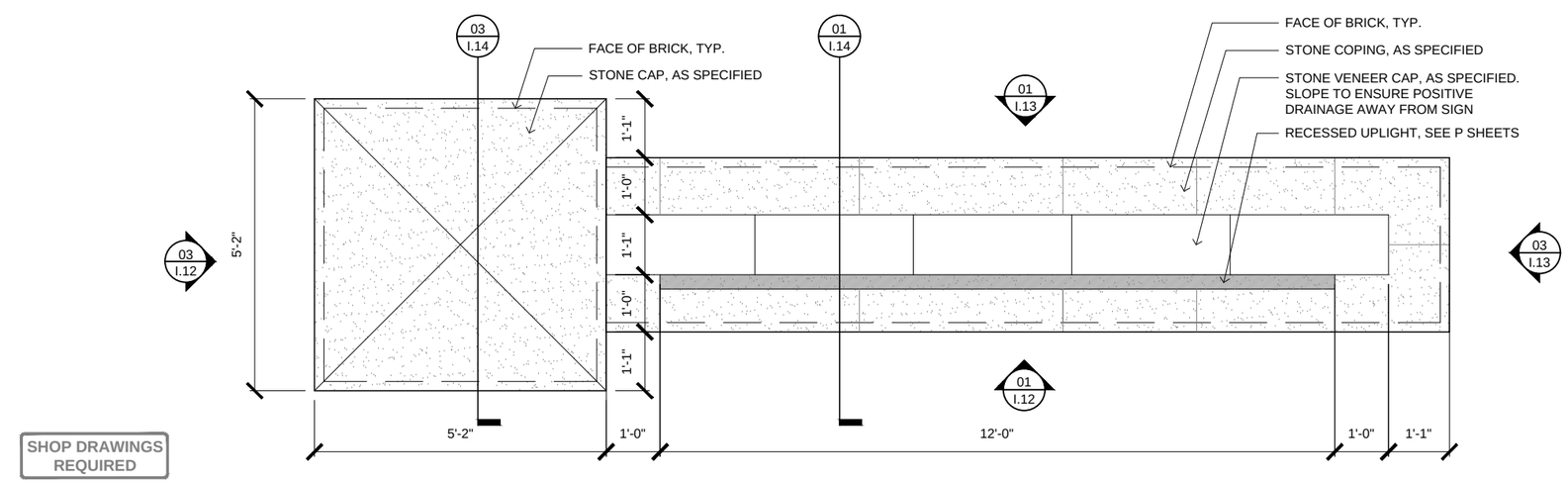
01 I.12 ELEVATION: GATEWAY SIGN, FRONT

N.T.S



04 I.12 ELEVATION: DECORATIVE MASONRY PANEL

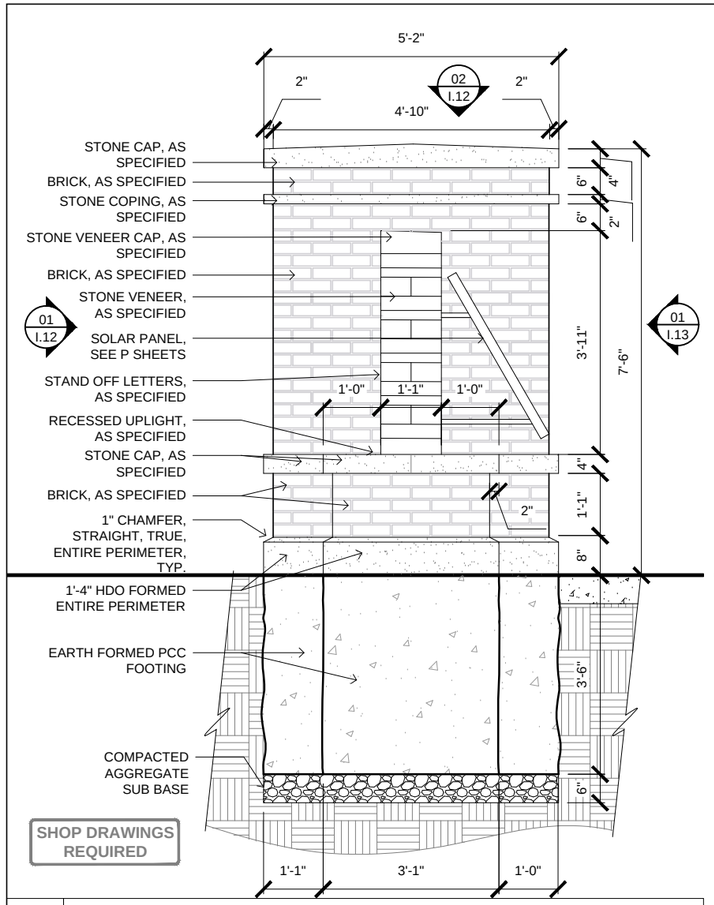
N.T.S



02 I.12 PLAN: GATEWAY SIGN

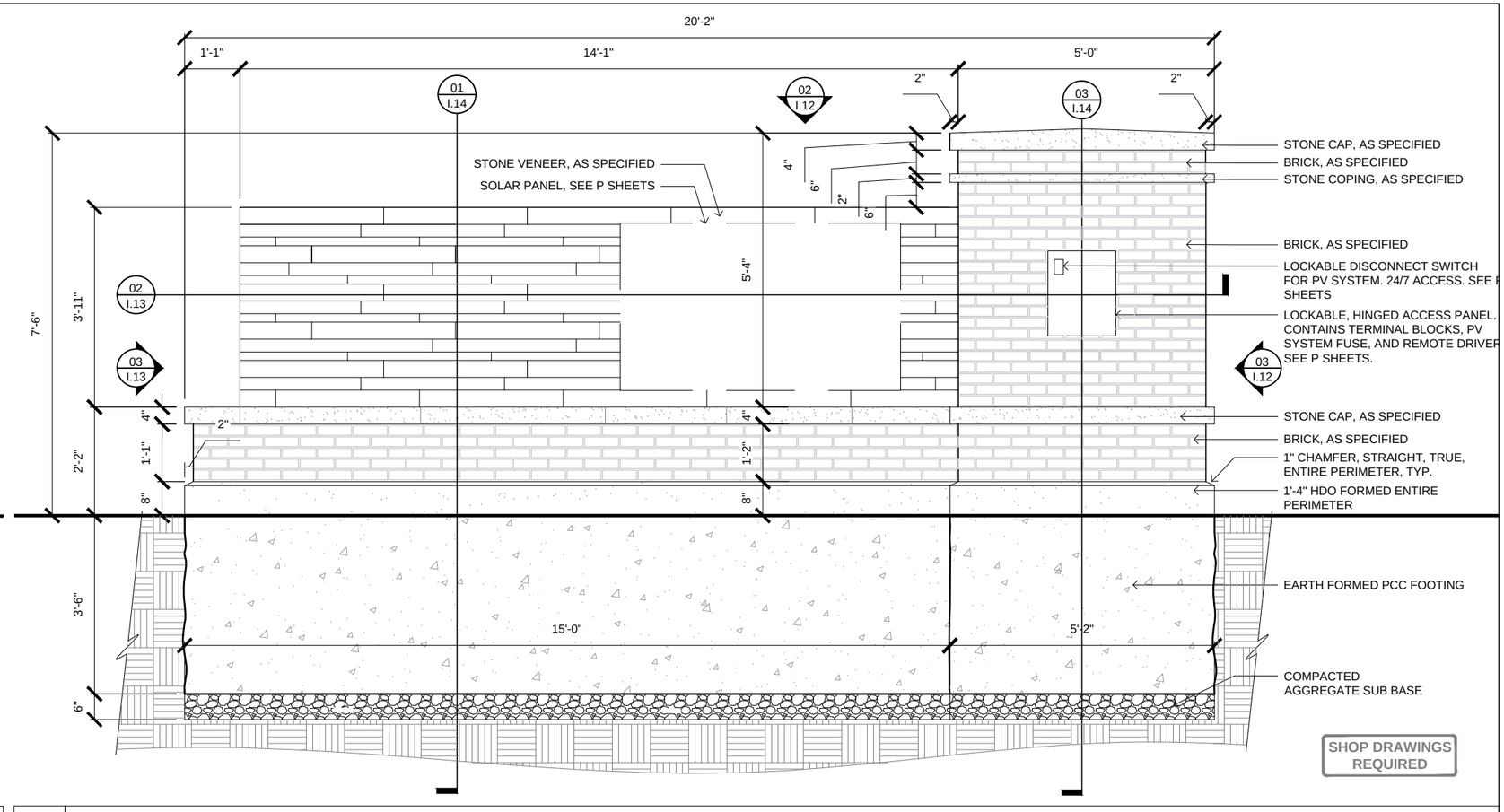
N.T.S

PROJECT	HICKMAN ROAD STREETSCAPE	DESIGN TEAM	CONFLUENCE bluestone engineering	COUNTY	POLK	PROJECT NUMBER	TAP-T-8477(613)--8V-77	SHEET TITLE	SITE DETAILS	SHEET NUMBER	I.12



03 I.13 ELEVATION: GATEWAY SIGN, SIDE

N.T.S

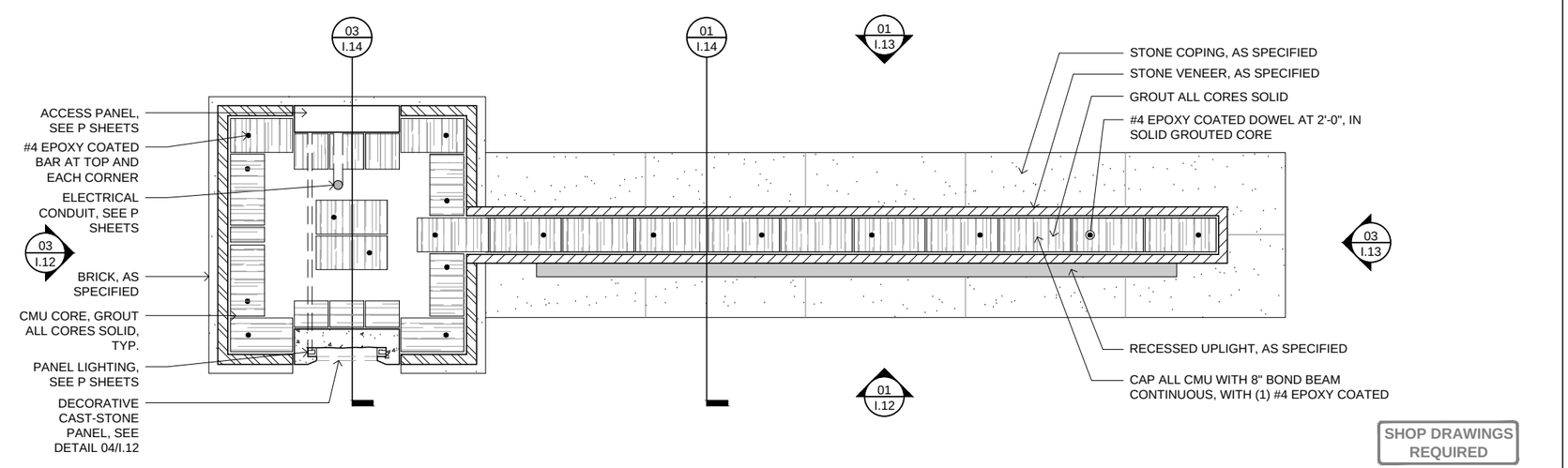


01 I.13 ELEVATION: GATEWAY SIGN, BACK

N.T.S

04 I.13 NOT USED

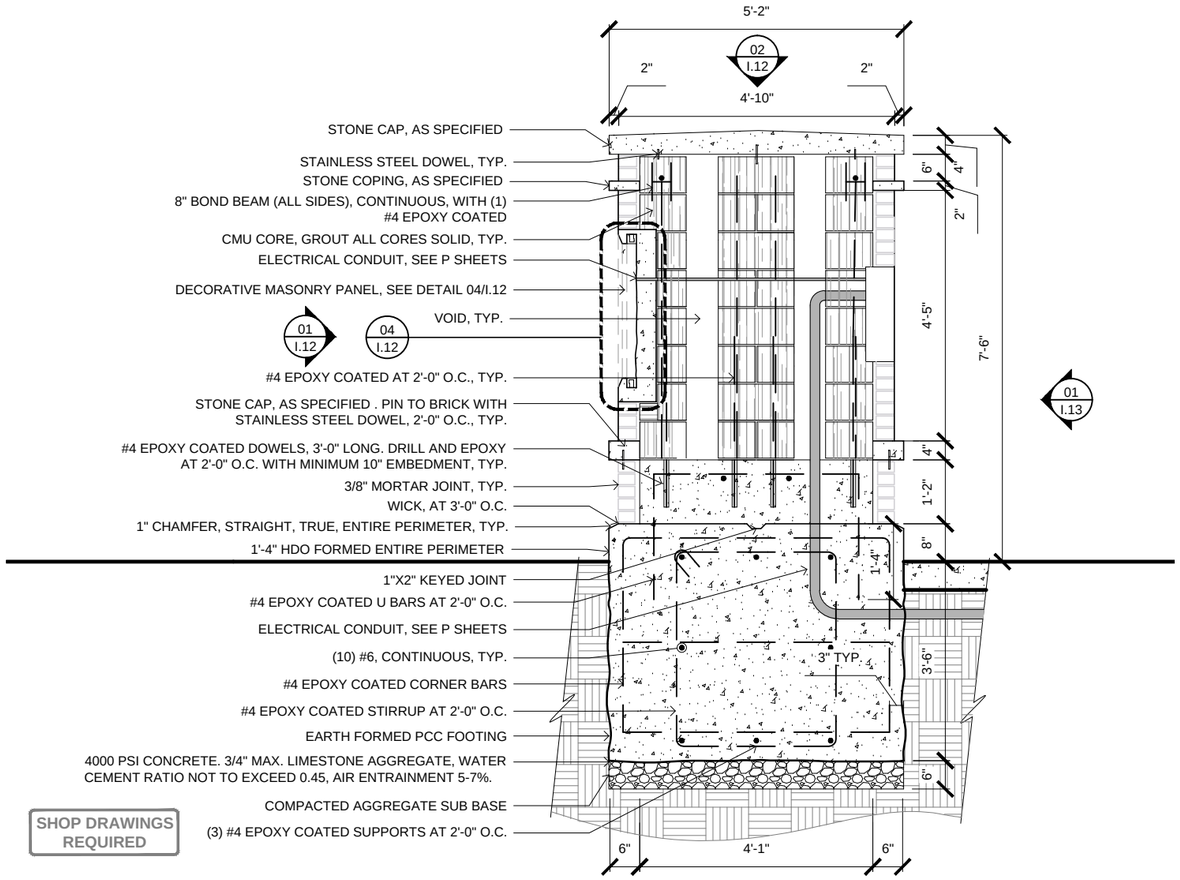
N.T.S



02 I.13 SECTION: GATEWAY SIGN

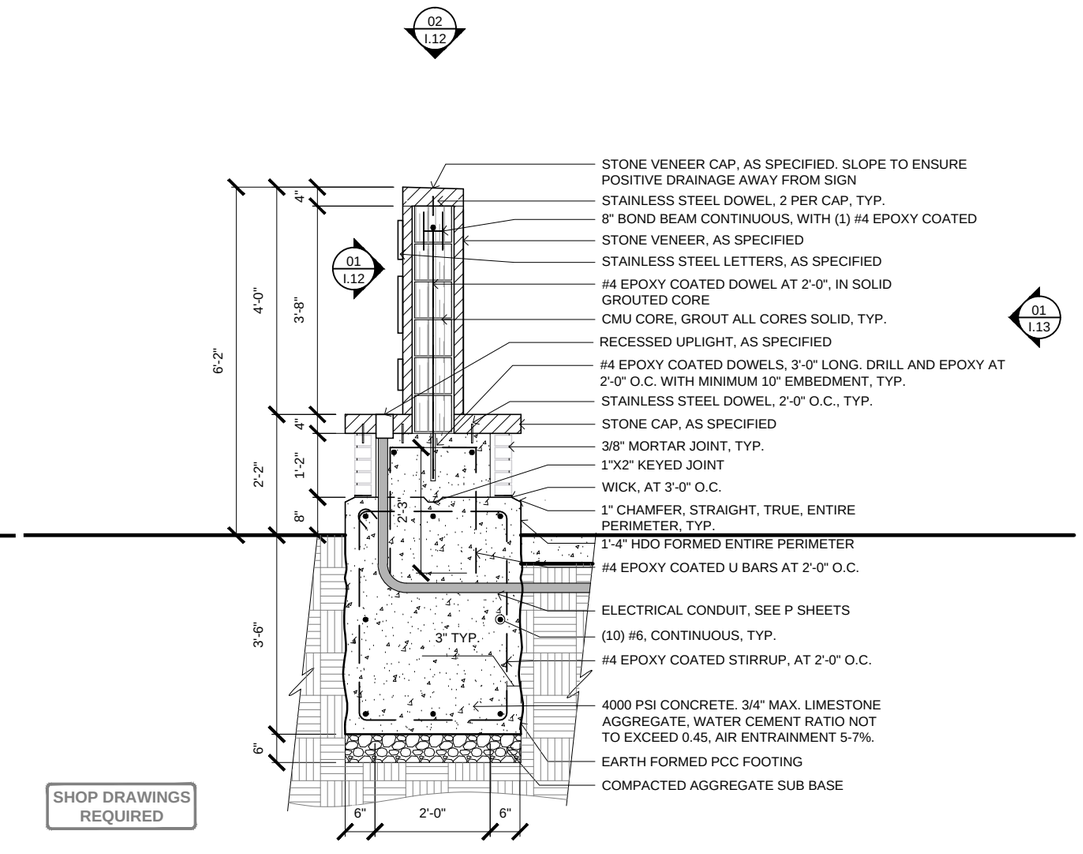
N.T.S

PROJECT	HICKMAN ROAD STREETSCAPE	DESIGN TEAM	CONFLUENCE bluestone engineering	COUNTY	POLK	PROJECT NUMBER	TAP-T-8477(613)--8V-77	SHEET TITLE	SITE DETAILS	SHEET NUMBER	I.13



03 I.14 SECTION: GATEWAY SIGN

N.T.S



01 I.14 SECTION: GATEWAY SIGN

N.T.S

04 I.14 NOT USED

N.T.S

02 I.14 NOT USED

N.T.S

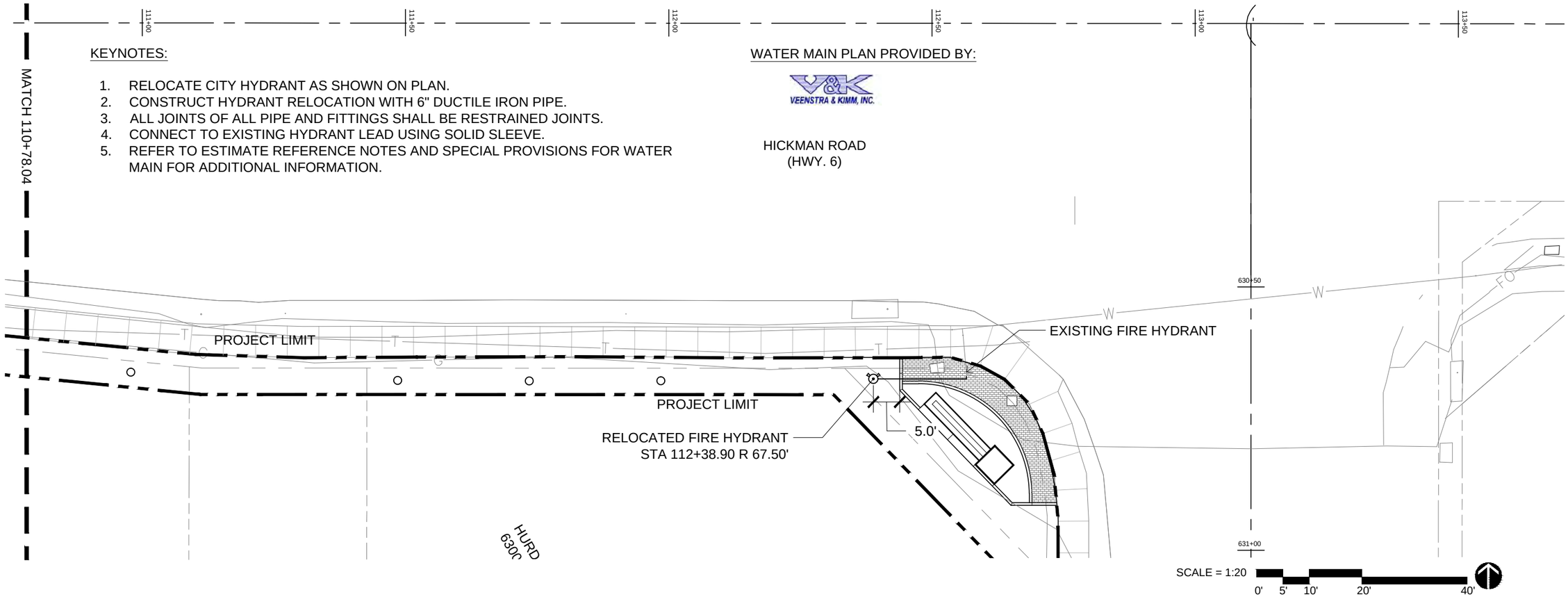
PROJECT	HICKMAN ROAD STREETSCAPE	DESIGN TEAM	CONFLUENCE bluestone engineering	COUNTY	POLK	PROJECT NUMBER	TAP-T-8477(613)--8V-77	SHEET TITLE	SITE DETAILS	SHEET NUMBER	I.14

KEYNOTES:

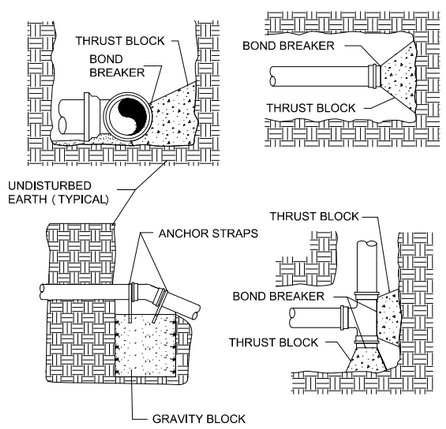
1. RELOCATE CITY HYDRANT AS SHOWN ON PLAN.
2. CONSTRUCT HYDRANT RELOCATION WITH 6" DUCTILE IRON PIPE.
3. ALL JOINTS OF ALL PIPE AND FITTINGS SHALL BE RESTRAINED JOINTS.
4. CONNECT TO EXISTING HYDRANT LEAD USING SOLID SLEEVE.
5. REFER TO ESTIMATE REFERENCE NOTES AND SPECIAL PROVISIONS FOR WATER MAIN FOR ADDITIONAL INFORMATION.

WATER MAIN PLAN PROVIDED BY:

VEENSTRA & KIMM, INC.



01 WATER MAIN PLAN



VOLUME IN CUBIC YARDS				
SIZE OF PIPE	BENDS			
	11 1/4°	22.5°	45°	90°
4"	0.16	0.43	0.9	1.35
6"	0.16	0.43	0.9	1.35
8"	0.3	0.76	1.57	2.33
12"	0.65	1.63	3.33	4.92
16"	1.16	2.85	5.8	8.56
20"	1.78	4.37	8.91	13.14
24"	2.47	6.17	12.63	18.64
30"	3.82	9.51	19.43	28.66

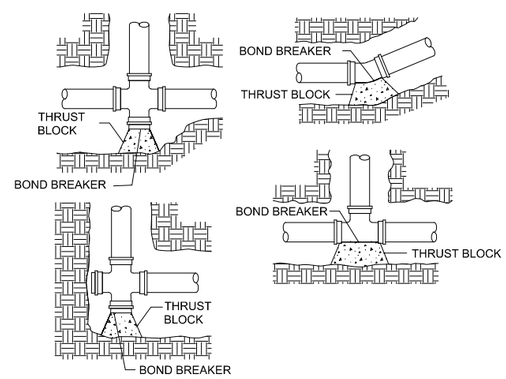
VOLUME OF GRAVITY BLOCK

NOT TO SCALE

MINIMUM BEARING SURFACE (IN SQ. FT.)					
SIZE OF PIPE	BENDS				TEE OR DEAD END
	11 1/4°	22.5°	45°	90°	
6"	1.00	1.25	2.25	4.50	3.00
8"	1.00	2.00	4.00	7.90	5.25
12"	2.00	4.25	8.25	18.00	11.00
16"	8.00	15.25	28.00	48.00	35.00
20"	8.50	16.50	32.00	57.00	40.00
24"	9.00	18.00	35.00	65.00	45.00

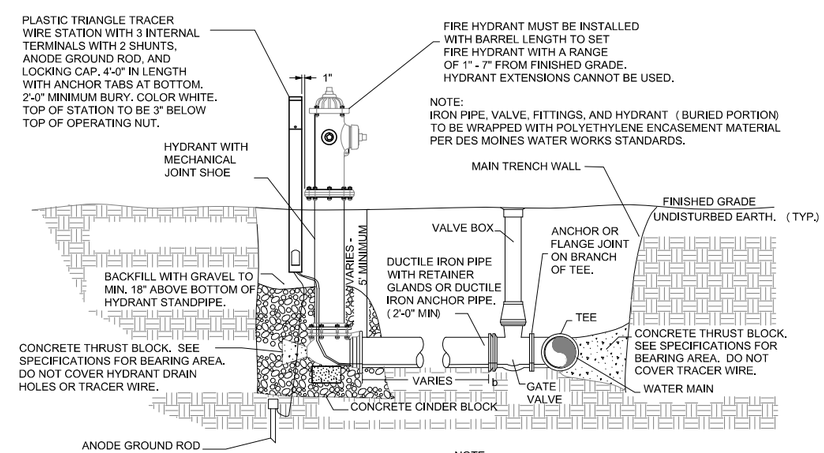
STANDARD CONCRETE THRUST BLOCKS

NOT TO SCALE



NOTE:
RESTRAINED JOINTS MAY BE USED IN LIEU OF BLOCKING WITH PRIOR APPROVAL OF THIS ENGINEERING OFFICE.

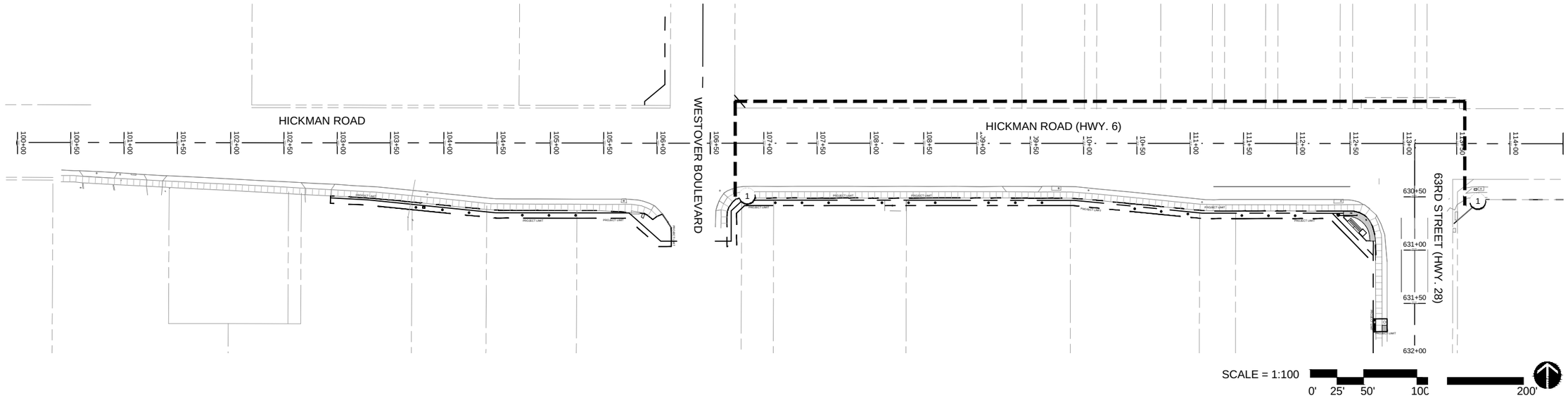
03 SECTION/DETAILS: THRUST BLOCKS N.T.S.



NOTE:
1. FIRE HYDRANT BRANCH MUST BE LEVEL OR ABOVE WATER MAIN.

02 SECTION: STANDARD HYDRANT ON WATER MAINS 16" OR LESS N.T.S.

PROJECT	HICKMAN ROAD STREETSCAPE	DESIGN TEAM	CONFLUENCE bluestone engineering	COUNTY	POLK	PROJECT NUMBER	TAP-T-8477(613)--8V-77	SHEET TITLE	WATER MAIN PLAN	SHEET NUMBER	M.01



01 TRAFFIC CONTROL PLAN

GENERAL TRAFFIC / PEDESTRIAN CONTROL NOTES:

1. SIDEWALK CLOSURES MAY BE REQUIRED FOR FIRE HYDRANT RELOCATION AND OR OTHER RELATED CONSTRUCTION ACTIVITIES.
2. PROPOSED SIGN SPACING MAY BE MODIFIED AS APPROVED BY THE CITY OF WINDSOR HEIGHTS TO MEET EXISTING FIELD CONDITIONS OR TO PREVENT OBSTRUCTIONS.
3. PROPOSED CHANGES IN THE TRAFFIC CONTROL / PEDESTRIAN CONTROL PLAN SHALL BE REVIEWED BY THE CITY OF WINDSOR HEIGHTS BEFORE CHANGES ARE MADE.
4. TRAFFIC CONTROL DEVICES, PROCEDURES AND LAYOUTS SHALL BE IN ACCORDANCE WITH THE CURRENT EDITION OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES AND SHALL BE APPROVED BY THE CITY OF WINDSOR HEIGHTS PRIOR TO PLACEMENT.
5. THE CONTRACTOR SHALL NOTIFY THE CITY OF WINDSOR HEIGHTS ONE WEEK PRIOR TO PLACING TRAFFIC CONTROL SIGNING SO PUBLIC AND BUSINESSES CAN BE MADE AWARE OF UPCOMING CONSTRUCTION.
6. CONTRACTOR SHALL INSTALL SAFETY FENCING AND IMPLEMENT SAFETY MEASURES TO KEEP PERSONNEL OTHER THAN CONSTRUCTION WORKERS OUT OF THE CONSTRUCTION AREA.
7. LOCATION OF TRAFFIC CONTROL DEVICES ARE GENERAL IN NATURE AND NOT EXACT. CONTRACTOR SHALL REVIEW LOCATION AND SPACING TO VERIFY IT MEETS THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES STANDARDS. CONTRACTOR TO SUBMIT FINAL TRAFFIC CONTROL / PEDESTRIAN CONTROL PLANS PRIOR TO THE BEGINNING OF CONSTRUCTION FOR CITY WINDSOR HEIGHTS AND LANDSCAPE ARCHITECT TO APPROVE.
8. STAGING PLANS ARE BEST ATTEMPT TO PROVIDE SAFE VEHICULAR AND PEDESTRIAN MOVEMENTS IN AND AROUND THE PROJECT SITE AT ALL TIMES. IT IS RECOMMENDED THAT THE CONTRACTOR THOROUGHLY REVIEW ALL STAGING CONCEPTS, DEVELOP IDEAS THAT MAY IMPROVE THE CONSTRUCTION PROCESS WHILE MAINTAINING SAFETY, AND SUBMIT IDEAS FOR REVIEW.
9. NO LANE CLOSURES ON U.S. HWY. 6 OR IOWA HWY. 28 WILL BE ALLOWED.

SIGN TYPES:

TRAFFIC CONTROL LEGEND:

RE-ROUTE PEDESTRIAN TRAFFIC

PROJECT	HICKMAN ROAD STREETSCAPE	DESIGN TEAM	CONFLUENCE bluestone engineering	COUNTY	POLK	PROJECT NUMBER	TAP-T-8477(613)--8V-77	SHEET TITLE	TRAFFIC CONTROL PLAN	SHEET NUMBER	TC.01

Hickman Road Streetscape

TAP-T-8477(613)--8V-77
LETTING DATE: MAY 19, 2015

TABULATED BY: AR
CHECKED BY: SG

APPROVED BY: SG

PROJECT: WH Hickman Road Streetscape

ITEM	ITEM CODE	DESCRIPTION	QUANITY	UNIT	UNIT PRICE	TOTAL
1	2101-0850001	CLEARING AND GRUBBING	0.18	ACRE	$10,000.00	$1,800.00
2	2111-8174100	GRANULAR SUBBASE	14	CY	$100.00	$1,400.00
3	2401-7207010	REMOVAL OF CONCRETE	24	CY	$50.00	$1,200.00
4	2511-7526006	SIDEWALK, P.C. CONCRETE, 6IN.	30	SY	$45.00	$1,350.00
5	2523-0000100	LIGHTING POLES	21	EACH	$1,300.00	$27,300.00
6	2523-0000400	CONTROLS CABINET	1	EACH	$1,200.00	$1,200.00
7	2526-8285000	CONSTRUCTION SURVEY	1	LS	$5,000.00	$5,000.00
8	2528-8445110	TRAFFIC CONTROL	1	LS	$5,000.00	$5,000.00
9	2533-4980005	MOBILIZATION	1	LS	$25,000.00	$25,000.00
10	2599-9999003	CONCRETE FOOTING	10	CY	$1,500.00	$15,000.00
11	2599-9999003	PLANTING SOIL MIX	4	CY	$100.00	$400.00
12	2599-9999003	GATEWAY SIGN FOOTING EXCAVATION	10	CY	$500.00	$5,000.00
13	2599-9999005	RELOCATE FIRE HYDRANT	1	EA	$3,000.00	$3,000.00
14	2599-9999005	BENCH	1	EA	$1,500.00	$1,500.00
15	2599-9999005	TRASH RECEPTACLE	1	EA	$800.00	$800.00
16	2599-9999005	CABINET FOUNDATION	1	EACH	$2,500.00	$2,500.00
17	2599-9999005	HANDHOLE	2	EACH	$375.00	$750.00
18	2599-9999005	S2 FIXTURE TYPE	3	EACH	$1,500.00	$4,500.00
19	2599-9999005	S3 FIXTURE TYPE	9	EACH	$3,000.00	$27,000.00
20	2599-9999005	POLE BASE	21	EACH	$573.00	$12,033.00
21	2599-9999005	GROUND ROD	22	EACH	$95.00	$2,090.00
22	2599-9999005	SOLAR PANEL ASSEMBLY	1	EACH	$4,000.00	$4,000.00
23	2599-9999005	DISCONNECT SWITCH	1	EACH	$450.00	$450.00
24	2599-9999005	ELECTRICAL ENCLOSURE	1	EACH	$73.00	$73.00
25	2599-9999009	6" PCC CONCRETE, EDGER	100	LF	$20.00	$2,000.00
26	2599-9999009	BORE	160	LF	$16.50	$2,640.00
27	2599-9999009	TRENCH	785	LF	$1.50	$1,177.50
28	2599-9999009	3/4" RIGID METAL CONDUIT	30	LF	$8.73	$261.90
29	2599-9999009	1" PVC CONDUIT (alt#1)	945	LF	$7.40	$6,993.00
30	2599-9999009	1 1/4" PVC CONDUIT	945	LF	$8.85	$8,363.25
31	2599-9999009	2" PVC CONDUIT	27	LF	$11.60	$313.20
32	2599-9999009	ELECTRICAL CIRCUITS - #2 THWN COPPER CONDUCTORS	27	STD	$3.23	$87.21
33	2599-9999009	ELECTRICAL CIRCUITS - #4 THWN COPPER CONDUCTORS	2730	LF	$1.82	$4,968.60
34	2599-9999009	ELECTRICAL CIRCUITS - #6 THWN COPPER CONDUCTORS	2836	LF	$1.31	$3,715.16
35	2599-9999009	ELECTRICAL CIRCUITS - #8 THWN COPPER CONDUCTORS	2730	LF	$0.83	$2,265.90
36	2599-9999010	DECORATIVE MASONRY PANEL	1	LS	$4,000.00	$4,000.00
37	2599-9999010	METAL SIGNAGE LETTERS	1	LS	$5,000.00	$5,000.00
38	2599-9999010	SITE CLEANUP	1	LS	$3,000.00	$3,000.00
39	2599-9999014	BRICK VENEER	150	SF	$50.00	$7,500.00
40	2599-9999014	MASONRY CAPSTONE	75	SF	$50.00	$3,750.00
41	2599-9999014	STONE VENEER	115	SF	$50.00	$5,750.00
42	2599-9999014	PAVERS	200	SF	$20.00	$4,000.00
43	2599-9999018	PAVER SUBBASE	7	SY	$25.00	$175.00
44	2601-2639010	SODDING	77	SQ	$75.00	$5,775.00
45	2601-2643110	WATERING FOR SOD	45	MGAL	$30.00	$1,350.00
46	2610-0000120	TREES, FURNISHED AND INSTALLED (WITH WARRANTY)	9	EACH	$1,000.00	$9,000.00
47	2610-0000180	FLOWERS, AS PER PLAN	1	LS	$20.00	$20.00
48	2610-0000212	MULCH, SHREDDED BARK	2	CY	$100.00	$200.00
49	2611-0000100	SHRUBS, FURNISED AND INSTALLED (WITH WARRANTY)	36	EACH	$50.00	$1,800.00

TOTAL CONSTRUCTION COST $232,451.72

Iowa Department of Transportation

SPECIAL PROVISIONS FOR
SIGNAGE

Polk County
TAP-T-8477(613)--8V-77

Effective Date
May 19, 2015

THE STANDARD SPECIFICATIONS, SERIES 2012, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

SPECIAL PROVISION SP 5

SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Exterior dimensional letters of cut metal construction.

1.2 QUALITY ASSURANCE

A. Installer: Installation shall be performed by installer specialized and experienced in work similar to that required for this project.

1.3 SUBMITTALS
A. Product Data: Submit product data for specified products. Include material details for each sign letter specified.
B. Shop Drawings: Submit shop drawings showing layout, profiles, and product components, including dimensions, anchorage, and accessories.
C. Samples: Submit supplier's standard color chart for selection purposes and selected colors for verification purposes.
D. Installation: Submit supplier's installation instructions.
E. Closeout Submittals:
1. Submit operation and maintenance data for installed products, including precautions against harmful cleaning materials and methods.
2. Submit warranty documents specified herein.

1.4 WARRANTY
A. Manufacturer's Warranty: Submit manufacturer's standard warranty document executed by authorized company official.
1. Warranty Period: 1 year from installation date.

PART 2 - PRODUCTS

2.1 SIGNAGE LETTERS

A. Material:
1. Stainless Steel in Satin.
a. Letters to be powder coated Black. Contractor to submit full range of color samples for Landscape Architect to select from.
B. Cut Stainless Steel Letters
1. Letterstyle: Font 'Book Antiqua' in italic-bold and regular.
2. Letter Cap Height: 13 inches and 6 inches.
3. Letter Depth: ¼ inches.

C. Mounting Method: Projected Stud Mount.

2.2 FABRICATION – GENERAL

A. General: Comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction.
B. Design, fabricate, and install sign assemblies to prevent buckling, opening up of joints, and over-stressing of welds and fasteners.
C. Mill joints to a tight, hairline fit. Form joints exposed to the weather to exclude water penetration.
D. Conceal fasteners if possible; otherwise, locate fasteners where they will be inconspicuous.

E. Create signage to required sizes and layout. Comply with requirements indicated for design, dimensions, finish, color, and details of construction.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Site Verification of Conditions: Verify installation conditions previously established under other sections are acceptable for product installation in accordance with manufacturer's instructions.

B. Scheduling of installation by Engineer or it's representative implies that substrate and conditions are prepared and ready for product installation. Proceeding with installation implies installer's acceptance of substrate and conditions.

3.2 INSTALLATION

A Install product in accordance with supplier's instructions.

B. Install product in locations indicated using mounting methods recommended by sign manufacturer and free from distortion, warp, or defect adversely affecting appearance.

C. Install product level, plumb, and at heights indicated.

3.3 CLEANING, PROTECTION, AND REPAIR

A. Repair scratches and other damage which might have occurred during installation.

B. Remove temporary coverings and protection to adjacent work areas. Clean installed products in accordance with manufacturer's instructions prior to the Engineer's acceptance.

3.4 SIGN SCHEDULE

A. Schedule: Refer to signage drawings for sizes, locations and layout of signage types, sign text copy, and graphics.

3.5 MEASUREMENT AND PAYMENT

A. Metal Signage Letters

1. Measurement and payment for this item shall be made on a lump sum basis. Included with this item is all labor, equipment and materials necessary for furnishing and installing the signage letters. All fasteners and connectors shall be considered incidental to the unit price.

Iowa Department of Transportation

SPECIAL PROVISIONS FOR
STREET LIGHTING

Polk County
TAP-T-8477(613)--8V-77

Effective Date
May 19, 2015

THE STANDARD SPECIFICATIONS, SERIES 2012, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

SPECIAL PROVISION E1

STREET LIGHTING

PART 1 - GENERAL

1.1 SCOPE

A. This Special Provision, and the sections herein, governs the furnishing of all material, equipment, and labor for the installation and testing of a complete, operational street lighting system, including power to miscellaneous equipment noted. All material and equipment supplied, and all work performed, shall be in accordance with these Special Provisions, and as shown on the Plans.

1.2 CODES AND STANDARDS

A. In addition to the requirements of the Plans and the Special Provisions, all material and work shall conform to the requirements of the 2008 National Electrical Code (ANSI/NFPA 70), the National Electrical Safety Code (ANSI C2), and the standards of the American Society for Testing Materials (ASTM) and the American Standards Associations (ASA), and local ordinances. All electrical equipment shall conform to the standards of the National Electrical Manufacturers Association (NEMA).

1.3 REVISION OF STANDARD SPECIFICATIONS

A. When reference is made to a standard specification (NEMA, ASTM, ASA, ANSI, IES, IPCEA, UL, AASHTO, FSS, etc.), the standard specification referred to shall be construed to mean the latest revision of said standard specification, as amended, that is in effect on the date the Plans are approved, except as otherwise shown on the Plans or specified in the Special Provisions.

1.4 PLANS

1. Incidental Parts

   a. All incidental parts, which are not shown on the Plans or specified herein and which are necessary to complete the street lighting system, shall be supplied and installed as though such parts were shown on the Plans or specified herein. All systems shall be complete and in operation to the satisfaction of the City and Engineer at the time of acceptance of the work.

2. Appurtenances

   a. All appurtenances shall be installed as shown on the Plans, or as specified in the Special Provisions. Any deviations must be established and authorized by the City and/or Engineer in the field.

3. As-Built Plans

   a. Prior to the acceptance of the work, the Contractor shall submit an “As-Built” or corrected plan showing in detail all construction changes, especially the location and depth of the conduit.

1.5 SHOP DRAWINGS

A. Before commencing the installation of any material or equipment, the Contractor shall submit two copies of complete shop drawings for manufactured materials and equipment to the City/Engineer for approval. Manufacturers’ bulletins, leaflets and other descriptive data that contain cuts,

dimensions, specifications and wiring diagrams will be acceptable for standard cataloged equipment. Such bulletins, leaflets and other descriptive data shall be clearly marked to show the item to be used to satisfy a required item in the schedule of materials shown on the Plans, or as specified in the Special Provisions. The City/Engineer may require other descriptive data, drawings, and diagrams for non-cataloged equipment or materials. In the event any items of material or equipment contained on the shop drawings fail to comply with the specification requirements, such items may be rejected by the Engineer. Orders for material and equipment shall not be placed until written approval is obtained from the Engineer.

B. Provide shop drawings for the following:

1. Luminaires and standards.

2. Controllers and accessories.

3. Junction boxes/hand holes.

4. Cable splices and connections.

5. Solar array.

6. Inverter.

1.6 ELECTRICAL PERMITS AND INSPECTIONS

A. The Contractor is responsible for obtaining an electrical permit from the City before any excavation for the control center foundation or the service feed takes place. The Contractor shall contact the City for an electrical inspection when the control center is ready.

B. The Contractor is responsible for obtaining such permits and approvals as may be required by the appropriate electrical utility company and is responsible for all costs associated with extending electrical power from the service point to the control center whatever the distance. The Contractor shall notify the appropriate electrical utility company ahead of when the system needs to be energized.

C. The City will assign an address for the control center, which the Contractor shall use when obtaining permits and when dealing with the electrical utility company.

D. The Contractor shall contact the City once project work begins including; trenching and pole installations and to request final project inspections.

1.7 SYSTEM TESTING

A. The Contractor is responsible for testing the completed street lighting system. Prior to acceptance by the City, the Contractor shall notify the City for an inspection as soon as the system(s) is (are) ready.

B. All street lighting system elements shall function properly as a complete system for a minimum period of 15 days before acceptance by the City. The 15 day period shall be continuous and initiated by the inspector. Any malfunction observed or recorded shall stop the test period as of the time of the malfunction. A period shall start when the malfunction has been repaired to the satisfaction of the inspector.

1.8 MAINTENANCE WORK

A. The Contractor is responsible for making all repairs and replacements, including, downed poles, damaged or cut cables, and burnt out lamps, to the street lighting system, regardless of the cause or responsible party, until the entire system is completed, inspected and accepted by the City.

1.9 GUARANTEE

A. Fully guarantee the street lighting installation against defective equipment and materials for 24 months. If defects develop under normal operating conditions within these specified periods after acceptance of the completed installation by the Engineer, the defects shall be corrected by, and at the expense of the Contractor.

PART 2 - MATERIALS AND EQUIPMENT

2.1 GENERAL

A. This section governs all luminaires, poles, conduits, cables and other material and equipment supplied by the Contractor as required to complete the street lighting system as shown on the Plans and as specified in the Special Provisions. All lighting equipment shall be new and of the best grade and shall be approved by the City/Engineer.

2.2 STANDARDS

A. The type of pole and length of luminaire arm (if any) shall be as specified on the plans.

B. Pole assembly shall be capable of withstanding winds up to 80 MPH with a 1.3 gust factor without failure.

C. The surface of the pole shall have a smooth finish. The finish color for the standard, arms and base covers shall be black. Finish coating shall be electrostatically applied semi-gloss, polyester powder coat.

D. Base Cover/Joint Cover: Cast aluminum base and joint cover shall clamp around the pole assembly using stainless steel hardware.

E. Maintenance Opening: A 4 inch by 10 inch opening shall be provided in the pole shaft for wiring. Secure cover with stainless steel hardware.

F. Banner Arms: Dual banner arm mounts suitable for an 18 inches wide, 48 inches long banner.

2.3 FOUNDATIONS

A. Construct cast-in-place concrete foundations for all lighting standards. Form and pour the top portion of all foundations in form work to at least 6 inches below the finished ground level. Ensure the foundations conform in all respects to the details including reinforcement as shown on the Plans. Pre-cast bases meeting the project requirements shall also be acceptable.

B. Ensure finished surfaces are smooth are free from stains and foreign materials.

C. Anchor bolts shall be threaded a minimum of 6 inches at one end and have a 4-inch long, 90 degree bend at the other end.

D. Place anchor bolts to provide for placement of nuts and washers on the top and bottom of the pole flange, leaving ample room for adjustment and plumbing the standard. After leveling the poles, expansive type grout shall be troweled between the pole base and the foundation for gaps of 1 inch or greater. Exposed edges of grout shall be neatly finished. Place a weep hole in the grout.

2.4 ILLUMINATION EQUIPMENT

A. The manufacturer, type and model of approved, acceptable luminaires shall be supplied as shown on the Plans.

2.5 SOLAR ARRAY

A. The manufacturer, type and model of approved, acceptable solar array shall be supplied as shown on the Plans.

B. Metals: Aluminum sheets and plates used in the construction of modules shall be compliant to ASTM B209.

C. Backsheet: Thin polymer sheets to be used which provide the following key functions:

1. Physical protection from puncture and abrasion.

2. Moisture protection and low thermal resistance.

3. Electrical insulation to isolate the cells and connections from the environment.

4. UV and moisture stability over the life of the module. Prevent ingress of water or water vapor.

5. Improve efficiency through optimized internal reflection.

D. Glass Cover: Anti-reflective tempered glass to be used as the protective shield for the active surface area of the module. To be carefully chosen for high impact and thermal shock resistance.

E. Encapsulation: The encapsulant shall fill all spaces inside the module and shall adhere to the front glass and the backsheet. The encapsulant should be stable at elevated temperature and high UV exposure.

F. Cell Material: All the photovoltaic cells within the module are made from crystalline silicon. These cells are produced through advanced printing technology and using proprietary surface texturing to enhance sunlight capture.

G. Junction Box: Each module shall have a sealed junction box. This box shall not extend more than one and three-quarters inch (1¾") from the backsheet of the module. This junction box shall contain both the positive and negative output terminal posts. The junction box shall contain a small replaceable cover for easy access for replacement of the blocking diode. The junction box shall be completely filled with a soft, clear, removable, self-healing, room temperature cure, dielectric potting gel leaving no air gaps.

H. Intercell Connections: Intercell connections contained by the module shall be ready to allow for thermal expansion and to discharge mechanical stress. Intercell electrical contacts to the collector grid contact area of one cell and the back contact area of the next cell shall be provided. These connections shall be designed such that failure of any contact shall not degrade the individual cell electrical output by more than 5% from its output under Standard Test Conditions (STC). Solder shall cover the contact area where the intercell connection overlays the front cell area of one cell and the back contact area of the next cell.

I. The positive and negative of cell outputs usually drive through the backsheet of the module. After the positive and negative outputs are soldered onto the outside of the solar panel, it is essential to connect the positive and negative outputs with positive and negative output cables inside the Junction Box.

2.6 INVERTER

A. The manufacturer, type and model of approved, acceptable micro inverter shall be supplied as shown on the Plans.

B. Input power range shall be 210-300W with a maximum input DC voltage of 48V.

C. Peak output power rating of 250W and continuous rated power output of 240W at 240VAC with a power factor of >0.95.

D. CEC weighted efficiency of 96.5% at 240VAC.

E. NEMA 6 enclosure, avoid installation where in direct contact with rain or sunlight.

2.7 ELECTRICAL MATERIAL

A. The types and lengths of cables shall be supplied as shown on the Plans or as specified in the Special Provisions.

B. Circuits

1. Unless specifically noted otherwise, install an underground, multiple system roadway lighting circuit that is totally encased in conduit. Construct circuits and control stations according to the Plans.

2. Ensure circuits are complete with all necessary accessories for proper operation. Thoroughly coordinate disconnecting devices, protective devices, and all other equipment to sure a safe operating lighting system. If any changes in arrangement of the circuit system are considered necessary by the Contractor, submit details of changes and reasons to the City/Engineer for approval. Obtain the City's/Engineer's approval prior to making changes.

C. Pole Wiring

1. Pole wiring above handhole in pole to luminaire(s) shall be single conductor cable with minimum 600 volt rating, No. 10 AWG Type THHN/THWN. Conductor shall be stranded annealed copper. A grounding conductor shall be No. 6 AWG solid copper wire. NM cable (Romex) is not acceptable.

2.8 CONTROL CENTER PEDESTAL

A. Control center shall be an underground service type, rated for 100 amperes, 120/240 volts, unless otherwise noted. Pedestal shall be stainless steel rain tight construction with individual meter, panel, contactor, HAND/AUTO test switch, receptacle, and photocell. Enclosure shall have piano hinged doors with padlocking provisions. Meter base shall be of the type used by the local utility. Panelboard shall have plated copper buss and shall be configured as shown on the plans. All factory installed wire shall be copper. Control center shall be U.L. listed. Photocell shall be mounted inside the control cabinet with a window in the cabinet facing south for vandal protection. Photocell shall be mounted as close as possible to the window. See approved material listing.

2.9 CONDUIT

A. The type, size and length of conduit and fittings shall be supplied as shown on the Plans or Standard Drawings, or as specified in the Special Provisions.

B. PVC Conduit Material

1. Rigid nonmetallic conduit shall be 2 inch Schedule 40 polyvinyl chloride (PVC) conduit unless noted otherwise. The conduit shall bear an Underwriters' Laboratories label and shall conform to Federal Specification WC-1094A (latest version). Fittings shall be fabricated from PVS and have the same chemical and physical properties as the conduit with which it is being used. 2 inch Schedule 80 PVC conduit is required under all road and commercial driveway crossings.

C. HDPE Conduit Material

1. Flexible nonmetallic conduit shall be 2 inch Schedule 40, high-density polyethylene conduit (HDPE). The conduit shall be smooth walled inside and out. The conduit shall be gray in color, and equipped with a polypropylene pull rope. The conduit shall be manufactured to ASTM D2447 specifications and shall meet the following applicable requirements:

   a. Minimum Wall Thickness: 2 inch Schedule 40 – 0.154”
   b. Tensile Strength: 3,300 psi ASTM D-638
   c. Elongation: 800 % ASTM D-638
   d. Density: 60 lbs/cu. ft. ASTM D-1505
   e. Melt Index: 0.011 oz./10 min. ASTM D-1238(E)
   f. Brittle Temp.: <-103º F ASTM D-746
   g. ESCR (Bell Test): >1500 F50 hrs. ASTM D-1693(C)
   h. Rockwell Hardness L: 49 ASTM D-785
   i. Shore Hardness D: 61 ASTM D-2240

D. HDPE Conduit Fittings

1. An approved factory coupling (PNA E-Loc or approved equal) shall be used for connection of the HDPE conduit to a 90 degree factory PVC elbow or between two lengths of HDPE conduit. The coupling shall be of high-density polyethylene. The coupling shall have individual reverse-locking threads with a built-in center stop.

2.10 SERVICE AND JUNCTION BOXES

A. The type and size of service and junction boxes shall be supplied as shown on the Plans. The Contractor may also use precast concrete junction boxes with cast iron covers, reinforced plastic mortar junction boxes, or cast-iron service boxes as may be shown on the Plans.

PART 3 - CONSTRUCTION REQUIRMENTS

3.1 GENERAL

A. This section governs the construction of all foundations and the installation of all luminaires, poles, conduits, cables and other material and equipment as required to complete the street lighting system as shown on the Plans, the Standard Drawings, and as specified in the Special Provisions. The Contractor is responsible for verifying the correct line and grade of all concrete foundations and conduits prior to installation.

3.2 POLE AND LUMINAIRE INSTALLATION

A. Street light poles and luminaires shall be installed as shown on the Plans and as specified in the Special Provisions or as directed by the City/Engineer.

B. Pole Wiring

1. The luminaire shall be connected to the secondary cables through in-line, waterproof, breakaway fuseholders. All secondary cable connections inside a pole base shall be made with Buchanan (or equal) Y-tap connectors with slipover rubber boots. The Contractor shall install waterproof, breakaway fused tap kits in each pole base. Provide two fused Y-taps for the phase and neutral lead (Buchanan 82S), and one non-fused Y-tap for the ground (Buchanan 83S). Type KTK 5-amp high interrupting fuses, or approved equal, shall be installed. The tap connectors shall be installed convenient to the handhole at the base of the pole. 1 foot of surplus cable shall be coiled at the line side of the tap connector. The

connectors for the ground shall be installed with the male end of the connector on the line side.

2. The ground wires shall be fastened to the factory-installed grounding lug(s) in the base of the pole.

3. The pole wiring shall be color coded (black/red = hot, white = neutral, green = ground) and without splices from the fuseholder to the connection at the luminaire. Luminaires (post-top) not equipped with terminal blocks shall be connected to the pole wiring with approved butt connectors. Circuit labels shall be installed on the pole wiring.

C. Pole and Luminaire Erection on a Concrete Foundation

1. Pole installation shall wait a minimum of 5 days after construction of the foundation. The pole will be mounted to the base using nuts and washers connected to cast-in-place anchor bolts. Using the lower nuts, the pole shall be brought into vertical alignment (plumb), the top nuts tightened, and the anchor bolt covers installed. A luminaire on a gooseneck arm shall project from the street side of the pole and be perpendicular to the curb line. The opening between the pole base and the foundation shall be taped and grouted. Handhole covers shall be situated so that they are on the house side or away from oncoming traffic.

D. Luminaire Adjustment

1. The luminaire shall be adjusted and leveled in accordance with the manufacturer's instructions, to place the nadir directly below the light center.

E. Lamp Installation

1. The installation date shall be marked on the base of the lamp prior to installing it in the luminaire.

F. Storage and Protection

1. Poles and arms shall be kept dry and out of the weather until time for erection. The manufacturer's protective paper wrapper may be removed for inspection upon receipt from the manufacturer.

G. Clean Up

1. Poles and luminaires shall be cleaned of dirt, grease, etc. Scratches, abrasions or other surface damage shall be repaired to like new condition.

3.3 GROUNDING

A. Use ground rods and connections to ground major components of the lighting system, such as control stations and lighting standards. Grounding system must have a resistance to ground of 25 ohms or less. Whenever the ground rod installation does not have a resistance to ground of 25 ohms or less, couple additional rods to the first, and drive to the full depth until the required resistance is obtained. If a maximum depth of 50 feet is reached, or if obstacles to further driving are encountered, install additional ground rods until the required resistance to ground is obtained.

B. Ground rods shall be driven to at least 18 inches below finished grade. Drive ground rods as vertical as possible. The minimum horizontal clearance between all rods in a multiple ground installation is to be 6 feet.

3.4 FOUNDATIONS

A. Foundation anchors shall be of the size and type required for the pole.

B. Concrete Foundations

1. The bottom of the concrete foundations shall rest on firm ground; foundations shall be poured monolithic. The exposed portions shall be formed to present a neat appearance. Forms shall be true to line and grade. Top of footing for standards, except special foundations, shall be finished to curb, or sidewalk grade or as directed by the City/Engineer. Forms shall be rigid and securely braced in place. Conduit ends and anchor bolts shall be placed in proper position, to proper heights, and held in place by means of a template until the concrete sets. Anchor bolts shall be provided with hex head nut, flat washer and lock washer. Both forms and ground which will contact the concrete shall be thoroughly moistened before placing concrete.

2. Pole base and control center foundations shall be 3,500 psi, air entrained, 28-day compressive strength Portland Cement Concrete.

3. Concrete pole bases shall be consolidated by an internal type vibrator. The vibrator shall operate at frequencies of vibration not less than 4,500 cycles per minute under load. The amplitude of vibration shall be adequate to consolidate concrete properly. The concrete shall be cured with an approved moisture barrier such as wet burlap, polyethylene, etc., for a period of 72 hours. Cold weather curing shall be such that the concrete temperature shall be maintained above freezing for the entire curing period. Forms shall not be removed until the concrete is thoroughly set.

4. The exposed portions of the foundation shall be finished to present a neat appearance. Finishing should be done with the positioning jig in place. If the jig must be removed for finishing, it shall be re-installed immediately after finishing and left in place throughout the cure period. A safety device (traffic cone, Type I barricade, etc.) shall be installed and secured firmly in place over each foundation immediately after finishing and remain in place until the pole or pedestal is installed. Prior to installing the pole or pedestal, the positioning jig shall be removed, loose concrete cleaned from around the anchor bolts and conduits, and the conduits trimmed to provide proper clearance for the pole or pedestal.

3.5 WIRING

A. The roadway lighting conductor system shall be installed in HDPE or 2 inch SCH 40 or 80 PVC conduit, wired and installed as a 120 volt system where indicated, required and shown on the Plans. Wiring shall conform to the appropriate articles of the National Electric Code. Wiring shall be continuous from street lighting appurtenance to street lighting appurtenance. No splices of cable will be permitted in conduit or outside of service boxes, junction boxes or pole bases.

B. Powdered soapstone, talc or other approved lubricant shall be used when inserting conductors in conduit. All cable to be installed in one conduit shall be pulled by the Contractor in one operation, and all ends shall be taped to exclude moisture and shall be so kept until the splices are made or terminal appliances attached. Ends of spare conductors shall be taped.

C. All splices in junction boxes and no service boxes shall be made with appropriate insulated connector block connectors and/or 4 AWG copper crimp butt connectors. Splices not factory insulated shall be carefully wrapped with three successive layers of Scotch (3M) No. 130C, "Linerless Rubber Splicing Tape" and then wrapped with three layers of Scotch (3M) No. 33+ "Electrical Tape". The total diameter of the taped splice shall be approximately 1 ½ times the diameter of the spliced conductor covering. 3M Scotchkote electrical coating shall be “Painted” over the splice. 2 feet of slack shall be left at all control centers, junction boxes and service boxes for splicing and connecting wires. Wiring within boxes shall be neatly arranged and laced up. Wires shall be color-coded (black/red = hot, white = neutral, green = ground) and circuits permanently identified in accordance with designations used on the plans. Color code with tape based on phase (A phase=Black, B phase=Red).

D. All poles shall be bonded to form a continuous system. At each multiple service point, a ground electrode shall be installed. The electrode shall be a copper rod not less than 5/8 inch in diameter

and 8 feet in length, unless otherwise noted on the plans, driven to a depth so the top is 18 inches below the surface of the ground. The service equipment shall be bonded to the driven ground rod by a No. 6 AWG copper wire enclosed in a 1 inch diameter conduit.

3.6 SOLAR ARRAY

A. Insure mounting rails or other type systems are properly secured and able to properly support the modules.

B. Install in accordance with manufacturer's instructions. Make sure that the module meets the technical requirements of the overall system.

C. Other system components shall not exert any adverse mechanical or electrical influences on the module.

D. Try to reduce possibility of corrosive or electrolytic action between metals. Implement care while installing components so as not to damage finish surfaces. Touch up as required to repair damaged finishes. Remove all protective masking from material immediately after installation.

3.7 INVERTER

A. Install in accordance with manufacturer's instructions.

B. The DC circuit for the model specified is isolated and insulated from ground and does not require a GEC. The unit is compatible with most 60-cell PV modules (to 300W or higher). It works with either three-phase 208 VAC or single-phase 240 VAC services. The unit shall include integrated DC and AC cables and connectors. The DC connectors attach to the PV module, while the AC connector attaches directly to the factory connector cable. No additional cabling is needed.

C. DO NOT connect or disconnect the PV module and the micro inverter without first removing AC power from the PV system.

D. DO NOT connect the micro inverter to the utility grid or energize the AC circuit until all of the installation procedures are completed per the installation instructions.

E. Install the micro inverter under the PV module, out of rain and sun. Do not mount the micro inverter in a position that allows long-term exposure to direct sunlight or in a vertical orientation that allows water to collect in the DC connector recess. Do not install the micro inverter black-side up or vertically, with the DC connectors facing up.

F. Provide support for all cabling connected to the micro inverter.

G. Make sure protective sealing caps have been installed on all unused AC connectors. Unused AC connectors are live when the system is energized by the utility system. Sealing caps may not be reused.

H. Connect the micro inverter to the utility grid only after receiving prior approval from the electrical utility company.

I. Ensure that all AC and DC wiring is correct. Ensure that none of the AC and DC wires are pinched or damaged. Ensure that all AC junction boxes are properly closed.

3.8 CONTROL CENTER PEDESTAL AND FOUNDATION

A. The control center assembly, including the pedestal, circuit breakers, fuses, contactors, photoelectric control, control wiring, meter socket, service feed, and foundation, shall be constructed and installed as shown on the Plans and as specified in the Special Provisions or as directed by the

City/Engineer. The Contractor shall coordinate his activities with the appropriate electrical utility company to insure delivery of power to the control center when and where required. The control center pedestal shall be cleaned of wrapping, shipping material, dirt, grease, etc. Scratches, abrasions or other surface damage shall be repaired to like new condition. The photo cell shall be directed south unless northbound traffic may impact photo cell operation. Photo cell shall be within 2 inches of window in enclosure.

3.9 CONDUIT

A. All conductors shall be run in conduit between all lighting equipment locations. Conduit shall be installed as shown on the Plans and Standard Drawings, and as specified in the Special Provisions or as directed by the City/Engineer to avoid underground obstructions. The size of the conduit used shall be as shown on the Plans, and as specified in the Special Provisions. Schedule 80 PVC conduit shall be used under existing and proposed street pavement and commercial driveway approaches. Schedule 40 or schedule 80 PVC or HDPE conduit may be used at all other locations. It shall be the privilege of the Contractor at his own expense to use larger size conduit if desired; and where larger size conduit is used, it shall be for the entire length of the run from outlet to outlet. No reducing couplings will be permitted.

B. Installation

1. The conduit installed under all roadway surfaces shall be placed a minimum of 48 inches below the top of curb elevation; under drives and within shoulders at a minimum depth of 24 inches below finished grade. Street lighting conduit may be installed in the same trench with traffic signal or fiber optic conduit as long as the minimum depth requirements are met and a minimum of 12 inches of vertical separation between the top of one conduit and the bottom of the other is maintained. Conduit set in standard bases shall extend approximately 3 inches above the foundation vertically. Conduit entering through the bottom of a junction box shall be located near the ends to leave the major portion of the box clear. Conduit entering service boxes shall terminate 2 inches inside the box wall and shall be sloped to facilitate pulling of cable. At all outlets, conduit shall enter from the direction of the run.

2. Install a bell end on all conduit terminations in junction boxes and at pole bases.

3. Existing underground conduit to be incorporated into a new system shall be cleaned with a mandrel and blown out with compressed air.

C. Trenching

1. A trench crossing a proposed street shall be backfilled with clean 1/2 inch crushed rock (CA-5) to 2 feet behind the future curb. If the bottom of the trench is in rock or rocky soil, the conduit shall be placed on a 6 inch 6 protective layer of clean, tamped backfill material. Backfill within 6 inches of the conduit shall be free of rock or other solid material likely to cause damage. All backfill material shall be compacted to a density at least 90% of the maximum density for the material used as determined by ASTM D-698. The 6 inches of backfill nearest the conduit shall not be machine compacted.

D. Boring

1. Conduit for a power lead-in cable to be placed under an existing developed area outside a street right-of-way shall be installed using approved boring methods. Also, where a conduit is to be placed under an existing paved surface, it shall be installed using approved boring methods. No existing developed property outside a street right-of-way or existing paved surface shall be cut or otherwise disturbed without the written permission of the City/Engineer and then only in the event insurmountable obstructions are encountered. The conduit shall be bored at a depth of between 24 inches and 36 inches below the final grade. Boring pits shall be kept 2 feet clear of the edge of any type of pavement wherever possible. Excessive use of

water, such that the paved surface might be undermined or the subgrade softened, will not be permitted. Boring may be used instead of trenching at all other locations.

3.10 CAUTION TAPE/TRACER WIRE

A. All underground conduits shall be installed with “DANGER – BURIED ELECTRICAL CONDUIT” red flagging tape 6-inches above conduit. Tape shall be continuous along the conduit run.

B. Tracer wire shall be installed on all exterior electrical utilities. Trace wire to be 10 gauge minimum stranded copper with yellow thermoplastic insulation recommended for direct burial. Wire connectors to be 3M DBR, or approved equal, and shall be watertight to provide electrical continuity. Tracer wire splices are only allowed in pole bases or handholes. Tracer wire shall be continuous along the conduit run.

C. The City shall test locate wires before accepting the work. Any damaged locate wires shall be repaired or replaced by the Contractor.

3.11 BOXES

A. Junction boxes shall be installed at the locations shown on the plans. However, boxes shall not be located in sidewalks and driveways. In the unlikely event that a box is placed in a sidewalk or a driveway, a traffic-rated box shall be used. A junction box shall also be installed at each end of a conduit run that crosses the road where direct buried cable begins and ends. The Contractor may install, at his own expense, additional boxes as may be desired to facilitate the work upon approval of the City/Engineer. Junction boxes shall be installed on 12 inches of crushed rock as shown on the plans or as directed by the Engineer. Unless otherwise directed by the City/Engineer, boxes shall be installed level to 1 inch above the finish grade.

3.12 EXCAVATIONS

A. The Contractor shall perform all excavations for installing underground conduits, cable, boxes and pole bases in whatever substances encountered, to the depths indicated on the drawings or as otherwise approved. During excavation, material suitable for backfilling shall be piled in an orderly manner a sufficient distance from the excavation to avoid slides. All excavated materials not required or unsuitable for backfill shall be removed and wasted on site obtained by the Contractor.

3.13 BACKFILLING

A. All areas excavated shall be backfilled and compacted in accordance with the Special Provisions and Standards. Backfill shall be deposited in not over 6-inch layers and tamped to 95% density ±3% moisture. The top 6 inches of backfill shall be select soil suitable for sodding. After backfilling, all disturbed areas shall be kept well filled and maintained in a smooth and well-drained condition until permanent repairs are made.

3.14 LOCATION

A. Unless otherwise noted on the plans, or physical obstructions exist, equipment installed on this project shall be located as follows:

1. Conduit shall be kept a minimum of 1 foot behind the back of curb.

2. Street light poles shall be installed at least 3 feet behind the back of curb. Handhole covers shall be situated so that they are on the house side or away from oncoming traffic.

3. Junction boxes shall be installed at least 2 feet behind the back of curb (to center of box) and no closer than 2 feet to any street light pole.

4. Control centers shall be located in accordance with the applicable City Ordinances.

3.15 MEASUREMENT AND PAYMENT

A. Lighting poles

1. Measurement and payment for this item shall be made on a per item basis. Included with this item is all labor, equipment, and materials necessary for furnishing and installing the luminaire, and pole. All fasteners, connectors, and accommodations for electrical stub ups shall be considered incidental to the unit price.

B. Electrical circuits - #8, #6, #4, #2 THWN copper conductors

1. Measurement and payment for this item shall be made on a per linear foot basis. Included with this item is all labor, equipment, and materials necessary for furnishing and installing the wire, pull lubricants, and caution tape/tracer wire. All connectors shall be considered incidental to the unit price.

C. Controls cabinet

1. Measurement and payment for this item shall be made on a per item basis. Included with this item is all labor, equipment, and materials necessary for furnishing and installing the controls cabinet. All fasteners, connectors, anchors/pad mount base and accommodations for electrical stub ups shall be considered incidental to the unit price.

D. Controls cabinet foundation

1. Measurement and payment for this item shall be made on a per cubic foot basis. Included with this item is all labor, equipment, and materials necessary for furnishing and installing the reinforcing, forms, excavation, and concrete base. All fasteners, connectors, and accommodations for electrical stub ups shall be considered incidental to the unit price.

E. Handhole

1. Measurement and payment for this item shall be made on a per item basis. Included with this item is all labor, equipment, and materials necessary for furnishing and installing the handhole. All fasteners, connectors, and accommodations for electrical conduits and conductors shall be considered incidental to the unit price.

F. S2 fixture

1. Measurement and payment for this item shall be made on a per item basis. Included with this item is all labor, equipment, and materials necessary for furnishing and installing the luminaire, and driver. All fasteners, connectors, and conductors shall be considered incidental to the unit price.

G. S3 fixture

1. Measurement and payment for this item shall be made on a per item basis. Included with this item is all labor, equipment, and materials necessary for furnishing and installing the luminaire, and driver. All fasteners, connectors, and conductors shall be considered incidental to the unit price.

H. Pole base

1. Measurement and payment for this item shall be made on a per item basis. Included with this item is all labor, equipment, and materials necessary for furnishing and installing the

reinforcing, forms, excavation, and concrete base. All fasteners, connectors, and accommodations for electrical stub ups shall be considered incidental to the unit price.

I. Ground rod

1. Measurement and payment for this item shall be made on a per item basis. Included with this item is all labor, equipment, and materials necessary for furnishing and installing the ground rod. All fasteners, connectors, and conductors shall be considered incidental to the unit price.

J. Solar panel assembly

1. Measurement and payment for this item shall be made on a per item basis. Included with this item is all labor, equipment, and materials necessary for furnishing and installing the solar panel, racking, protective expanded metal barrier, and micro-inverter. All fasteners, connectors, conductors, labeling, and conduit shall be considered incidental to the unit price.

K. Disconnect switch

1. Measurement and payment for this item shall be made on a per item basis. Included with this item is all labor, equipment, and materials necessary for furnishing and installing the lockable recessed switch and finger safe fuse holder. All fasteners, connectors, and conductors shall be considered incidental to the unit price.

L. Boring

1. Measurement and payment for this item shall be made on a per linear foot basis. Included with this item is all labor, equipment, and materials necessary for boring conduits under existing pavement. All coordination and routing around existing utilities shall be considered incidental to the unit price.

M. Trenching

1. Measurement and payment for this item shall be made on a per linear foot basis. Included with this item is all labor, equipment, and materials necessary for trenching conduits. All coordination and routing around existing utilities shall be considered incidental to the unit price.

N. 2”, 1 ¼”, 1” PVC conduit

1. Measurement and payment for this item shall be made on a per linear foot basis. Included with this item is all labor, equipment, and materials necessary for installing conduits. All fasteners, couplings, and connectors utilities shall be considered incidental to the unit price.

O. ¾” rigid metal conduit

1. Measurement and payment for this item shall be made on a per linear foot basis. Included with this item is all labor, equipment, and materials necessary for installing conduits. All fasteners, couplings, and connectors utilities shall be considered incidental to the unit price.

P. Electrical enclosure

1. Measurement and payment for this item shall be made on a per item basis. Included with this item is all labor, equipment, and materials necessary for furnishing and installing the recessed electrical enclosure, lockable handle, DIN rail, and termination blocks. All fasteners, connectors, anchors, sealing for alterations and accommodations for electrical conduits shall be considered incidental to the unit price.

Iowa Department of Transportation

SPECIAL PROVISIONS FOR
UNIT PAVERS

Polk County
TAP-T-8477(613)--8V-77

Effective Date
May 19, 2015

THE STANDARD SPECIFICATIONS, SERIES 2012, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

SPECIAL PROVISION SP 3

UNIT PAVERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

Drawings.

1.2 DESCRIPTION OF WORK:

Provide all labor, materials, equipment and supervision required to furnish and install unit pavers.

1.3 SUBMITTALS:

A. Paver manufacturer's material test data certifying pavers comply with specification.

B. Paver sample.

1.4 CODES, PERMITS AND FEES:

A. Obtain any necessary permits for this work and pay any fees required for permits.

B. The entire installation shall fully comply with all local and state laws and ordinances, and with all established codes applicable thereto.

1.5 SITE DISTURBANCES:

A. Take precautions to insure that equipment and vehicles do not disturb or damage existing site grading, walks, drives, utilities, plants, etc.

B. Verify locations and depths of all underground utilities prior to excavation.

C. Repair and/or return to original condition any damage caused by Contractor's negligence at no cost to Contractoing Authority.

D. Provide temporary barricades and warning lights as required for protection of project work and public safety.

PART 2 - PRODUCTS

2.1 CLAY PAVERS:

A. Products: Subject to compliance with requirments as set forth in ASTMC 902 – Pedestrian and Light Traffic Paving Brick, Weather Class SX, Application PX provide one of the following:

1. Belden Brick – Claret Velour
2. Yankee Hill Brick – Maroon Velour
3. Glen-Gery Brick – Maroon Classic

B. Paver Size: 4 inches x 2-1/4 inches x 8 inches with chamfer and lugs.

C. Minimum Compressive strength: 10,000 psi.

D. Provide brick similar in texture and physical properties to those available for inspection at the Landscape Architects office.

E. Do not exceed variations in color and texture of samples accepted by the Landscape Architect.

2.2 AGGREGATE SETTING-BED MATERIALS:

A. Graded Aggregate for Subbase: Sound, crushed stone or gravel complying with ASTM D 448 for Size No. 57.

B. Graded Aggregate for Base: Sound, crushed stone or gravel complying with ASTM D 448 for Size No. 8.

C. Sand for Leveling course: Sound, sharp, washed, natural sand or crushed stone complying with gradation requirments in ASTM C 33 for fine aggregate.

D. Sand for Joints: Polymeric Sand with fine, sharp, washed, natural sand or crushed stone with 100 % passing No. 16 sieve and no more than 10 % passing No. 200 sieve.

PART 3 - EXECUTION

3.1 PREPARATION OF AGGREGATE SUB-BASE:

A. Compact soil subgrade uniformly to at least 95 % of ASTM D 698 laboratory density.

B. Proof-roll prepared subgrade to identify soft pockets and areas of excess yielding. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting as determined by the Landscape Architect and replace with compacted vackfill or fill as directed.

C. Place aggregate base, compact by tamping with plate vibrator, and screed to depth indicated.

D. Place aggregate base, compact to 100 percent of ASTM D 1557 maximum laboratory density, and screed to depth indicated.

E. Place leveling course and screed to a thickness of 1-1-1/2 inches, taking care that moisture content remains constant and density is loose and constant until pavers are set and compacted.

F. Treat leveling course with herbicide to inhibit growth of grass and weeds.

G. Set pavers with a minimum joint width of 1/16 inch and a maximum of 1/8 inch, being careful not to disturb leveling base. If pavers have spacer bars, place pavers hand tight against spacer bars. Use string lines to keep straight lines. Fill gaps between units that exceed 3/8 inch with pieces cut to fit from full-size unit pavers

H. Vibrate pavers into leveling course with a low-amplitude plate vibrator capable of a 3500- to 5000 pound per square square foot compaction force at 80 to 90 Hz. Perform at least three passes across paving with vibrator. Vibrate under the following conditions:

1. After edge pavers are installed and there is a completed surface or before surface is exposed to rain.
2. Before ending each day's work, fully compact installed concrete pavers to within 36 inches of the laying face. Cover pavers that have not been compacted, and leveling course on which pavers have not been placed, with nonstaining plastic sheets to protect them from rain.

I. Spread dry sand and fill joints immediately after vibrating pavers into leveling course. Vibrate pavers and add sand until joints are completely filled, then remove excess sand. Leave a slight surplus of sand on the surface for joint filling:

J. Do not allow traffic on installed pavers until sand has been vibrated into joints:

3.2 PLACEMENT OF PAVERS:

A. Begin laying pavers from the edge/s referenced on the drawings.

B. Place pavers by hand.

C. Always work on top of laid pavers.

D. A chalk line may be snapped on asphalt base to assist in alignment of pavers.

E. Complete placement of whole pavers over entire area.

F. Complete placement of pavers by placing cut pavers along edges.

G. Joint Pattern: Running Bond

3.3 JOINT FILLING:

A. Cross directionally sweep a thin layer of sand over the entire paver area.

B. Fill paver joints to within ½ inch of surface.

3.4 CLEAN-UP:

A. Sweep excess sand from paved surfaces and remove from site.

B. Remove all excess materials and debris from site.

3.5 MEASUREMENT AND PAYMENT:

A. Unit Pavers

1. Measurement and payment for this item shall be made on a per square foot basis. Included with item is all labor,equipment, and materials necessary for furnishing and installation the unit pavers.

Iowa Department of Transportation

SPECIAL PROVISIONS
FOR
UNIT MASONRY

Polk County
TAP-T-8477(613)--8V-77

Effective Date
May 19, 2015

THE STANDARD SPECIFICATIONS, SERIES 2012, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Concrete masonry units.
2. Concrete building brick.
3. Face brick.
4. Mortar and grout.
5. Steel reinforcing bars.
6. Masonry joint reinforcement.
7. Ties and anchors.
8. Embedded flashing.
9. Miscellaneous masonry accessories.

1.3 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 PERFORMANCE REQUIREMENTS

A. Provide structural unit masonry that develops indicated net-area compressive strengths at 28 days.

1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.
2. Determine net-area compressive strength of masonry by testing masonry prisms according to ASTM C 1314.

1.5 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Contracting Authority will engage a qualified independent testing agency to perform preconstruction testing indicated below. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
1. Clay Masonry Unit Test: For each type of unit required, according to ASTM C 67 for compressive strength.
2. Concrete Masonry Unit Test: For each type of unit required, according to ASTM C 140 for compressive strength.
3. Mortar Test (Property Specification): For each mix required, according to ASTM C 109for compressive strength**,** ASTM C 1506 for water retention, and ASTM C 91 for air content.
4. Mortar Test (Property Specification): For each mix required, according to ASTM C 780 for compressive strength.
5. Grout Test (Compressive Strength): For each mix required, according to ASTM C 1019.
6. Prism Test: For each type of construction required, according to ASTM C 1314.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For the following:
1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
2. Stone Trim Units: Show sizes, profiles, and locations of each stone trim unit required.
3. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement."
4. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

C. Samples for Initial Selection:
1. Face brick, in the form of straps of five or more bricks.
2. Colored mortar.
3. Weep holes/vents.

D. Samples for Verification: For each type and color of the following:
1. Face brick, in the form of straps of five or more bricks.
2. Special brick shapes.
3. Pigmented mortar. Make Samples using same sand and mortar ingredients to be used on Project.
4. Weep holes and vents.
5. Accessories embedded in masonry.

1.7 INFORMATIONAL SUBMITTALS

A. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.
1. Submittal is for information only. Neither receipt of list nor approval of mockup constitutes approval of deviations from the contract documents unless such deviations are specifically brought to the attention of Engineer and approved in writing.

B. Qualification Data: For testing agency.

C. Material Certificates: For each type and size of the following:
   1. Masonry units.
      a. Include material test reports substantiating compliance with requirements.
      b. For brick, include size-variation data verifying that actual range of sizes falls within specified tolerances.
      c. For exposed brick, include test report for efflorescence according to ASTM C 67.
      d. For surface-coated brick, include test report for durability of surface appearance after 50 cycles of freezing and thawing per ASTM C 67.
      e. Retain first subparagraph below only if retaining unit-strength method in "Performance Requirements" Article or if requirements for average net-area compressive strength of units are retained in Part 2.
      f. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.
   2. Cementitious materials. Include brand, type, and name of manufacturer.
   3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
   4. Grout mixes. Include description of type and proportions of ingredients.
   5. Reinforcing bars.
   6. Joint reinforcement.
   7. Anchors, ties, and metal accessories.

D. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
   1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109 for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
   2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

E. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.

F. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.8 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM C 1093 for testing indicated.

B. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.

C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

D. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.

E. Sample Panels: Build sample panels to verify selections made under sample submittals and to demonstrate aesthetic effects.

1. Build sample panels for each type of exposed unit masonry construction in sizes approximately 24 inches long x 24 inches high.
2. Where masonry is to match existing, erect panels adjacent and parallel to existing surface.
3. Clean exposed faces of panels with masonry cleaner indicated.
4. Protect approved sample panels from the elements with weather-resistant membrane.
5. Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Engineer in writing.
    a. Approval of sample panels does not constitute approval of deviations from the contract documents contained in sample panels unless such deviations are specifically approved by Engineer in writing.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in covered weatherproof dispensing silos.

E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.10 PROJECT CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
    1. Extend cover a minimum of 24 inches down both sides of walls and hold cover securely in place.
    2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
    1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
    2. Protect sills, ledges, and projections from mortar droppings.
    3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.

4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
   1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40° F and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.

E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL

A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.

B. Fire-Resistance Ratings: Where indicated, provide units that comply with requirements for fire-resistance ratings indicated as determined by testing according to ASTM E 119, by equivalent masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

2.2 CONCRETE MASONRY UNITS

A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
   1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
   2. Provide square-edged units for outside corners unless otherwise indicated.

B. CMUs: ASTM C 90.
   1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi.
   2. Density Classification: Normal weight, unless otherwise indicated.
   3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.
   4. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.
   5. Faces to Receive Plaster: Where units are indicated to receive a direct application of plaster, provide textured-face units made with gap-graded aggregates.

C. Concrete Building Brick: ASTM C 55.
   1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3750 psi.
   2. Density Classification: Normal weight.
   3. Size (Actual Dimensions): 3-5/8 inches wide by 2-1/4 inches high by 7-5/8 inches long.

2.3 MASONRY LINTELS

A. General: Provide one of the following:

B. Masonry Lintels: Unless otherwise noted on contract documents, use prefabricated or built-in-place masonry lintels made from bond beam CMUs with reinforcing bars placed as indicated

and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.4 BRICK

A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:
   1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
   2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
   3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
   4. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

B. Face Brick: Facing brick complying with ASTM C 216 or hollow brick complying with ASTM C 652, Class H40V (void areas between 25 and 40% of gross cross-sectional area).
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Manufacturer: Belden Brick.
         1) Blend: Jewel Blend Velour
      b. Manufacturer: Yankee Hill Brick
         1) Blend: Dark Red Velour
      c. Manufacturer: Glen-Gery Brick:
         1) Maroon Classic
   2. Dimensions: 3 5/8 inches x 2-1/4 inches x 7-5/8 inches
   3. Grade: SW.
   4. Type: FBS.
   5. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 10,000 psi minimum.
   6. Application: Use where brick is exposed unless otherwise indicated.

2.5 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

B. Hydrated Lime: ASTM C 207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Masonry Cement: ASTM C 91.

E. Mortar Cement: ASTM C 1329.

F. See Editing Instruction No. 1 in the Evaluations for cautions about naming manufacturers and products. See Section 016000 "Product Requirements."

G. Aggregate for Mortar: ASTM C 144.
   1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.

2. For joints less than 1/4 inch thick, use aggregate graded with 100% passing the No. 16 sieve.
3. White-Mortar Aggregates: Natural white sand or crushed white stone.

H. Aggregate for Grout: ASTM C 404.

I. Epoxy Pointing Mortar: ASTM C 395, epoxy-resin-based material formulated for use as pointing mortar for structural-clay tile facing units (and approved for such use by manufacturer of units); in color indicated or, if not otherwise indicated, as selected by Engineer from manufacturer's colors.

J. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

K. Water: Potable.

2.6 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60.

B. Masonry Joint Reinforcement, General: ASTM A 951/A 951M.
1. Interior Walls: Hot-dip galvanized, carbon steel.
2. Exterior Walls: Hot-dip galvanized, carbon steel.
3. Wire Size for Side Rods: W1.7.
4. Wire Size for Cross Rods: W1.7.
5. Wire Size for Veneer Ties: W1.7.
6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
7. Provide in lengths of not less than 10 feet.

C. Masonry Joint Reinforcement for Single-Wythe Masonry: Ladder type with single pair of side rods.

D. Masonry Joint Reinforcement for Multiwythe Masonry:
1. Adjustable (two-piece) type, either ladder or truss design, with one side rod at each face shell of backing wythe and with separate adjustable ties with pintle-and-eye connections having a maximum adjustment of 1-1/4 inches. Size ties to extend at least halfway through facing wythe but with at least 5/8-inch cover on outside face.

2.7 TIES AND ANCHORS

A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated.
1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M; with ASTM A 153/A 153M, Class B-2 coating.
2. Stainless-Steel Wire: ASTM A 580/A 580M, Type 304.
3. Galvanized Steel Sheet: ASTM A 653/A 653M, Commercial Steel, G60 zinc coating.
4. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, with ASTM A 153/A 153M, Class B coating.
5. Steel Plates, Shapes, and Bars: ASTM A 36.
6. Stainless-Steel Bars: ASTM A 276 or ASTM a 666, Type 304.

B. Wire Ties, General: Unless otherwise indicated, size wire ties to extend at least halfway through veneer but with at least 5/8-inch cover on outside face. Outer ends of wires are bent 90 degrees and extend 2 inches parallel to face of veneer.

C. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches wide.
   1. Z-shaped ties with ends bent 90 degrees to provide hooks not less than 2 inches long may be used for masonry constructed from solid units.
   2. Where wythes are of different materials, use adjustable ties with pintle-and-eye connections having a maximum adjustment of 1-1/4 inches.
   3. Wire: Fabricate from 3/16-inch diameter, stainless-steel wire.

D. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
   1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch- diameter, hot-dip galvanized steelwire.
   2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch of masonry face, made from 0.187-inch diameter, hot-dip galvanized steel wire.

E. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
   1. Connector Section: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from 0.060-inch- thick, steel sheet, galvanized after fabrication.
      a. 0.064-inch thick, galvanized sheet may be used at interior walls unless otherwise indicated.
   2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch of masonry face, made from 0.187-inch diameter, hot-dip galvanized steel wire.

F. Adjustable Masonry-Veneer Anchors:
   1. General: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs, and as follows:
      a. Structural Performance Characteristics: Capable of withstanding a 100-lbf load in both tension and compression without deforming or developing play in excess of 0.05 inch.
   2. Contractor's Option: Unless otherwise indicated, provide any of the following types of anchors:
   3. Screw-Attached, Masonry-Veneer Anchors: Units consisting of a wire tie and a metal anchor section.
      a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
         1) Dayton Superior Corporation, Dur-O-Wal Division; D/A 213.
         2) Wire-Bond; RJ-711.
      b. Anchor Section: Rib-stiffened, sheet metal plate with screw holes top and bottom, 2-3/4 inches wide by 3 inches high; with projecting tabs having slotted holes for inserting vertical legs of wire tie specially formed to fit anchor section.
   4. Screw-Attached, Masonry-Veneer Anchors: Units consisting of a wire tie and a metal anchor section.
      a. Anchor Section: Sheet metal plate, 1-1/4 inches wide by 9 inches long, with screw holes top and bottom and with raised rib-stiffened strap, 5/8 inch wide by 5-1/2 inches long, stamped into center to provide a slot between strap and plate for inserting wire tie.
   5. Screw-Attached, Masonry-Veneer Anchors: Units consisting of a wire tie and a metal anchor section.
      a. Anchor Section: Sheet metal plate, 1-1/4 inches wide by 6 inches long, with screw holes top and bottom and with raised rib-stiffened strap, 5/8 inch wide by 3-5/8 inches long, stamped into center to provide a slot between strap and plate for inserting wire tie.
   6. Screw-Attached, Masonry-Veneer Anchors: Units consisting of a wire tie and a metal anchor section.

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:Anchor Section: Gasketed sheet metal plate, 1-1/4 inches wide by 6 inches long, with screw holes top and bottom; top and bottom ends bent to form pronged legs of length to match thickness of insulation or sheathing; and raised rib-stiffened strap, 5/8 inch wide by 6 inches long, stamped into center to provide a slot between strap and plate for inserting wire tie. Provide anchor manufacturer's standard, self-adhering, modified bituminous gaskets manufactured to fit behind anchor plate and extend beyond pronged legs.

7. Screw-Attached, Masonry-Veneer Anchors: Units consisting of a wire tie and a metal anchor section.
   a. Anchor Section: Corrosion-resistant, self-drilling, eye-screw designed to receive wire tie. Eye-screw has spacer that seats directly against framing and is same thickness as sheathing and has gasketed, washer head that covers hole in sheathing.
8. Slip-in, Masonry-Veneer Anchors: Units consisting of a wire tie section and an anchor section designed to interlock with metal studs and be slipped into place as sheathing is installed.
   a. Wire-Type Anchor: Bent wire anchor section with an eye to receive the wire tie. Wire tie has a vertical leg that slips into the eye of anchor section and allows vertical adjustment. Both sections are made from 3/16-inch, hot-dip galvanized wire.
9. Polymer-Coated, Steel Drill Screws for Steel Studs: ASTM C 954 except manufactured with hex washer head and neoprene or EPDM washer, No. 10 diameter by length required to penetrate steel stud flange with not less than three exposed threads, and with organic polymer coating with salt-spray resistance to red rust of more than 800 hours per ASTM B 117.
10. Stainless-Steel Drill Screws for Steel Studs: Proprietary fastener consisting of carbon-steel drill point and 300 Series stainless-steel shank, complying with ASTM C 954 except manufactured with hex washer head and neoprene or EPDM washer, No. 10 diameter by length required to penetrate steel stud flange with not less than three exposed threads.

2.8 MISCELLANEOUS ANCHORS

A. Dovetail Slots in Concrete: Furnish dovetail slots with filler strips, of slot size indicated, fabricated from 0.034-inch, galvanized steel sheet.

B. Anchor Bolts: Headed steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.

C. Postinstalled Anchors: Torque-controlled expansion anchors or chemical anchors.
   1. Load Capacity: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
   2. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5 unless otherwise indicated.

2.9 EMBEDDED FLASHING MATERIALS

A. Flexible Flashing: Use one of the following unless otherwise indicated:
   1. EPDM Flashing: Sheet flashing product made from ethylene-propylene-diene terpolymer, complying with ASTM D 4637, 0.040 inch thick.

B. Application: Unless otherwise indicated, use the following:

1. Where flashing is indicated to receive counterflashing, use metal flashing.
2. Where flashing is indicated to be turned down at or beyond the wall face, use metal flashing.
3. Where flashing is partly exposed and is indicated to terminate at the wall face, use metal flashing with a drip edge or flexible flashing with a metal drip edge.
4. Where flashing is fully concealed, use metal flashing or flexible flashing.

C. Single-Wythe CMU Flashing System: System of CMU cell flashing pans and interlocking CMU web covers made from high-density polyethylene incorporating chemical stabilizers that prevent UV degradation. Cell flashing pans have integral weep spouts that are designed to be built into mortar bed joints and weep collected moisture to the exterior of CMU walls and that extend into the cell to prevent clogging with mortar.

D. Solder and Sealants for Sheet Metal Flashings:
1. Solder for Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
2. Solder for Copper: ASTM B 32, Grade Sn50, 50% tin and 50% lead.
3. Elastomeric Sealant: ASTM C 920, chemically curing urethane sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

E. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.10 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35%; of width and thickness indicated; formulated from neoprene urethane or PVC.

B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

D. Weep/Vent Products: Use one of the following unless otherwise indicated:
1. Wicking Material: Absorbent rope, made from cotton or UV-resistant synthetic fiber, 1/4 to 3/8 inch in diameter, in length required to produce 2-inch exposure on exterior and 18 inches in cavity. Use only for weeps.
2. Round Plastic Weep/Vent Tubing: Medium-density polyethylene, 3/8-inch OD by 4 inches long.
3. Rectangular Plastic Weep/Vent Tubing: Clear butyrate, 3/8 by 1-1/2 by 3-1/2 inches long.
4. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch less than depth of outer wythe, in color selected from manufacturer's standard.
5. Mesh Weep/Vent: Free-draining mesh; made from polyethylene strands, full height and width of head joint and depth 1/8 inch less than depth of outer wythe; in color selected from manufacturer's standard.
6. Aluminum Weep Hole/Vent: One-piece, L-shaped units made from sheet aluminum, designed to fit into a head joint and consisting of a vertical channel with louvers stamped in web and with a top flap to keep mortar out of the head joint; painted before installation in color selected by Engineer.

7. Vinyl Weep Hole/Vent: One-piece, offset, T-shaped units made from flexible PVC, designed to fit into a head joint and consisting of a louvered vertical leg, flexible wings to seal against ends of masonry units, and a top flap to keep mortar out of the head joint; in color selected by Engineer.

E. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
   1. Provide one of the following configurations:
      a. Strips, full-depth of cavity and 10 inches high, with dovetail shaped notches 7 inches deep that prevent clogging with mortar droppings.
      b. Strips, not less than 3/4 inch thick and 10 inches high, with dimpled surface designed to catch mortar droppings and prevent weep holes from clogging with mortar.
      c. Sheets or strips full depth of cavity and installed to full height of cavity.
      d. Sheets or strips not less than 3/4 inch] thick and installed to full height of cavity with additional strips 4 inches high at weep holes and thick enough to fill entire depth of cavity and prevent weep holes from clogging with mortar.

F. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.

2.11 MASONRY CLEANERS

A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

2.12 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
   1. Do not use calcium chloride in mortar or grout.
   2. Limit cementitious materials in mortar to Portland cement and lime.
   3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistant.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. Mortar for Unit Masonry: Comply with ASTM C 270. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.
   1. For masonry below grade or in contact with earth, use Type S.
   2. For reinforced masonry, use Type S.
   3. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.
   4. For interior non-load-bearing partitions, Type N.

D. Grout for Unit Masonry: Comply with ASTM C 476.

1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
2. Proportion grout in accordance with ASTM C 476.
3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
   1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
   2. Verify that foundations are within tolerances specified.
   3. Verify that reinforcing dowels are properly placed.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.

B. Build chases and recesses to accommodate items specified in this and other Sections.

C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.

D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
   1. Mix units from several pallets or cubes as they are placed.

F. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

G. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 gallons per 30 square inches per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:
   1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch or minus 1/4 inch.

2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch.
3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

B. Lines and Levels:
1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
5. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:
1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.
5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

3.4 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4-inches. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

D. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.

H. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

I. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
   1. Install compressible filler in joint between top of partition and underside of structure above.
   2. Wedge non-load-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.
   3. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 078446 "Fire-Resistive Joint Systems."

3.5 MORTAR BEDDING AND JOINTING

A. Lay hollow brick and CMUs as follows:
   1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
   2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
   3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
   4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.

B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. Set cast-stone trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.
   1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
   2. Allow cleaned surfaces to dry before setting.
   3. Wet joint surfaces thoroughly before applying mortar.

D. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
   1. For glazed masonry units, use a nonmetallic jointer 3/4 inch or more in width.

E. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

3.6 COMPOSITE MASONRY

A. Bond wythes of composite masonry together using one of the following methods:
   1. Individual Metal Ties: Provide ties as shown installed in horizontal joints, but not less than one metal tie for 2.67 square feet of wall area spaced not to exceed 32 inches o.c. horizontally and 16 inches o.c. vertically. Stagger ties in alternate courses. Provide

additional ties within 12 inches of openings and space not more than 36 inches apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches o.c. vertically.

a. Where bed joints of wythes do not align, use adjustable (two-piece) type ties.

2. Masonry Joint Reinforcement: Installed in horizontal mortar joints.
   a. Where bed joints of both wythes align, use ladder-type reinforcement extending across both wythes.
   b. Where bed joints of wythes do not align, use adjustable (two-piece) type reinforcement.
3. Header Bonding: Provide masonry unit headers extending not less than 3 inches into each wythe. Space headers not over 8 inches clear horizontally and 16 inches clear vertically.

B. Bond wythes of composite masonry together using bonding system indicated on Drawings.

C. Collar Joints: Solidly fill collar joints by parging face of first wythe that is laid and shoving units of other wythe into place.

D. Corners: Provide interlocking masonry unit bond in each wythe and course at corners unless otherwise indicated.
   1. Provide continuity with masonry joint reinforcement at corners by using prefabricated L-shaped units as well as masonry bonding.

E. Intersecting and Abutting Walls: Unless vertical expansion or control joints are shown at juncture, bond walls together as follows:
   1. Provide individual metal ties not more than 16 inches o.c.
   2. Provide continuity with masonry joint reinforcement by using prefabricated T-shaped units.
   3. Provide rigid metal anchors not more than 24 inches o.c. If used with hollow masonry units, embed ends in mortar-filled cores.

3.7 CAVITY WALLS

A. Bond wythes of cavity walls together using one of the following methods:
   1. Individual Metal Ties: Provide ties as shown installed in horizontal joints, but not less than one metal tie for 2.67 square feet of wall area spaced not to exceed 36 inches o.c. horizontally and 16 inches o.c. vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches of openings and space not more than 36 inches apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches o.c. vertically.
      a. Where bed joints of wythes do not align, use adjustable (two-piece) type ties.
      b. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable (two-piece) type ties to allow for differential movement regardless of whether bed joints align.
   2. Masonry Joint Reinforcement: Installed in horizontal mortar joints.
      a. Where bed joints of both wythes align, use ladder-type reinforcement extending across both wythes.
      b. Where bed joints of wythes do not align, use adjustable (two-piece) type reinforcement.
      c. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable (two-piece) type reinforcement to allow for differential movement regardless of whether bed joints align.
   3. Masonry Veneer Anchors: Comply with requirements for anchoring masonry veneers.

B. Bond wythes of cavity walls together using bonding system indicated on Drawings.

C. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.

D. Apply air barrier to face of backup wythe.

E. Installing Cavity-Wall Insulation: Place small dabs of adhesive, spaced approximately 12 inches o.c. both ways, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.
   1. Fill cracks and open gaps in insulation with crack sealer compatible with insulation and masonry.

3.8 MASONRY JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
   1. Space reinforcement not more than 16 inches o.c.
   2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
   3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.

B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

C. Provide continuity at wall intersections by using prefabricated T-shaped units.

D. Cut and bend reinforcing units as directed by manufacturer for continuity at corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.9 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

A. Anchor masonry to structural steel and concrete where masonry abuts or faces structural steel or concrete to comply with the following:
   1. Provide an open space not less than 1/2 inch wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
   2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
   3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

3.10 ANCHORING MASONRY VENEERS

A. Anchor masonry veneers to wall framing and concrete and masonry backup with masonry-veneer anchors to comply with the following requirements:
   1. Fasten anchors through sheathing to wall framing and to concrete and masonry backup with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
   2. Embed tie sections in masonry joints. Provide not less than 2 inches of air space between back of masonry veneer and face of sheathing.
   3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
   4. Space anchors as indicated, but not more than 18 inches o.c. vertically and 24 inches o.c. horizontally, with not less than 1 anchor for each 2 square feet of wall area. Install

additional anchors within 12 inches of openings and at intervals, not exceeding 8 inches, around perimeter.

5. Space anchors as indicated, but not more than 16 inches o.c. vertically and 24 inches o.c. horizontally with not less than 1 anchor for each 2.67 square feet of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 36 inches, around perimeter.

3.11 CONTROL AND EXPANSION JOINTS

A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.

B. Form control joints in concrete masonry using one of the following methods:
   1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout and rake out joints in exposed faces for application of sealant.
   2. Install preformed control-joint gaskets designed to fit standard sash block.
   3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar or rake out joint for application of sealant.
   4. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.

C. Form expansion joints in brick as follows:
   1. Build flanges of metal expansion strips into masonry. Lap each joint 4 inches in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints if any.
   2. Build flanges of factory-fabricated, expansion-joint units into masonry.
   3. Build in compressible joint fillers where indicated.

D. Provide horizontal, pressure-relieving joints by either leaving an air space or inserting a compressible filler of width required for installing sealants and backer rods.
   1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

3.12 LINTELS

A. Install steel lintels where indicated.

B. Provide masonry lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.

C. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

3.13 FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS

A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.

B. Install flashing as follows unless otherwise indicated:
   1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.

2. At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 8 inches, and through inner wythe to within 1/2 inch of the interior face of wall in exposed masonry. Where interior face of wall is to receive furring or framing, carry flashing completely through inner wythe and turn flashing up approximately 2 inches on interior face.
3. At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 8 inches, and 1-1/2 inches into the inner wythe. masonry-veneer walls, extend flashing through veneer, across air space behind veneer, and up face of sheathing at least 8 inches; with upper edge tucked under building paper or building wrap, lapping at least 4 inches.
4. At lintels and shelf angles, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.
5. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches or as recommended by flashing manufacturer, and seal lap with elastomeric sealant.
6. Install metal drip edges and sealant stops with ribbed sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant.
7. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall and adhere flexible flashing to top of metal drip edge.
8. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall and adhere flexible flashing to top of metal flashing termination.
9. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.

C. Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts aligned with face of wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.

D. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.

E. Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:
1. Use specified weep/vent products to form weep holes.
2. Use wicking material to form weep holes above flashing under brick sills. Turn wicking down at lip of sill to be as inconspicuous as possible.
3. Space weep holes 24 inches o.c. unless otherwise indicated.
4. Space weep holes formed from plastic tubing 16 inches o.c.
5. Cover cavity side of weep holes with plastic insect screening at cavities insulated with loose-fill insulation.
6. Trim wicking material flush with outside face of wall after mortar has set.

F. Place pea gravel in cavities as soon as practical to a height equal to height of first course above top of flashing, but not less than 2 inches, to maintain drainage.
1. Fill cavities full height by placing pea gravel in cavities as masonry is laid so that at any point masonry does not extend more than 24 inches above top of pea gravel.

G. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.

H. Install vents in head joints in exterior wythes at spacing indicated. Use specified weep/vent products to form vents.
   1. Close cavities off vertically and horizontally with blocking in manner indicated. Install through-wall flashing and weep holes above horizontal blocking.

3.14 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
   1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
   2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
   1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
   2. Limit height of vertical grout pours to not more than 60 inches.

3.15 FIELD QUALITY CONTROL

A. Testing and Inspecting: Contracting Authority will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

B. Inspections: Level 1 special inspections according to the "International Building Code."
   1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
   2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
   3. Place grout only after inspectors have verified proportions of site-prepared grout.

C. Testing Prior to Construction: One set of tests.

D. Testing Frequency: One set of tests for each 5000 square feet of wall area or portion thereof.

E. Clay Masonry Unit Test: For each type of unit provided, according to ASTM C 67 for compressive strength.

F. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.

G. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.

H. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780. Test mortar for mortar air content and compressive strength.

I. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.

J. Prism Test: For each type of construction provided, according to ASTM C 1314 at 28 days.

3.16 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Engineer’s approval of sample cleaning before proceeding with cleaning of masonry.
3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
6. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
7. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.
8. Clean stone trim to comply with stone supplier's written instructions.
9. Clean limestone units to comply with recommendations in ILI's "Indiana Limestone Handbook."

3.17 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

B. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
1. Crush masonry waste to less than 4 inches in each dimension.
2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste.
3. Do not dispose of masonry waste as fill within 18 inches of finished grade.

C. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Contracting Authority’s property.

3.18 MEASUREMENT AND PAYMENT

A. BRICK VENEER

1. Measurement and payment for this item shall be made on a square foot basis. Included in this item is all labor, equipment, CMU Core, mortar, reinforcing, flashing, and materials necessary to construct the brick monument sign.

Iowa Department of Transportation

SPECIAL PROVISIONS FOR
STONE MASONRY

Polk County
TAP-T-8477(613)--8V-77

Effective Date
May 19, 2015

THE STANDARD SPECIFICATIONS, SERIES 2012, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

SPECIAL PROVISION SP 1

STONE MASONRY

PART 1 - GENERAL

1.1 SUMMARY:

A. Provide masonry work as shown and specified. The work includes:

1. Stone masonry.

1.2 REFERENCES:

A. Drawings.

1.3 QUALITY ASSURANCE:

A. Materials and methods of construction shall comply with the following standards and association recommendations:

1. American Society for Testing and Materials, (ASTM).

B. Comply with the applicable requirements of local governing authorities and American National Standards Institute (ANSI) A41.1, Building Code Requirements for Masonry, for the types of stone masonry construction indicated.

C. Source Limitations for Stone: Obtain stone units through one source from a single manufacturer.

D. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color, from one manufacturer for each cementitious component and from one source or producer for each aggregate.

E. Installation: Performed only by experienced masons with satisfactory record of performance on complete projects of comparable size and quality.

F. Provide each type of material from only one quarry or manufacturer to ensure consistent color range and texture.

1.4 SUBMITTALS:

A. Submit manufacturer's product data for each type of stone and accessory required.

B. Submit cutting and setting shop drawings for cut and cast stone work showing dimensions and arrangement.

C. Submit samples of each type and color of stone required. Include the full range of exposed color and texture proposed for the work. Provide cut stone samples not less than 12 inches x 12 inches in size. Final approval of all colors must be obtainied prior to any fabrication beginning.

D. Provide 2 foot x 2 foot mock-up panel to remain on site during construction.

1.5 DELIVERY, STORAGE, AND HANDLING:

A. Stone masonry materials: Deliver, store, and handle materials in accordance with stone fabricators recommendations. Use non-staining materials for blocking and packing. Stack materials off the ground on non-staining skids. Protect from damage and soiling.Coordinate delivery of materials to minimize the need for on-site storage and to avoid delaying the Work.

B. Pack, handle, and ship stone units in suitable packs or pallets.

1. Lift with wide-belt slings; do not use wire rope or ropes that might cause staining. Move stone units, if required, using dollies with wood supports.

2. Store stone units on wood skids or pallets with nonstaining, waterproof covers. Arrange to distribute weight evenly and to prevent damage to units. Ventilate under covers to prevent condensation.

C. Masonry accessories: Deliver, store, and handle masonry accessories to prevent weather damage and deterioration.

1.6 PROJECT CONDITIONS:

A. Do not use metal accessories with loose coatings, including ice, which will reduce bond.

B. Protect partially-completed stone masonry work against weather damage and moisture, when work is not in progress. Cover tops of walls with strong, waterproof, non-staining membrane. Extend membrane at least 2 feet down both sides of walls and hold securely in place.

C. Brace unsupported and newly-laid masonry walls. Maintain bracing in place until walls reach design strength.

D. Cold weather construction:

1. Precondition masonry materials to maintain 50° F. when installed.

2. Do not install stone masonry work when the temperature of the outside air is below 40° F. and falling unless suitable means acceptable to the Engineer are provided to protect work from cold and frost and ensure that mortar will set without freezing. Comply with International Masonry Industry All-Weather Council cold weather construction and protection recommendations.

3. No masonry work will be permitted when outside air temperature is below 25° F.

4. Do not use frozen materials or materials mixed or coated with ice or frost.

5. Do not build on frozen work. Remove and replace masonry work damaged by frost or freezing.

6. Protect completed masonry work against freezing for not less than four days after laying.

E. Protect adjacent work from damage, soiling, and staining during masonry work operations.

PART 2 - PRODUCTS

2.1 CUT STONE MATERIALS:

A. Stone Materials: Stone shall be standard grade, free of crack or seam which may impair its structural integrity or function and shall comply with industry standards and practices

B. Products: Subject to compliance with requirmetns as set forth in ASTM C568, Classification: Category III, High Density. Stone shall be provided with the following physical properties:

1. Absorption: ASTM C97, 2.0% maximum.
2. Density: ASTM C 97, 150 pounds per cubic foot minimum.
3. Modulus of Rupture: ASTM C 99, 1,000 psi minimum.
4. Compressive Strength: ASTM C 170, 15,000 psi average
5. Abrasive Resistance: ASTM C 241, R12.0 minimum.
6. Freeze Thaw Durability: ASTM D 5312, mass loss after 35 cycles, 0%.
7. Wetting and Drying Durability: ADSM D 5313 mass loss after 80 cycles, 0 to 0.10 of 1%.

C. Provide sound stone uniform in color and texture, free from mineral stains, other foreign matter, and defects detrimental to appearance and durability.Color range, texture, and finish of cut stone materials shall be within range of Engineer's accepted samples.

D. Embedded Anchors and Other Inserts: Fabricated from stainless steel complying with ASTM A 240/A 240M, ASTM A 276,

E. Available Manufacturers: Provide one of the following.

1. Valders Limestone, Buff flamed finish on caps, coping and banding. Splitface texture on sign field.

2. Glacier Stone, Canyon Creek, flamed finish on caps, coping and banding. Splitface texture on sign field.

3. Cordova Stone, Alabaster Groundface finish on caps, coping and banding. Rockface Texture on sign field.

2.2 CUT STONE FABRICATION:

A. Fabricate stone work as indicated or as accepted and detailed on final shop drawings.

B. Fabrication Tolerances:

1. Variation in Cross Section: Do not vary from indicated dimensions by more than 1/8 inch.

2. Variation in Length: Do not vary from indicated dimensions by more than 1/360 of the length of unit or 1/8 inch, whichever is greater, but in no case by more than 1/4 inch.

3. Warp, Bow, and Twist: Not to exceed 1/360 of the length of unit or 1/8 inch, whichever is greater.

C. Location of Grooves, False Joints, Holes, Anchorages, and Similar Features: Do not vary from indicated position by more than 1/8 inch on formed surfaces of units and 3/8 inch on unformed surfaces

D. Cut accurately to shape and dimensions indicated or accepted final shop drawings.

1. Dress joints, bed, and vertical, straight at 90 degree angle to face. Provide drips and washes as indicated.

2. Joint width: Cut to allow uniform ¼ inch wide joints unless previously stated otherwise.

3. Thickness: Provide thickness indicated.

4. Jointing: Provide as indicated; when not indicated, in accordance with industry standards and practices.

2.3 MORTAR MATERIALS:

A. Portland cement: ASTM C150, Type I, natural color.

B. Masonry cement: ASTM C91.

C. Hydrated lime: ASTM C207, Type S.

D. Aggregate:

1. Masonry mortar: ASTM C144, clean masonry sand, not over 10% to pass #100 sieve.

2. Masonry grout: ASTM C404, clean pea gravel, maximum 3/8 inch size.

E. Water: Clean, fresh, and potable.

F. Colored mortar pigment: Lime-proof and alkalai-proof mineral oxide pigments. Color as indicated on drawings. Submit color samples with shop drawings.

2.4 MORTAR AND GROUT MIXES:

A. Type N mortar: ASTM C270 proportions by volume. Minimum average compressive strength at 28 days of 2,500 psi, either:

1. 1 part portland cement, 1/4 part hydrated line, not less than 2 1/4 and not more than 3 times the sum of the volumes of cement used of damp, loose sand.

B. Coarse grout: ASTM C476 proportions by volume. Minimum average compressive strength at 28 days of 2,500 psi:

1. 1 part portland cement, 0 to 1/10 part hydrated lime, not less than 1 and not more than 2 times the volume of cement used of damp, loose coarse aggregate.

C. Measure and batch material either by volume or weight. Use accurate measuring devices to ensure uniformity and coloration of mix. Shovel count measurement of sand is not acceptable.

D. Mix cementitious material and aggregate in a clean mechanical mixer for at least 5 minutes. Add water in amount to provide satisfactory workable consistency of mortar.

E. Proportion colored mortar pigment with other ingredients to match the approved samples.

F. Retemper mortar as required within 2 hours of mixing to replace water lost by evaporation. Use and place mortar in final position within 2 1/2 hours of the initial mixing. Discard mortar after 2 1/2 hours of the initial mixing.

2.5 ACCESSORIES

A. Anchors: Type and size indicated, fabricated from stainless steel complying with ASTM A 240/A 240M, ASTM A 276, or ASTM A 666, Type 304.

B. Dowels: Round stainless-steel bars complying with ASTM A 276, Type 304, and 1/2-inch diameter.

PART 3 - EXECUTION

3.1 INSPECTION:

A. Examine substrates and installation conditions. Do not start stone masonry work until unsatisfactory conditions are corrected.

3.2 PREPARATION:

A. Establish lines, levels, and coursing.

1. Clean cut stone work before setting by thoroughly scrubbing with fiber bristle brushes and clean water. Drench stone with clean water just prior to setting.

B. Do not use mansonry units with chips, cracks, voids, stains, or other visible defects.

C. Excavation

1. Contractor shall excavate to the lines and grades shown on the project grading plans. Contractor shall take precautions to minimize over-excavation. Over-excavation shall be filled with compacted infill material, or as directed by the Engineer, at the Contractor's expense.

2. Contractor shall verify location of existing structures and utilities prior to excavation. Contractor shall ensure all surrounding structures are protected from the effects of wall excavation. Excavation support, if required, is the responsibility of the Contractor.

D. Foundation Preparation

1. Following the excavation, the foundation soil shall be examined by the Engineer to assure actual foundation soil strength meets or exceeds the assumed design bearing strength. Soils not meeting the required strength shall be removed and replaced with infill soils, as directed by the Engineer.

2. Foundation soil shall be proofrolled and compacted to 95% standard Proctor density and inspected by the Engineer prior to placement of leveling pad materials.

E. Leveling Pad Construction

1. Leveling pad shall be placed as shown on the plans. The leveling pad should extend laterally at least a distance of 6 inches from the toe and heel of the lower most masonry unit.

2. Granular leveling pad material shall be compacted to provide a firm, level bearing surface on which to place the first course of units. Well-graded sand can be used to smooth the top 1/2 to 1/4 inch of the leveling pad. Compaction will be with mechanical plate compactors to achieve 95% of maximum standard Proctor density (ASTM D 698).

3.3 INSTALLATION OF CUT STONE:

A. Set stone in accordance with drawing details and final shop drawings for stone work. Provide anchors, supports, and other attachments shown, or necessary to secure stonework in place. Shim and adjust accessories as required for proper setting of stone.

B. Erect cut stone work plumb and true with joints uniform in width and accurately aligned.

3.4 CLEANING:

A. Remove and replace stone units which are loose, broken, stained, or otherwise damaged. Provide new matching units, install as specified.

B. Clean stonework not less than six days after completion of work, using clean water and stiff-bristle brushes. Do not use wire brushes, acid type cleaning agents or other cleaning compounds with caustic or harsh fillers.

C. Cleaning agents and methods shall be acceptable to the Engineer.

D. Upon completion of the work, remove from site all excess materials, debris, tools, and equipment. Repair damage resulting from stone masonry work operations.

3.5 MEASUREMENT AND PAYMENT

A. Stone Veneer

1. Measurement and payment for this item shall be made on a per square foot basis. Included with this item is all labor, equipment and materials necessary for furnishing and installing the stone veneer. All fasterns, connectors, mortar, pins, anchors and sealant necessary shall be considered incidental to the unit price.

B. Masonry Capstone

1. Measurement and payment for this item shall be made on a per square foot basis. Included with this item is all labor, equipment and materials necessary for furnishing and installing the masonry capstone. Capstones along the top of brick walls and decorative stone copings included in this price. All fasterns, connectors, mortar, pins, anchors and sealant necessary shall be considered incidental to the unit price.

SP- 127031
(New)

Iowa Department of Transportation

SPECIAL PROVISIONS
FOR
WATER MAIN

Polk County

Project No.
TAP-T-8477(613)—8V-77

Effective Date
May 19,2015

THE STANDARD SPECIFICATIONS, SERIES 2012, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

I. GENERAL INFORMATION

A. Submittals

The Des Moines Water Works (DMWW) will review all shop drawings for materials related to water main construction. Shop drawings shall be provided to DMWW 2 weeks prior to any water main construction. The Contractor shall submit these shop drawings to:

Des Moines Water Works
Attn.: Katie Kinsey, P.E.
2201 George Flagg Parkway
Des Moines, Iowa 50321

B. Preparation

Notify DMWW (515-283-8729) 48 hours prior to the start of any water main related construction.

Verify proposed grades prior to construction to ensure adequate finished cover will be provided over all water mains.

The Contractor shall arrange for all survey required to install water main on line and grade as shown on the plans.

The Contractor shall arrange with DMWW for all valves and hydrants to be operated only by DMWW's personnel.

C. Connections to the Existing Water System

Expose existing buried pipe at locations that will be connected to new piping. Confirm location, depth, orientation, type of pipe, outside diameter, and type and location of joints.

Connections to the existing DMWW's system shall be coordinated with the Engineer and scheduled a minimum of 48 hours in advance. Customers who will be without water shall be notified by the Contractor a minimum of 24 hours in advance. Water main shutdowns may need to be completed outside normal working hours to minimize impact on affected customers. No additional compensation will be paid for work outside normal working hours.

Taps larger than 2 inches required for connections to existing mains shall be made by DMWW. The Contractor shall schedule the taps a minimum of 24 hours in advance and prepare the necessary excavation, including shoring. DMWW will provide the tapping sleeve, valve, and valve box.

Field locate tapping sleeves so that the tap is centered 3 to 6 feet from the joint that will be capped/plugged.

D. Abandonment of Existing Facilities

Existing water mains shall be abandoned as shown on the plans. Mains shall be capped and hydrant assemblies and valve boxes shall be removed incidental to water main construction.

II. WARRANTY

The Contractor shall protect and save harmless the Des Moines Water Works' Board from claims and damages of any kind caused by the operation of the Contractor, warranty materials and quality of work to be free of defects for a period of 2 years after the date of successful completion of testing as stated in Sections 02674 and 02675, and Part 3.7 of Section 02220 all contained within this Special Provision and shall otherwise in all respects comply with Chapter 573, Code of Iowa. Should defects be discovered during this period, the Contractor shall repair the defect at its sole cost and expense upon notice from DMWW.

Submit written report stating intentions and schedule for completing repairs within 7 calendar days after being notified of need for repairs.

If Contractor fails to make needed repairs, DMWW will contact the Office of Contracts and their bidding qualifications may be jeopardized according to Article 1102.03 of the Standard Specifications.

DMWW reserves the right to make emergency repairs that are necessary to keep the water main facilities serviceable or to provide immediate action to prevent further damage to the water main or surrounding area. The Contractor shall reimburse the cost incurred by DMWW for any emergency repairs.

III. BASIS OF PAYMENT

No other payment will be made for work covered by this Special Provision, but will be considered incidental to the contract unit price bid for the individual items for which the work was done. Payment for each item shall be considered full compensation for furnishing all material, equipment, tools, labor, and warranty for the construction of each item including excavation, backfill, compaction, and other incidental work to complete the construction in accordance with the contract documents.

SECTION 02220 EXCAVATING, BACKFILLING, AND COMPACTING FOR WATER MAINS

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Part 1 General

1.1 Summary of Work

A. Excavating, backfilling, and compacting specifications as applicable for installation of water main and appurtenances.

1.2 Related Sections

A. Section 02610 – Ductile Iron and Polyvinyl Chloride Pipe for Water Mains.
B. Section 02640 – Valves and Hydrants.

1.3 References

A. American Society for Testing and Materials (ASTM) D2922 – Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
B. American Society for Testing and Materials (ASTM) D3017 – Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
C. American Society for Testing and Materials (ASTM) D698 – Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft3).
D. Federal Register – Occupational Safety and Health Administration (OSHA), Occupational Safety and Health Standards - Excavations.
E. Iowa Department of Transportation (IDOT) Standard Specifications for Highway and Bridge Construction – Series 2012, including Supplemental Specification.

1.4 Submittals (Not used)

1.5 Measurement and Payment (Not used)

Part 2 Products

2.1 Excavated Materials
- A. Topsoil shall be stripped, grubbed, and stockpiled for finished grading.
- B. Backfill material shall be:
  1. Approved for use by the Engineer.
  2. Selected material taken from the excavation or select borrow material, if sufficient quantities of compliant excavated material are not available.
  3. Inorganic clays, clayey sands, or inorganic and clayey silts, compatible with and having an obtainable density no less than adjacent soils.
  4. Free of lumps or clods over 3 inches in the largest dimension.
  5. Free of foreign debris including rocks, organic materials, and man-made debris.
  6. Material that is not frozen.

2.2 Bedding Material
- A. Steel Pipe: Bed pipe using sand free of frozen material, foreign debris, including rocks, organic materials, and man-made debris.
- B. Ductile iron pipe, prestressed concrete cylinder pipe, polyvinyl pipe, and corrugated steel pipe: Bed pipe using material taken from the excavation with the following characteristics:
  1. Inorganic clay, clayey sand, or inorganic and clayey silt.
  2. Free of lumps or clods over 2 inches in the largest dimension.
  3. Free of foreign debris including rocks, organic materials, and man-made debris.
  4. With a soil moisture range of optimum moisture to 4% points above optimum moisture content.
  5. Material that is not frozen.

2.3 Stabilization Material
- A. When required by field conditions, stabilization material shall be crushed limestone, dolomite, or quartzite generally meeting the following characteristics:
  1. 2-inch nominal maximum size.
  2. 95% retained on a ¾-inch screen.
  3. Generally free from deleterious substances as determined by the Engineer.

2.4 Borrow Materials
- A. If sufficient quantity of suitable material is not available from excavations, material shall be obtained from approved off-site sources. Off-site sources must hold a National Pollutant Discharge Elimination System (NPDES) permit from the IDNR for storm water discharge associated with construction activity.
- B. Borrow materials, including topsoil and backfill material, shall conform to specifications for excavated materials in Part 2.1.
- C. Topsoil borrow material shall be:
  1. Natural loam and humus with characteristics consistent with the existing topsoil on site.
  2. Finely graded and free of clumps larger than 2 inches in the largest dimension.
  3. Free of man-made materials and debris.
  4. Free of rock or organic matter, including wood and roots, greater than ¾-inch, in the largest dimension.
  5. Comprised of less than 0.5% clay.

2.5 Special Pipe Embedment and Encasement Material

A. When directed by Engineer, Contractor shall install controlled low-strength material to provide support to existing utilities.

1. Controlled Low-Strength Material (CLSM):

a. Approximate quantities per cubic yard:

(1) Cement: 50 pounds.

(2) Fly ash: 250 pounds.

(3) Fine aggregate: 2910 pounds.

(4) Water: 60 gallons.

b. A compressive strength of at least 50 psi compressive strength at 28 calendar days.

c. Comply with material requirements of Article 2506.02 of the Standard Specifications.

Part 3 Execution

3.1 General

A. Quality Assurance

1. The Engineer shall be given the opportunity to review excavated or borrowed soils prior to placement as backfill.

2. The Contracting Authority will commission and compensate a qualified soils engineer to develop Proctor curves indicating moisture-density relationships for all soil types used as backfill.

3. Proctor curves and soil analysis information shall be used in determining proper compaction of the soils placed.

B. General Safety

1. Blasting shall not be permitted.

2. Safety and protection:

a. Provide shoring, sheeting, and bracing, as required, to protect the Work, adjacent property, private or public utilities, and workers.

b. Strictly observe laws and ordinances regulating health and safety measures.

c. Excavations that Contracting Authority's personnel are required to enter shall comply with OSHA standards.

C. Soil Testing

1. Field tests for density and moisture content shall be performed by the soils engineer, defined in Part 3.1.B above, to ensure that the specified density is being obtained. Testing shall be done using ASTM D2922 nuclear methods or another method approved by the Engineer.

2. Density tests shall be taken at finished grade, at 3 feet below finished grade, and as directed by the Engineer under special conditions. Test locations shall be selected by the Engineer immediately prior to performing tests. Excavate, as directed by the Engineer, for tests at intermediate depths. As a minimum, density tests shall be taken at approximately 200-foot intervals along the trench. Additional tests shall be required at the following locations:

a. Over jacking pits where casing was installed.

b. Immediately adjacent to all structures.

3. When test results indicate compaction is not as specified:

a. Additional tests will be required in both directions from the failed test until satisfactory results are obtained.

b. All material between the satisfactory tests shall be removed, replaced, and recompacted in lifts to meet specifications. Compaction corrections shall be made at no expense to the Contracting Authority.

c. Recompacted areas shall receive density tests provided at the same frequency as the original tests. Testing of recompacted areas shall be at the Contractor's expense.

4. If petroleum-based materials are detected in the soils, the Contractor shall notify the Engineer. Appropriate action will be taken by the Contracting Authority.
5. Tests that are not conducted in the presence of the Engineer, or are conducted at locations not selected by the Engineer, will be rejected.

D. Protection of Utility Lines
1. Conduct trenching operations to avoid damaging underground utilities.
2. Underground utilities that are shown on the Drawings, located or identified for the Contractor prior to trenching, shall be protected. Damage resulting from trenching or backfilling shall be repaired by the Contractor or utility company at Contractor's expense.
3. Underground utilities discovered by the Contractor shall be protected.

3.2 Disposal of Excavated Material

A. Remove excess material excavated for the water main trench from the site and in compliance with environmental regulations.
B. Backfill consisting of suitable material, which comes from an off-site source, must conform to Part 2.1.

3.3 Trench Excavation

A. Strip and stockpile topsoil for finished grading. A minimum of 12 inches of topsoil must be segregated from other materials in agricultural areas.
B. Trenches shall be excavated so as to:
1. Follow lines and grades as indicated on the plans.
2. Provide uniform bearing on undisturbed soil and continuous support along the entire length of the pipe.
3. Prevent over-excavation in locations where suitable subgrade conditions exist.
4. Provide vertical trench walls to an elevation no less than 12 inches above the pipe.

C. Unstable trench bottoms, as determined by the Engineer, shall be corrected as follows:
1. Over-excavate the trench to stable soil or to a maximum of to 2 feet below the bottom of the pipe.
2. If stable soil is reached, the trench shall be brought back to grade using suitable backfill material or bedding material compacted to 90 percent Standard Proctor Density.
3. If stable soil is not reached after 2 feet of over-excavation, 1 foot of the specified trench stabilization material shall be placed in the trench bottom and compacted. The trench shall then be brought back to grade using suitable backfill material or bedding material compacted to 90% Standard Proctor Density.
4. Pipe shall be placed only after the trench bottom has been fully stabilized.

D. Remove stones encountered during excavation. When large rocks are encountered, they shall be broken away to an elevation 6 inches below the bottom of the proposed improvement. Voids created through removal of stones shall be filled with approved backfill material and thoroughly compacted to 90% Standard Proctor Density.
E. Trench bottoms shall be excavated deeper at the location of bell joints to permit the body of the pipe to rest uniformly supported upon the trench bottom. Bell holes shall be no longer than is necessary for practical installation of the pipe.
F. The length of trench to be opened at one time shall be as follows:
1. In extended runs, open trench length shall not exceed 100 feet.
2. In street crossings, trench shall not be open in more than one lane at a time, unless specified differently in traffic control plan.
3. Backfill driveways and entrances immediately after placement of pipe.

G. Excavated material shall be placed:
1. As approved by the Engineer when this Special Provisions does not apply.
2. Compactly along sides of excavation.
3. To provide continuous access to fire hydrants and utility valves.
4. To provide as little inconvenience as possible to public travel.
5. To minimize damage to adjacent lawns and planted areas.

3.4 Pipe Bedding

A. Bed pipe with 4-inch thick layer of specified bedding material for pipes 20-inch and larger.
B. Place bedding alongside of the pipe to an elevation above the springline (no lower than half the height of the pipe).
C. Compact bedding to a minimum of 90% Standard Proctor Density.
D. Obtain required compaction within a soil moisture range of optimum moisture to 4 percentage points above optimum moisture content.
E. Do not damage pipe coating or wrapping system during bedding placement and compaction.

3.5 Backfilling

A. Backfilling of trenches shall be done only after pipe installation, jointing, and bedding are complete, inspected, and approved.
B. Backfill material shall comply with Part 2 above.
C. Backfill shall be mechanically tamped with impact or vibrating compaction equipment.
D. Place backfill in layers and compact to the required density.
E. Backfill shall be:
    1. Compacted to 90% Standard Proctor Density to a level 1 foot above the pipe.
    2. For the remainder of the trench:
        a. Public rights-of-way shall be compacted to 95 percent Standard Proctor Density.
        b. Easement areas shall be compacted to 90 percent Standard Proctor Density.
    3. Within a soil moisture range of optimum moisture to 4 percentage points above optimum moisture content.
F. Protect pipe coating or pipe wrapping system from damage during backfill operations.
G. Hydraulic compaction or water jetting of the pipe trenches shall not be permitted.
H. Adjust moisture content of material that exceeds optimum moisture range, but is otherwise acceptable, by spreading and aerating or otherwise drying as necessary until moisture content is within required moisture range and required compaction can be obtained.
I. Adjust moisture content of material that is below optimum moisture, but is otherwise acceptable, by wetting as necessary until moisture content is within required moisture range and required compaction can be obtained.

3.6 Grading

A. Finish-grade surfaces with a well-compacted, free-draining uniform surface without obstructive protrusions or depressions.
B. Place topsoil at a uniform depth equal to the surrounding topsoil, but not less than 4 inches.
C. Place topsoil to a minimum depth of 6 inches when ample native topsoil is available.
D. Place topsoil only under lawn and planted areas.

3.7 Control of Water

A. Install pipe in the dry.
B. Dewater as necessary to prevent water from entering the pipe or rising around the pipe.
C. Water pumped or diverted from the excavation site shall not be:
    1. Pooled anywhere on the site.
    2. Removed in such a manner as to disperse silt.
    3. Placed on surfaces heavily traveled by pedestrian traffic.
D. Installed pipe shall not be used as a conduit for trench dewatering.
E. Surface water shall be controlled as follows:
    1. Divert surface water to prevent entry into the pipe trenches.
    2. Remove surface water accumulated in the pipe trenches and other excavations prior to continuation of excavation work.
    3. Remove surface water saturated soil from the excavation.

F. Control groundwater as follows:
   1. Where groundwater is encountered, trenches and other excavations shall be dewatered, as necessary, to permit the proper execution of the Project.
   2. When large quantities of groundwater are encountered, trenches shall be stabilized with the specified stabilization material and pipe shall be bedded as specified.

3.8 Disposal of Unsuitable or Excess Material
   A. Surplus material and material not suitable for backfill shall be disposed of off-site at a location provided by Contractor.
      1. Off-site disposal locations must hold a National Pollutant Discharge Elimination System (NPDES) permit from the IDNR for storm water discharge associated with construction activity.
      2. Transportation of such material shall be provided by Contractor.

3.9 Cleanup and Restoration
   A. The site in and around the excavation shall be cleared of mud and construction debris to a condition equal to, or better than, that existing prior to trenching work.
   B. Remove construction remnant materials from the site.
   C. Damage to adjacent property suffered during installation work shall be repaired to a condition equal to, or better than, that existing prior to trenching work.

SECTION 02600 PROTECTION OF WATER SUPPLY

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1.5 Measurement and Payment (Not used)

Part 2 Products
Not used.

Part 3 Execution
3.1 General Installation Requirements
3.2 Separation Distance
3.3 Water Crossings
3.4 Depth of Cover and Width of Trench

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Part 1 General

1.1 Summary of Work

A. This Section describes Iowa Department of Natural Resources requirements for protection of water supply systems.

1.2 Related Sections

A. Section 02220 – Excavating, Backfilling, and Compacting for Water Mains.
B. Section 02610 – Ductile Iron and Polyvinyl Chloride Pipe for Water Mains.
C. Section 02640 – Valves and Hydrants.
D. Section 02674 – Pressure Testing Water Mains.
E. Section 02675 – Disinfection of Water Distribution Systems.

1.3 References

A. Iowa Wastewater Facilities Design Standards.

1.4 Submittals (Not used)

1.5 Measurement and Payment (Not used)

Part 2 Products

Not used.

Part 3 Execution

3.1 General Installation Requirements

A. Lay water mains to avoid high points where air can accumulate. Grade piping so that proposed hydrants will be at the highest points.
B. Do not locate hydrants within 10 feet of sanitary sewers or storm drains.
C. Plug hydrant drain ports in areas where groundwater rises above the water main and pump the hydrant barrel dry following construction.
D. Pressure test and disinfect new water mains prior to placing them in service.

3.2 Separation Distance

A. Horizontal separation of water mains from gravity sewers:
   1. Provide a horizontal separation distance of at least 10 feet between water mains and gravity sewer mains, unless both of the following conditions can be met:
      a. The bottom of the water main is at least 18 inches above the top of the sewer.
      b. The water main is placed in a separate trench with a minimum 3-foot horizontal separation.
   2. When it is impossible to obtain the required 3-foot horizontal clearance and 18-inch vertical separation, the sewer must be replaced with water main quality materials having a minimum pressure rating of 150 psi and meeting the requirements of Section 02610. In no case shall the linear separation be less than 2 feet.
B. Horizontal separation of water mains from sewer force mains:
   1. Provide a horizontal separation distance of at least 10 feet between water mains and sewer force mains, unless both of the following conditions can be met:
      a. The force main is constructed of water main quality materials having a minimum pressure rating of 150 psi and meeting the requirements of Section 02610.
      b. The water main is laid at least 4 linear feet from the sewer force main.
C. Vertical separation of water mains from sanitary sewer crossovers:
   1. Provide a vertical separation of at least 18 inches from the bottom of the water main to the top of the sanitary sewer whenever possible where water mains cross over sanitary sewers. If 18 inches cannot be met, provide a minimum vertical separation of 6 inches and place the water main inside 20-feet of a larger diameter polyvinyl chloride water main casing pipe with no casing chocks centered on the sanitary sewer.
   2. Provide a vertical separation of at least 18 inches from the bottom of the sanitary sewer to the top of the water main in cases where water mains cross under the sanitary sewer. Place the water main inside 20-feet of a larger diameter polyvinyl chloride water main casing pipe with no casing chocks centered on the sanitary sewer.
   3. Adequately support both water and sanitary sewer pipes and provide watertight joints.
D. Vertical separation of water mains from storm sewer crossovers:
   1. Provide a vertical separation of at least 18 inches from the bottom of the water main to the top of the storm sewer whenever possible where water mains cross over storm sewers. If 18 inches cannot be met, provide a minimum vertical separation of 6 inches and construct one of the following:
      a. Verify the storm sewer has gasketed joints.
      b. The water main shall be 20-feet of ductile iron pipe material with nitrile gaskets.
      c. Encase the storm sewer.
      d. Encase the water main.
   2. Provide a minimum vertical separation of at least 18 inches from the bottom of the storm sewer to the top of the water main in cases where water mains cross under storm sewer mains and construct one of the following:
      a. Verify the storm sewer has gasketed joints.
      b. The water main shall be 20-feet of ductile iron pipe material with nitrile gaskets.
      c. Encase the storm sewer.
      d. Encase the water main.
   3. Adequately support both water and storm sewer pipes and provide watertight joints.

E. Separation of water mains from sewer manholes:
   1. No water pipe shall pass through or come in contact with any part of a sewer manhole.
   2. Provide a horizontal separation distance of at least 10 feet between water mains and sewer manholes.
F. Advise Engineer should physical conditions exist such that exceptions to Part 3.2 of this Section are necessary.

3.3 Water Crossings
A. Above-water crossings:
   1. Adequately support and anchor pipe used for above-water crossings.
   2. Protect pipe from damage and freezing.
   3. Ensure pipe is accessible for repair or replacement.
B. Underwater crossings:
   1. Use restrained joint pipe for water mains entering or crossing streams.
      a. Place the top of the water main a minimum of 5 feet below the natural bottom of the streambed.
      b. Securely anchor the water main to prevent movement of the pipe and provide easily accessible shutoff valves located outside the floodway at each end of the water crossing.
      c. Backfill the trench with crushed rock or gravel.
      d. Seed, sod, or otherwise protect the streambank from erosion upon completion of the Project.
   2. For smaller streams, the same requirements shall apply except that shutoff valves do not need to be located immediately adjacent to the water crossing.
   3. Water crossings in areas where no evidence of erosion exists are excluded from these requirements.

3.4 Depth of Cover and Width of Trench
A. Provide 5 feet minimum depth of cover from the top of the pipe to the ground surface.
B. Where possible, provide an additional 1 foot of cover under pavement.
C. Insulate water mains where conditions prevent adequate earth cover.
D. Provide a trench width adequate to lay and joint pipe properly but not more than 12 inches on either side of the pipe.

* END OF SECTION *

SECTION 02610 DUCTILE IRON AND POLYVINYL CHLORIDE PIPE FOR WATER MAINS

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Part 1 General

1.1 Summary of Work

A. This Section includes water mains, fittings, and specials as shown on the plans, complete with accessories.

1.2 Related Sections

A. Section 02220 – Excavating, Backfilling, and Compacting for Water Mains.
B. Section 02600 – Protection of Water Supply.
C. Section 02640 – Valves and Hydrants.
D. Section 02660 – Water Service Transfers.
E. Section 02674 – Pressure Testing Water Mains.
F. Section 02675 – Disinfection of Water Distribution Systems.
G. Section 13210 – Cathodic Protection for Small Diameter (8”-16”) Water Mains.

1.3 References

A. American National Standards Institute (ANSI) B16.1 – Cast Iron Pipe Flanges and Flanged Fittings.
B. American Society for Testing and Materials (ASTM) A320 – Alloy-Steel and Stainless Steel Bolting for Low-Temperature Service.
C. American Society for Testing and Materials (ASTM) A536 – Standard Specification for Ductile Iron Castings.

D. American Water Works Association (AWWA) C104 – Cement-Mortar Lining for Ductile-Iron Pipe and Fittings.
E. American Water Works Association (AWWA) C105 – Polyethylene Encasement for Ductile-Iron Pipe Systems.
F. American Water Works Association (AWWA) C110 – Ductile-Iron and Gray-Iron Fittings.
G. American Water Works Association (AWWA) C111 – Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
H. American Water Works Association (AWWA) C115 – Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
I. American Water Works Association (AWWA) C150 – Thickness Design of Ductile Iron Pipe.
J. American Water Works Association (AWWA) C151 – Ductile Iron Pipe, Centrifugally Cast.
K. American Water Works Association (AWWA) C153 – Ductile-Iron Compact Fittings.
L. American Water Works Association (AWWA) C600 – Installation of Ductile-Iron Water Mains and Their Appurtenances.
M. American Water Works Association (AWWA) C605 – Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water.
N. American Water Works Association (AWWA) C900 – Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 12 In., for Water Transmission and Distribution.
O. American Water Works Association (AWWA) C905 – Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 In. Through 48 In, for Water Transmission and Distribution.

1.4 Submittals
A. The following items shall be submitted for materials provided by the Contractor:
1. Manufacturer's certification that materials furnished is in compliance with the applicable requirements of the referenced standards and this Specification.
2. Drawings and manufacturer's data showing details of the pipe and fittings to comply with this Specification.
3. Class of pipe and fittings.
4. Restrained joint details for Engineer's approval.
B. Provide dimensional drawings, fabrication details, functional description, and properly identified catalog data on pipe and equipment to prove complete compliance with Contract Documents.

1.5 Measurement and Payment
A. Water main shall be measured in linear feet, along centerline of the pipe.
B. Install regular joint pipe items by open trench. Include costs for material, equipment, and labor for Work included in this Section.
C. Install lock joint pipe items by horizontal directional drilling. Include costs for material, equipment, and labor for Work included in this Section.

Part 2 Products

2.1 Ductile Iron Pipe (12 Inches and Smaller)
A. Special Thickness Class 52 per AWWA C150.
B. Manufacture pipe in accordance with AWWA C151.
C. Provide asphaltic outside coating per AWWA C151, 1 mil in thickness.
D. Cement Mortar Lining:
1. Provide pipe with standard thickness cement mortar lining per AWWA C104.
2. Seal-coat cement mortar lining in accordance with AWWA C104.

2.2 Polyvinyl Chloride Pipe C-900
- A. Manufacture 12-inch and smaller pipe in accordance with AWWA C900.
- B. Pipe shall be Class 235 (DR 18) with ductile iron pipe equivalent outside diameters.
- C. Pipe installed utilizing horizontal directional drilling shall be restrained joint PVC.
- D. Pipe shall be blue in color.

2.3 Polyvinyl Chloride Pipe C-905
- A. Manufacture 16-inch pipe in accordance with AWWA C905.
- B. Pipe shall be Class 235 (DR 18) with ductile iron pipe equivalent outside diameters.
- C. Pipe installed utilizing horizontal directional drilling shall be restrained joint PVC.
- D. Pipe shall be blue in color.

2.4 Fittings for Ductile Iron and Polyvinyl Chloride Pipe
- A. Fittings shall be compact in accordance with AWWA C153, or full size in accordance with AWWA C110.
- B. Material of construction shall be ductile iron in accordance with AWWA C110.
- C. Joints
  1. Mechanical in accordance with AWWA C111 and shall be restrained.
     - a. T-bolts and hex-head nuts for mechanical joints in accordance with AWWA C111.
       - (1) Material: low carbon alloy weathering Cor-Ten steel.
       - (2) Coating: Cor-Blue fluorocarbon resin.
       - (3) Color: blue.
  2. Flanged in accordance with AWWA C115, as indicated on the plans, with ANSI Class 125 full-faced flange.
     - a. Gaskets: of thickness compatible with machining tolerances of flange faces. Minimum thickness: 1/8-inch.
     - b. Nuts and bolts: stainless steel in accordance with ASTM A320, Type 304.
- D. Pressure rating:

Size (Inches)	Pressure Rating (psi)
3 – 24	350
30 – 48	250
54 – 64	150

- E. Provide asphaltic outside coating per AWWA C110, 1 mil in thickness.
- F. Cement Mortar Lining:
  1. Provide standard thickness cement mortar lining per AWWA C104.
  2. Seal-coat cement mortar lining in accordance with AWWA C104.

2.5 Joints for Ductile Iron and Polyvinyl Chloride Pipe
- A. Joints shall be push-on using an integral bell with an elastomeric or nitrile gasket in accordance with AWWA C111, mechanical in accordance with AWWA C111, or restrained as needed for thrust restraint.
- B. Follower glands for mechanical joints shall be ductile iron.
- C. Solvent cement joints are strictly prohibited.
- D. T-bolts and hex-head nuts for mechanical joints in accordance with AWWA C111.
  1. Material: low carbon alloy weathering Cor-Ten steel.
  2. Coating: Cor-Blue fluorocarbon resin.
  3. Color: blue.

2.6 Restrained Joints

A. Mechanical Joint
   1. Incorporate restraint for all mechanical joints into the design of the follower gland.
   2. Retainer gland design shall impart multiple wedging actions against the pipe, increasing its resistance as pressure increases.
   3. Restrained joints to consist of a mechanical joint with retainer gland or manufacturer's proprietary-restrained joint.
   4. Dimensions shall conform to the requirements of AWWA C111 and AWWA C153.
   5. Pressure rating:
      a. Minimum of 235 psi for PVC pipe.
      b. Minimum of 350 psi for ductile iron pipe for sizes 16-inch and smaller.
      c. Minimum of 250 psi for ductile iron pipe for sizes 18-inch and larger.
   6. Color:
      a. Red for PVC pipe.
      b. Black for ductile iron pipe.
   7. Materials for construction:
      a. Body, wedge segments, and break-off bolt assemblies: Grade 65-45-12 ductile iron as specified by ASTM A536.
      b. Coating to be electrostatically applied and heat cured.
         (1) Approved manufacturers:
            (a) MEGA-BOND by Ebaa Iron, Inc.
            (b) CORRSAFE by Sigma.
            (c) Starbond by Star Products.
            (d) Resicoat R2-ES by Tyler Union.
            (e) Or approved equal.
   8. Minimum factor of safety of 2.
   9. Ductile iron retainer wedge segments shall be heat treated to a minimum Brinell Hardness Number of 370.
   10. Twist-off nuts, the same size as hex-head nuts for T-bolts, shall be incorporated into the design to ensure proper actuating torque is applied during installation.
   11. Approved manufacturers for PVC pipe:
      a. Megalug by EBAA Iron Inc. Series 2000PV.
      b. One-Lok by Sigma Series SLCE.
      c. Stargrip by Star Products Series 4000.
      d. TUFGrip by Tyler Union Series 2000.
      e. Or approved equal.
   12. Approved manufacturers for ductile iron pipe:
      a. Megalug by EBAA Iron Inc. Series 1000.
      b. One-Lok by Sigma Series SLDE.
      c. Stargrip by Star Products Series 3000.
      d. TUFGrip by Tyler Union Series 1000.
      e. Or approved equal.

B. PVC Pipe Joints:
   1. Restraint for in-line PVC pipe shall be provided through the use of groove and spline or grip ring located in the bell that provides full-circumferential restrained joint.
   2. Restraint joints to have a minimum pressure rating of 150 psi.
   3. Manufacturers:
      a. Certa-Lok by Certainteed.
      b. Diamond Lok-21 by Diamond Plastics.
      c. Eagle Loc 900 by JM Eagle.
      d. Or approved equal.

C. Ductile Iron Pipe Joint
   1. Restraint for in-line ductile iron pipe shall consist of the manufacturer's proprietary-restrained joint.
   2. Restraint joints to have a minimum pressure rating of 250 psi.

2.7 Polyethylene Pipe Encasement Material (Ductile Iron Pipe and Fittings)

A. Polyethylene encasement shall be manufactured in accordance with AWWA C105.
B. Linear low-density polyethylene film.
C. Minimum thickness shall be 8 mils.
D. Color: Blue.
E. Physical Properties:
   1. Tensile strength 3600 psi, minimum.
   2. Elongation 800%, minimum.
   3. Dielectric strength 800 V/mil, minimum.
   4. Impact resistance 600 g, minimum.
   5. Propagation tear resistance 2550 gf, minimum.
F. Flat-width tubing of the following sizes shall be used:

Pipe Size	Tubing Width
3 inches	14 inches
4 inches	14 inches
6 inches	16 inches
8 inches	20 inches
12 inches	27 inches
16 inches	34 inches
20 inches	41 inches
24 inches	54 inches
30 inches	67 inches
36 inches	81 inches

G. Markings shall contain the following information spaced every 2 feet apart:
   1. Name of manufacturer.
   2. Year of manufacture.
   3. ANSI/AWWA C150-A21.5.
   4. 8 mil linear low-density polyethylene (LLDPE).
   5. Applicable range of nominal pipe diameter.
   6. Warning – Corrosion Protection – Repair Any Damage.
H. Sheet material can be used to wrap irregular-shaped valves and fittings.
I. 2-inch-wide, 10-mil-thick pressure-sensitive polyethylene tape shall be used to close seams and hold overlaps.

2.8 Tracer System

A. Tracer Wire:
   1. Open Cut:
      a. No. 14 AWG high-strength copper clad steel (HS-CCS) manufactured by Copperhead Industries, or pre-approved equal.
         (1) Insulation: 30 mil, high-density, high molecular weight polyethylene (HDPE) and rated for direct burial at 30 volts.
         (2) HW-CCS Conductor: 21% conductivity for locates purposes with a minimum 282 lbs. break load.
         (3) Origin of copper clad steel manufacture is required and steel core must be manufactured in the United States.
         (4) Color: Blue.
   2. Directional Drilling/Boring:
      a. No. 12 AWG extra-high-strength copper clad steel conductor (EHS-CCS) manufactured by Copperhead Industries for directional drilling and boring applications, or pre-approved equal.
         (1) Insulation: 45 mil, high-density, high molecular weight polyethylene (HDPE) and rated for direct burial at 30 volts.
         (2) EHS-CCS Conductor: 21% conductivity for locates purposes with a minimum 1150 lbs. break load.

(3) Origin of copper clad steel manufacture is required and steel core must be manufactured in the United States.
(4) Color: Blue.

b. Tracer wire on pipe installations with a combination of open cut and directional drilling shall be installed to meet directional drilling requirements.

B. Anode Ground Rod:
1. 1# x 1.315”D x 18.5”L, magnesium drive in anode manufactured by Copperhead Industries, or pre-approved equal.
2. Cap installed on one end of anode ground rod to be HDPE.
3. Provide a beveled pointed end on anode ground rod opposite of the cap to aid in hammering into the ground.
4. Wire from cap for anode ground rod to tracer wire connection:
a. No. 14 AWG copper clad steel (HS-CCS) manufactured by Copperhead Industries or approved equal.
b. Insulation: 30 mil, high-density, high molecular weight polyethylene (HDPE) and rated for direct burial at 30 volts.
c. Length: 10 feet.
(1) HS-CCS Conductor: 21% conductivity for locates purposes with a minimum 250 lbs. break load.
d. Color: Red.

C. Wire Splice Connector:
1. Tracer wire splices shall only be used to connect the anode ground rod to the tracer wire.
2. Tracer wire splices will not be allowed between anode ground rods and connection terminal.
3. Splices used for tracer wire repair must be approved by the Engineer.
a. Splice Kit: 3M Scotchcase 3832 Buried Service Wire Splice Kit with Burndy KS15 8-14 AWG Splice Bolt.
b. Or approved equal.

D. Tracer Wire Connection:
1. Rhino TriView TracerPed, or approved equal.
a. Three internal terminals with two shunts.
b. 5-foot white plastic triangular post.
c. Removable top cap with lock.
d. Three 2-7/8” by 14” custom vinyl decals No. SD-5594K.
e. Tri-grip anchor.

Part 3 Execution

3.1 Handling, Storage, and Shipping
A. Handle pipe carefully.
B. Blocking and hold-downs shall be used during shipment to prevent movement or shifting.
C. Pipe with damage to the cement mortar lining will be rejected with field-patching not permitted.
D. For shipment and storage, small pipe shall not be telescoped inside larger pipe.
E. Handle pipe materials by use of slings, hoists, skids, or other approved means.
F. Dropping or rolling of pipe material is not permitted.
G. PVC pipe shall not be stored in direct sunlight for prolonged periods of time.
H. Pipe shall be protected to prevent dirt entering the pipe.

3.2 General Pipe Installation
A. Protect pipe joints from injury while handling and storing.
B. Use no deformed, defective, gouged, or otherwise impaired pipe.
C. Excavate and prepare trench as specified in Section 02220.

D. Install ductile iron pipe in accordance with AWWA C600.
E. Install PVC pipe in accordance with AWWA C605.
F. Prepare the trench bottom with sufficient exactness before the pipe is installed so that only minor movement of the pipe will be necessary after installation.
G. Clean pipe interior prior to placement in the trench.
H. Install pipe to the line and grade shown on the plans with an allowable tolerance of 6 inches, plus or minus.
I. Maintain uniform bearing along the full length of the pipe barrel at all times. Blocking the pipe up will not be acceptable. Excavate trench bottoms deeper at the location of bell joints to permit the body of the pipe to rest uniformly supported upon the trench bottom.
J. Bell holes shall be no longer than is necessary for practical installation of the pipe.
K. Clean joint surfaces of dirt and foreign matter using a wire brush before jointing pipe.
L. Lubricate gasket and pipe bell. Furnish a vegetable-soap lubricant meeting manufacturer's recommendations. Lubricant shall be approved for use with potable water.
M. Make joints in strict accordance with manufacturer's recommendations.
N. Joint deflections shall be within the manufacturer's specifications for maximum deflections.
O. Bolts on mechanical joints shall be tightened evenly around the pipe by alternating from one side of the pipe to the other.
P. Cut pipe in a neat manner, without damage to the pipe or the cement mortar lining, if any. Leave a smooth end at right angles to the axis of the pipe. Cut pipe ends shall be beveled for push-on-type joints in accordance with manufacturer's recommendations.
Q. No pipe shall be installed in water, nor shall water be allowed to rise in the trench around the pipe.
R. Place watertight bulkheads on the exposed ends of the pipe at all times when the pipe installation is not actually in progress.
S. Backfill and compact around pipe as outlined in Section 02220.

3.3 Installation of Polyethylene Pipe Encasement Material
A. Use polyethylene encasement material on buried ductile iron pipe, fittings, rods, and appurtenances in accordance with AWWA C105, Method A.
B. Use polyethylene tubing to encase pipe.
C. Cut tubing 2 feet longer than pipe section. Overlap tubing 1 foot at each end of pipe.
D. Gather and lap tubing to provide a snug fit.
E. Secure lap at quarter points with polyethylene tape. Secure each end of tube with a complete wrap of polyethylene tape.
F. The polyethylene encasement shall prevent contact between the pipe and bedding material, but is not intended to be a completely airtight and watertight enclosure.
G. Repair damaged polyethylene encasement material using polyethylene tape, or replace the damaged section.

3.4 Thrust Blocks
A. Provide concrete thrust blocks or collars at changes in alignment, tees, and dead ends.
B. Carry thrust blocks or collars to undisturbed soil that will provide adequate bearing.
C. The bearing area of thrust blocks or collars, in square feet, shall be as shown on the plans. Minimum thickness for any thrust block shall be 1.5 times outside pipe diameter or 18 inches, whichever is greater.
D. Hold thrust blocks or collars back 3 inches from all bolts, nuts, glands, or other jointing materials. Ensure joints could be remade without disturbing thrust block or collar.
E. Provide bond breaker between thrust block or collar and pipe. Polyethylene encasement material will be considered an acceptable bond breaker.
F. Provide thrust blocks at all connections to existing water mains.

3.5 Tracer System Installation

A. Install tracer wire with buried piping.
B. Duct tape tracer wire to the pipe every 5 feet in the 3 or 9 o'clock position opposite of the anode beds to prevent damage to the wire during backfill and future construction exposure.
C. Install anode ground rods adjacent to connections to existing piping and at each fire hydrant.
D. Terminate tracer wire in tracer wire connection next to each fire hydrant or other locations directed by Engineer.
E. Wire splice connectors can only be used to connect ground rods to tracer wire. Wire splice connectors are not allowed at any other locations unless approved by Engineer. Provide long enough roll of tracer wire to not need the use of wire splices connectors
F. Allow Engineer to inspect underground splices prior to backfilling.
G. Tracer wire installation is considered incidental to water main installation.

3.6 Testing and Chlorination

A. Perform hydrostatic and leakage tests in accordance with Section 02674.
B. Disinfect all water mains in accordance with Section 02675.
C. A tracer wire test will be conducted by the Des Moines Water Works prior to acceptance of the Project. Discontinuities found in the tracer system shall be corrected by the Contractor at the Contractor's expense.

* END OF SECTION *

SECTION 02640 VALVES AND HYDRANTS

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Part 1 General

1.1 Summary of Work
A. This Section includes valves and hydrants as shown on the plans, complete with accessories.

1.2 Related Sections
A. Section 02220 – Excavating, Backfilling, and Compacting for Water Mains.
B. Section 02610 – Ductile Iron and Polyvinyl Chloride Pipe for Water Mains.

1.3 References
A. American National Standards Institute (ANSI) B16.1 – Cast Iron Pipe Flanges and Flanged Fittings.
B. American Society for Testing and Materials (ASTM) A320 – Alloy-Steel and Stainless Steel Bolting for Low-Temperature Service.
C. American Society for Testing and Materials (ASTM) B584 – Copper Alloy Sand Castings for General Applications.
D. American Water Works Association (AWWA) C105 – Polyethylene Encasement for Ductile-Iron Pipe Systems.
E. American Water Works Association (AWWA) C111 – Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

F. American Water Works Association (AWWA) C115 – Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
G. American Water Works Association (AWWA) C153 – Ductile Iron Compact Fittings.
H. American Water Works Association (AWWA) C502 – Dry-Barrel Fire Hydrants.
I. American Water Works Association (AWWA) C509 – Resilient-Seated Gate Valves for Water Supply Service.
J. American Water Works Association (AWWA) C515 – Reduced-Wall, Resilient-Seated Gate Valves for Water Supply Service.
K. American Water Works Association (AWWA) C550 – Protective Interior Coatings for Valves and Hydrants.
L. American Water Works Association (AWWA) C600 – Installation of Ductile-Iron Water Mains and Their Appurtenances.

1.4 Submittals
A. Submit manufacturer's certification that materials furnished is in compliance with the applicable requirements of the referenced standards and this Section.
B. Provide dimensional drawings, fabrication details, functional description, and properly identified catalog data on all items to prove complete compliance with Drawings and specifications.

1.5 Measurement and Payment
A. All material, equipment, and labor necessary to comply with this Section shall be incidental to the unit price bids on the Proposal.

Part 2 Products

2.1 Gate Valves
A. Provide resilient-seated gate valves manufactured in accordance with AWWA C509 or AWWA C515.
1. Type of service: buried service handling potable water with a pH range of 9.5 to 9.8.
2. Minimum pressure rating: 250 psi.
3. Furnish valves with non-rising stem.
4. Provide 2-inch by 2-inch wrench operating nut that opens valves when turned in clockwise direction (open to the right), unless noted otherwise on the Drawings.
5. Valve gearing for 20-inch to 48-inch valves:
a. Provide valve with gear box.
b. Provide vertical valve unless otherwise specified on the Drawings.
c. The following gear ratios shall be used for the corresponding sizes:

Valve Size	Gear Ratio
20"	3 to 1
24"	3 to 1
30"	6 to 1
36"	6 to 1
42"	8 to 1
48"	8 to 1

d. Totally enclosed type, oil-filled, and designed for buried and submerged service.
e. Materials of construction:
(1) Gear housing: ductile iron.
(2) Gears: carbon steel.
(3) Pinion shaft: 304 stainless steel.
(4) Input shaft shall be designed with a ball bearing and sealed with o-rings.
(5) Exposed hex nuts and bolts: 304 stainless steel.

B. Materials of Construction:
   1. Body and bonnet: ductile iron.
   2. Gate: cast or ductile iron fully encapsulated with synthetic rubber.
   3. Stem and stem nut: bronze.
   4. O-rings: Buna-N.
   5. Exposed hex bolts and nuts: 304 stainless steel.
   6. Joints:
      a. Mechanical in accordance with AWWA C111.
         (1) Gaskets: Buna-N or nitrile.
         (2) Nuts and bolts:
            (a) All T-bolts and hex-head nuts for mechanical joints in accordance with AWWA C111.
            (b) Material: low carbon alloy weathering Cor-Ten steel.
            (c) Coating: Cor-Blue fluorocarbon resin.
            (d) Color: blue.
            (e) Approved Manufacturers:
               1) Birmingham Fastener Manufacturing Fluorocarbon Coated T-Head Bolt.
               2) Or approved equal.
      b. Flanged in accordance with AWWA C115, as indicated on the plans, with ANSI Class 125 full-faced flange.
         (1) Gaskets: Buna-N or nitrile, of thickness compatible with machining tolerances of flange faces. Minimum thickness: 1/8-inch.
         (2) Nuts and bolts: 304 stainless steel.

C. Design valve to:
   1. Allow replacement of upper O-ring while valve is under pressure in the full-open position.
   2. Not permit metal-to-metal contact between gate and body.
   3. Accommodate full-size tapping machine shell cutter.

D. Horizontal valves shall consist of a cleaning system on both sides of the gate. The cleaning system shall consist of materials that will not cause corrosion.

E. Interior and exterior valve coating shall be minimum 10-mil-thick fusion-bonded epoxy per AWWA C550.

F. Operating valve through 500 cycles at rated pressure must not result in disbondment or degradation of the coating. Certification will be required for manufacturers not listed below.

G. Indicate manufacturer, casting year, size, working pressure, and body material (ductile iron) in valve casting.

H. Manufacturers' Models for 4-inch to 16-inch valves:
   1. Clow Model 2638.
   2. American Flow Control Series 2500.
   3. Mueller 2300 Series.
   4. M & H Style 4067.
   5. Approved equal.

I. Manufacturers' Models for 20-inch to 48-inch valves:
   1. Clow Model 2638.
   2. American Flow Control Series 2500.
   3. Mueller 2300 Series.
   4. Approved equal.

2.2 Hydrants

A. Hydrants shall be manufactured in accordance with AWWA C502.
B. Hydrants shall be dry-barrel, breakaway type designed to break near the ground line on impact. Breaking ring or flange shall be one piece or split and shall contact retaining ring for its full circumference.
C. Provide flanged connections for head and base to hydrant barrel.
D. Provide 6-inch mechanical joint shoe with harnessing lugs.
E. Provide 4-1/2-inch minimum diameter main valve with bronze seat ring. Thread seat ring directly to bronze bushing or drain ring that is securely locked to hydrant shoe.
F. Provide pentagon-shaped operating nut with weather cap. Dimension from point to flat at top of operating nut: 1-3/16-inch.
G. Provide two 2-1/2-inch hose nozzles and one 4-inch pumper nozzle with caps; nozzle caps shall have nut with dimensions identical to operating nut:
   1. Hose nozzle threads
      a. Outside diameter of male thread: 3-1/16 inches
      b. Diameter at root of male thread: 2-7/8 inches
      c. Threads per inch: 7-1/2
      d. Length of nozzle threads: 1 inch
      e. Cut off at top of threads: 1/4 inch
   2. Pumper nozzle threads
      a. Outside diameter of male thread: 4-31/32 inches
      b. Diameter at root of male thread: 4-19/32 inches
      c. Threads per inch: 4
      d. Length of nozzle threads: 1-1/2 inches
      e. Cut off at top of threads: 1/4 inch
H. Provide markings cast-in-bonnet that indicate direction of opening. Hydrants shall open clockwise (to the right).
I. Provide anti-thrust washers for ease of operation.
J. Provide grease chamber or oil reservoir, sealed by means of O-rings, for lubrication of operation threads. Provide lubricant suitable for contact with potable water.
K. Painting:
   1. Prepare surfaces to be coated according to SSPC-SP6, commercial blast cleaning.
   2. Coat hydrant in accordance with AWWA C502 and coating manufacturer's instructions.
   3. Tnemec epoxy paint system
      a. Interior surfaces, other than machined surfaces, shall be coated with asphaltic coating.
      b. Exterior surfaces below grade shall be coated with two coats of asphaltic coating.
      c. Exterior surfaces above grade shall be primed using a polyamide epoxy system, Tnemec Series 20, FC20 or 66, and painted using an aliphatic acrylic polyurethane system, Tnemec Series 75, or approved equal. Provide total dry mil thickness of 5 to 7 mils.
      d. Exterior surfaces above grade shall have 2 to 4 mils dry thickness of clear coat applied after paint has been allowed to dry thoroughly.
      e. Color:
         (1) Asphaltic coating: Black.
         (2) Primer: White (AA83).
         (3) Paint: Bright Yellow (SC02).
         (4) Bonnet: Safety Green (SC07).
         (5) Caps: Bright Yellow (SC02).
   4. TGIC Protective Coating only with prior approval from Des Moines Water Works.
      a. Color:
         (1) Asphaltic coating: Black.
         (2) Base coat: Red Oxide Epoxy IF1947T.
         (3) Paint: Dandelion Yellow TGIC.
         (4) Bonnet: Des Moines Water Works Green TGIC.

(5) Caps: Dandelion Yellow TGIC.

5. Approved equal.
   a. System must be approved by DMWW prior to bid opening.

L. Materials of Construction:
1. Breakaway stem coupling: steel, cast iron, or stainless steel.
2. Bonnet barrel, shoe, gate, and nozzle caps: cast iron.
3. Threaded internal components exposed to water, valve seats, and nozzles: bronze.
4. Cotter pins, drive pins, bolts, and screws exposed to water: stainless steel or brass.
5. Exterior bolts, nuts, set screws, and other miscellaneous fasteners: stainless steel or bronze. Any metal component in contact with water shall comply with the requirements of ASTM B584 copper alloy UNS No. C89520 or UNS No. C89833. Residual lead levels of the metal shall not exceed 0.25% by weight as cast or extruded.

M. Manufacturers:
1. Clow Medallion.
2. Mueller Centurion.
3. Approved equal.

2.3 Joints for Valves and Hydrants

A. Joints shall be mechanical in accordance with AWWA C111, or restrained as indicated on the plans.
B. Follower glands for mechanical joints shall be ductile iron.
C. Bolts:
1. All T-bolts and hex-head nuts for mechanical joints in accordance with AWWA C111.
   a. Material: low carbon alloy weathering Cor-Ten steel.
   b. Coating: Cor-Blue fluorocarbon resin.
   c. Color: blue.
   d. Approved Manufacturers:
      (1) Birmingham Fastener Manufacturing Fluorocarbon Coated T-Head Bolt.
      (2) Or approved equal.
2. All bolts and hex nuts for flanged joints shall be 304 stainless steel.

D. Flange joints shall have 1/8-inch rubber ring gaskets for nominal diameters of 24 inches or less and 1/8-inch rubber ring gaskets for nominal diameter greater than 24 inches.
E. Gaskets shall be elastomeric or nitrile in accordance with AWWA C111.

2.4 Retainer Glands

A. Incorporate restraint for all mechanical joints into the design of the follower gland.
B. Retainer gland design shall impart multiple wedging actions against the pipe, increasing its resistance as pressure increases.
C. Restrained joints to consist of a mechanical joint with retainer gland or manufacturer's proprietary-restrained joint.
D. Dimensions shall conform to the requirements of AWWA C111 and AWWA C153.
E. Pressure rating:
1. Minimum of 235 psi for PVC pipe.
2. Minimum of 350 psi for ductile iron pipe for sizes 16-inch and smaller.
3. Minimum of 250 psi for ductile iron pipe for sizes 18-inch and larger.

F. Color:
1. Red for PVC pipe.
2. Black for ductile iron pipe.

G. Materials for construction:
1. Body, wedge segments, and break-off bolt assemblies: Grade 65-45-12 ductile iron as specified by ASTM A536.

2. Coating to be electrostatically applied and heat cured.
   a. Approved manufacturers:
      (1) MEGA-BOND by Ebaa Iron, Inc.
      (2) CORRSAFE by Sigma.
      (3) Starbond by Star Products.
      (4) Resicoat R2-ES by Tyler Union.
      (5) Or approved equal.

H. Minimum factor of safety of 2.

I. Ductile iron retainer wedge segments shall be heat treated to a minimum Brinell Hardness Number of 370.

J. Twist-off nuts, the same size as hex-head nuts for T-bolts, shall be incorporated into the design to ensure proper actuating torque is applied during installation.

K. Approved manufacturers for PVC pipe:
   1. Megalug by EBAA Iron Inc. Series 2000PV.
   2. One-Lok by Sigma Series SLCE.
   3. Stargrip by Star Products Series 4000.
   4. TUFGrip by Tyler Union Series 2000.
   5. Or approved equal.

L. Approved manufacturers for ductile iron pipe:
   1. Megalug by EBAA Iron Inc. Series 1000.
   2. One-Lok by Sigma Series SLDE.
   3. Stargrip by Star Products Series 3000.
   4. TUFGrip by Tyler Union Series 1000.
   5. Or approved equal.

2.5 Valve Boxes

A. Provide cast iron screw-type adjustable valve box with cast iron stay-put cover marked "WATER" for each buried valve.

B. Minimum inside diameter of valve boxes shall be 5-1/8 inches.

C. Tyler No. 6850, or approved equal.

D. Valve boxes shall be installed upon the valve with the use of a rubber Valve Box Adapter II as manufactured by Adaptor Inc., or approved equal.

2.6 Polyethylene Encasement Material

A. Polyethylene encasement shall be manufactured in accordance with AWWA C105.

B. Linear low-density polyethylene film.

C. Minimum thickness shall be 8 mils.

D. Color: Blue.

E. Physical Properties:
   1. Tensile strength 3600 psi, minimum.
   2. Elongation 800%, minimum.
   3. Dielectric strength 800 V/mil, minimum.
   4. Impact resistance 600 g, minimum.
   5. Propagation tear resistance 2550 gf, minimum.

F. Sheet material can be used to wrap irregular-shaped valves and fittings.

G. 2-inch-wide, 10-mil-thick pressure-sensitive polyethylene tape shall be used to close seams and hold overlaps.

Part 3 Execution

3.1 Handling, Storage, and Shipping

A. Handle valves and hydrants carefully.
B. Use blocking and hold-downs during shipment to prevent movement or shifting.

3.2 General Installation Requirements

A. Protect valves and hydrants from injury while handling and storing.
B. Use no defective, damaged, or otherwise impaired materials.
C. Prepare excavation as outlined in Section 02220.
D. Install valves and hydrants in accordance with AWWA C600.
E. Clean interior of valve or hydrant prior to placement in the trench.
F. Install valves and hydrants to the line and grade as shown on the plans.
G. Install valves and hydrants plumb.
H. Clean joint surfaces of dirt and foreign matter using a wire brush before jointing.
I. Lubricate gasket and bell. Furnish a vegetable-soap lubricant meeting manufacturer's recommendations. Lubricant shall be approved for use with potable water.
J. Make joints in strict accordance with manufacturer's recommendations.
K. Bolts on mechanical joints or flanged joints shall be tightened evenly around the pipe by alternating from one side of the pipe to the other. Follow manufacturer’s installation specifications for electrical isolation flanges to prevent damage during bolt torquing.
L. Backfill and compact around hydrants and valves as outlined in Section 02220.

3.3 Valve Installation

A. Do not support valves off of piping.
B. Ensure that valve box is centered over operating nut.

3.4 Hydrant Installation

A. Anchor auxiliary valve to hydrant tee.
B. Install hydrant with break flange more than 1 inch and less than 7 inches above finished grade.
C. The use of hydrant extensions will not be allowed to set hydrant to the appropriate height unless approved by Engineer. Hydrant extensions, if approved, must be from same manufacture as the fire hydrant.
D. Use restrained joints in hydrant branch.
E. Set hydrant on a solid concrete cinder block not smaller than 8-inches by 16-inches by 4-inches.
F. Provide poured concrete thrust blocks behind hydrant and hydrant tee.
G. Ensure hydrant drain is free-flowing and unobstructed in areas where normal groundwater level is below the drain opening.
H. Provide not less than 1 cubic yard of open-graded granular fill around base of hydrant for drainage.

3.5 Installation of Polyethylene Pipe Encasement Material

A. Polyethylene encasement material shall be used on buried valves and the buried portion of hydrants in accordance with AWWA C105.
B. Wrap valves using polyethylene sheet material to prevent contact with bedding. Secure sheet to adjacent pipe and just below valve operation nut using polyethylene tape.
C. Wrap buried portions of hydrants using 24-inch flat-width polyethylene tubing. Secure tubing to hydrant barrel just below grade using polyethylene tape.
D. The polyethylene encasement shall prevent contact with bedding material, but is not intended to be an airtight and watertight enclosure.
E. Damaged polyethylene encasement material shall be repaired using polyethylene tape, or the damaged section shall be replaced.

3.6 Thrust Blocks

A. Provide concrete thrust blocks at hydrants and hydrant tees.
B. Carry thrust blocks to undisturbed soil that will provide adequate bearing.
C. The bearing area of thrust blocks, in square feet, shall be as shown on the plans. Minimum thickness for any thrust block shall be 1.5 times outside pipe diameter or 18 inches, whichever is greater.
D. Hold thrust blocks back 3 inches from bolts, nuts, glands, or other jointing materials. Ensure joints could be remade without disturbing thrust block.
E. Provide bond breaker between thrust block and pipe or hydrant. Polyethylene encasement material will be considered an acceptable bond breaker.

3.7 Removal of Abandoned Fire Hydrants and Valve Boxes

A. Surface restoration items including pavement removal and replacement, seeding, or sodding, needed to remove abandoned fire hydrants or valve boxes shall be paid in accordance with appropriate bid item in contract.
B. All other items related to removal of abandoned fire hydrants and valve boxes including repairs to traffic loops and lawn irrigations systems shall be incidental to contract.
C. Abandoned fire hydrants shall be removed by disconnecting the pipe from the fire hydrant at the shoe.
D. Abandoned fire hydrants shall be returned to Des Moines Water Works at 408 Fleur Drive unless Engineer approves their disposal.
E. All excavations for fire hydrant removals shall be backfilled and restored according to Sections 02220 of these specifications.
F. Abandoned valve boxes shall have the entire top section of the valve box removed and the lower section and excavation backfilled and restored according to Sections 02220 of these specifications.

SECTION 02674 PRESSURE TESTING WATER MAINS

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****

Part 1 General

1.1 Summary of Work
A. Pressure-test water mains in accordance with this Section.

1.2 Related Sections
A. Section 02610 – Ductile Iron and Polyvinyl Chloride Pipe for Water Mains

1.3 References
A. American Water Works Association (AWWA) C600 – Installation of Ductile-Iron Water Mains and Their Appurtenances.
B. American Water Works Association (AWWA) C605 – Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water.

1.4 Submittals (Not used)

1.5 Measurement and Payment
A. Work under this Section incidental to Contract.

Part 2 Products

Not used.

Part 3 Execution

3.1 Pressure Testing
A. Perform Work in accordance with AWWA C600 and AWWA C605.
B. Test piping at 150 psi or as indicated on the plans for 2 hours.
C. Fill and flush new piping with potable water, ensuring that all trapped air is removed.
D. Isolate new piping from the existing system.
E. Pressure test new piping in sections by isolating each section using the in-line gate valves. Relieve pressure on non-test side of the gate valve.

F. Pressurize the new piping to the test pressure at the lowest point in the isolated system. Do not pressurize to more than 5 psi over the test pressure at the lowest point in the isolated system.
G. Monitor pressure in the line being tested for a period of not less than 2 hours.
H. If at any point during that 2-hour period the pressure drops to 5 psi below the test pressure, re-pressurize by pumping water into the line in sufficient quantity to bring the pressure back to between the test pressure and 5 psi above the test pressure. Accurately measure the amount of water required to re-pressurize the main.
I. At the end of the 2-hour period, if pressure in the line has dropped below the test pressure, re-pressurize to the test pressure. Accurately measure the amount of water required to re-pressurize the main.
J. Allowable leakage in gallons, per hour of testing shall equal $(ND(P)^{1/2}) / 7{,}400$.
   N = number of joints in the length of pipe to be tested
   D = nominal diameter of pipe in inches
   P = average test pressure in psig
K. Leakage equals the total amount of water required to keep the line pressurized during the 2-hour test period and re-pressurize the line at the end of the test period.
L. If the average leakage per hour is less than the allowable leakage, the pressure test is acceptable.
M. If the average leakage per hour is more than the allowable leakage, the pressure test is not acceptable. Locate and make approved repairs as necessary until leakage is within the specific allowance.
N. If pressure in the isolated line never drops to the test pressure, having started no more than 5 psi above the test pressure, the pressure test is acceptable.
O. If pressure in the isolated line never drops to the test pressure, having started no more than 5 psi above the test pressure, the pressure test is acceptable.
P. Repair visible leaks regardless of the amount of leakage.

SECTION 02675 DISINFECTION OF WATER DISTRIBUTION SYSTEMS

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Part 1 General

1.1 Summary of Work

A. Disinfect water mains and 2-inch and larger water services in accordance with this Section.

1.2 Related Sections

A. Section 02220 – Excavating, Backfilling, and Compacting for Water Mains.
B. Section 02610 – Ductile Iron and Polyvinyl Chloride Pipe for Water Mains.
C. Section 02660 – Water Service Transfers.

1.3 References

A. American Water Works Association (AWWA) B300 – Hypochlorites.
B. American Water Works Association (AWWA) B301 – Liquid Chlorine.
C. American Water Works Association (AWWA) C651 – Disinfecting Water Mains.

1.4 Submittals (Not used)

1.5 Measurement and Payment

A. Work under this Section incidental to Contract.

Part 2 Products

2.1 Chlorine

A. Calcium hypochlorite granules conforming to AWWA B300.
B. Liquid chlorine conforming to AWWA B301.

2.2 De-chlorination Chemicals
- A. Vita-D-Chlor (Ascorbic Acid) by Integra Chemical Company.
- B. Vita-D-Chlor, Neutral (Sodium Ascorbate) by Integra Chemical Company.
- C. No-Chlor (Ascorbic Acid) by Measurement Technologies.
- D. Approved equal.

Part 3 Execution

3.1 Examination
- A. Water for disinfection will be provided by Des Moines Water Works for two disinfection attempts. If additional attempts are necessary, the Contractor will be billed for water used at the normal rate set for industrial customers.
- B. Disinfection of piping shall take place only after satisfactory pressure testing.
- C. Ensure piping to be disinfected is isolated from portion of the distribution system that is in service.
- D. Review procedures and coordinate disinfection with Des Moines Water Works.
- E. Perform Work in accordance with AWWA C651.
- F. Bacteriological samples shall be taken and tested by the Des Moines Water Works to ensure satisfactory disinfection.

3.2 Chlorination of Piping
- A. Provide equipment and materials necessary to complete chlorination.
- B. Use the continuous feed method as outlined in AWWA C651.
- C. Prior to feeding chlorine, fill and flush new piping to remove trapped air and particulates. Provide equipment and materials necessary to obtain a minimum flushing velocity of 2.5 fps in piping to be disinfected. When flushing velocities of 2.5 fps cannot be obtained, the pipe shall be swabbed until the pipe is free of debris. Type of swab and procedures for use shall be approved by Des Moines Water Works prior to its use.
- D. Induce flow of potable water through the new piping at required flushing velocity. Make provisions for diverting and disposing of flushing water in manner that does not damage surroundings. Repair any damage caused by flushing activities.
- E. At a point within five pipe diameters of the connection to the existing distribution system, introduce highly chlorinated water in sufficient quantity to provide at least 25 mg/L free chlorine in the new piping. Provide all metering and feed equipment and temporary chlorination taps. Remove the temporary chlorination taps and cap the main once the main passes.
- F. Introduce highly chlorinated water continuously until the entire section of new piping contains a minimum of 25 mg/L free chlorine. Do not exceed 100 mg/L free chlorine.
- G. Isolate the newly chlorinated piping for a contact period of at least 24 hours, and not more than 48 hours, taking care not to backflow chlorinated water into the existing potable water system.
- H. After the contact period, water in the new piping must have a residual-free chlorine content of not less than 10 mg/L. If the residual is less than 10 mg/L, rechlorinate as outlined above.

3.3 Flushing Chlorinated Piping
- A. After the contact period, flush the recently chlorinated piping with potable water.
- B. Continue flushing until the chlorine residual in the new piping is equal to the chlorine residual in the existing distribution system.
- C. Isolate the new piping from the existing distribution system for a period of not less than 24 hours.
- D. Chlorinated water, which is flushed from the new piping, shall be dechlorinated and disposed of so not to cause damage to the environment. Conform to state and federal requirements.

E. De-chlorinate all water from flushing activities and testing before it is released into the ground, stream, or storm sewers. Method to be approved by the Des Moines Water Works prior to any flushing activities.

3.4 Bacteriological Testing

A. Immediately following flushing of pipelines and again at least 24 hours after flushing pipelines, samples will be taken and tested by Des Moines Water Works.
B. The Des Moines Water Works reserves the right to take and test additional samples 48 hours after flushing.
C. Approximately one sample will be taken for each 1,200 feet of new water main.
D. Additional samples may be taken at the discretion of the Des Moines Water Works.
E. Samples must show the absence of coliform organisms and other contaminants and meet requirements of the Iowa Department of Natural Resources to be considered acceptable.
F. If any sample is not satisfactory with either sampling, the piping represented by that sample must be flushed and rechlorinated by the Contractor at the discretion of, and as directed by, the Des Moines Water Works.

NOTICE OF PUBLIC HEARING
FOR
HICKMAN ROAD STREETSCAPE IMPROVEMENTS PROJECT

CITY OF WINDSOR HEIGHTS, IOWA

IDOT PROJECT No. TAP-T-8477(613)--8V-77

To all persons residing in the City of Windsor Heights, Iowa and other interested parties:

Notice is hereby given that a public hearing will be held by the City Council on the proposed plans, specifications, form of contract and estimate of cost, for the construction of the Hickman Road Streetscape Improvements Project. The hearing will be conducted at 6:00 P.M. on April 20th, 2015, in the Council Chambers at City Hall, 1133 66th Street, Windsor Heights, Iowa 50324.

A copy of the proposed plans, specifications, form of contract and estimate of cost will be available beginning April 6th, 2015, for public inspection during regular business hours at the City Administrator's office at 1145 66th Street, Suite 1, Windsor Heights, Iowa 50324.

Proposed Project Letting Date: May 19, 2015
Project Construction Estimate: $232,451.72