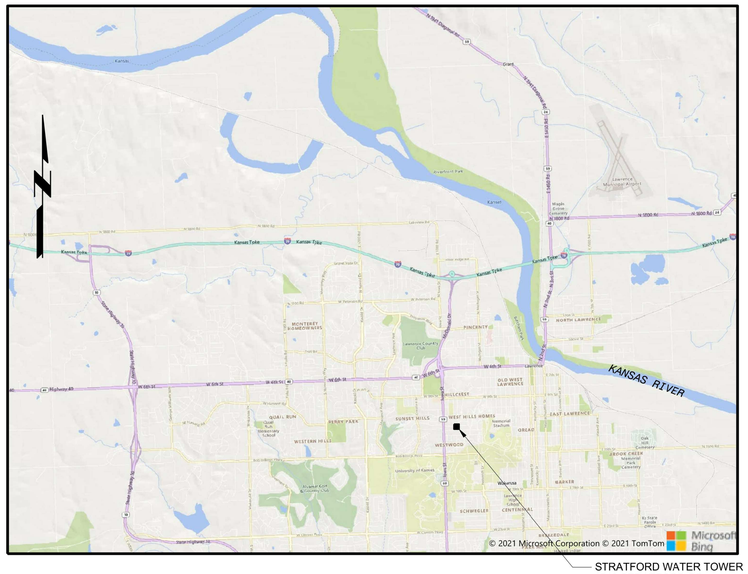
LAWRENCE, KANSAS

UTILITIES DEPARTMENT
PROJECT NO. UT1984
CITY BID NO. B2120

STRATFORD WATER TOWER REPLACEMENT



STRATFORD WATER TOWER
1740 STRATFORD RD
LAWRENCE, KS 66044

VICINITY MAP
1" = 5000'

PROJECT CONTACT INFORMATION

CITY OF LAWRENCE, KANSAS
PO BOX 708, LAWRENCE, KS 66044
785-832-7843
LEAH MORRIS
LEMORRIS@LAWRENCEKS.ORG

CONSULTING ENGINEER INFORMATION

BLACK & VEATCH
8400 WARD PARKWAY, KANSAS CITY, MO 64114
STEVE NAGRICH
913-458-9808
NAGRICHSN@BV.COM

THESE PLANS HAVE BEEN PREPARED IN ACCORDANCE WITH THE CITY OF LAWRENCE'S DESIGN GUIDELINES, CITY CODE, STREET, STORM WATER, WATERLINE, AND SANITARY SEWER STANDARDS. THE CITY AND UTILITY ENGINEER'S REVIEW IS ONLY FOR GENERAL CONFORMANCE WITH THESE STANDARDS. THE CITY DID NOT VERIFY AND IS NOT RESPONSIBLE FOR THE ACCURACY AND ADEQUACY OF THE DESIGN, DIMENSIONS, ELEVATION, AND QUANTITIES. THE CITY OF LAWRENCE SHALL BE HELD HARMLESS FOR ERRORS AND OMISSIONS AS STATED HEREIN. THE CITY OF LAWRENCE THROUGH THE APPROVAL OF THIS DOCUMENT ASSUMES NO RESPONSIBILITY OTHER THAN STATED ABOVE FOR THE COMPLETENESS AND/OR ACCURACY OF THIS DOCUMENT. THESE PLANS ARE ACCEPTED FOR ONE YEAR FROM THE DATE OF APPROVAL, AFTER WHICH THEY BECOME VOID AND MUST BE UPDATED AND RE-APPROVED BY THE CITY BEFORE ANY CONSTRUCTION WILL BE PERMITTED, UNLESS CONSTRUCTION HAS BEEN COMPLETED AND APPROVED.
RELEASED FOR CONSTRUCTION:

SANITARY SEWER EXTENSION APPROVAL:

KDHE DATE

RELEASED FOR CONSTRUCTION:

MUNICIPAL SERVICES AND OPERATIONS DATE

BLACK & VEATCH

LAWRENCE, KANSAS
PROJECT NO. 402979
2021

I HEREBY CERTIFY THAT THE FOLLOWING DOCUMENTS WERE 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 KANSAS.

ANDREW J. HANSEN — 12/16/2021 (DATE)

MY LICENSE NUMBER IS: 13933
MY LICENSE EXPIRATION DATE IS: APRIL 30TH, 2022
MY SUBJECT MATTER IS: CIVIL
SHEETS COVERED BY THIS SEAL:
G-00-001, G-00-002, G-00-007, C-10-100, C-10-101, C-10-102, C-10-103
C-10-104, C-10-105, C-10-301, C-10-501, C-10-502

ANDREW J. HANSEN LICENSED 13933 12/16/2021 KANSAS PROFESSIONAL ENGINEER

I HEREBY CERTIFY THAT THE FOLLOWING DOCUMENTS WERE 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 KANSAS.

JOSHUA L. TEDDER — 12/16/2021 (DATE)

MY LICENSE NUMBER IS: 23787
MY LICENSE EXPIRATION DATE IS: APRIL 30TH, 2023
MY SUBJECT MATTER IS: STRUCTURAL
SHEETS COVERED BY THIS SEAL:
G-00-003, G-00-004, S10-101, S-10-301, S-10-501, S-10-502
S-10-503, S-10-504, S10-505, S-10-506, S-10-507, S-10-508

JOSHUA LYNN TEDDER LICENSED 23787 12/16/2021 KANSAS PROFESSIONAL ENGINEER

I HEREBY CERTIFY THAT THE FOLLOWING DOCUMENTS WERE 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 KANSAS.

DAVID W. NELSON — 12/16/2021 (DATE)

MY LICENSE NUMBER IS: 11286
MY LICENSE EXPIRATION DATE IS: APRIL 30TH, 2023
MY SUBJECT MATTER IS: MECHANICAL
SHEETS COVERED BY THIS SEAL:
G-00-005, G-00-006, C10-105, C-10-502

DAVID W. NELSON LICENSED 11286 12/16/2021 KANSAS PROFESSIONAL ENGINEER

I HEREBY CERTIFY THAT THE FOLLOWING DOCUMENTS WERE 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 KANSAS.

ETHAN JOSHUA BOGNER — 12/16/2021 (DATE)

MY LICENSE NUMBER IS: 25367
MY LICENSE EXPIRATION DATE IS: APRIL 30TH, 2022
MY SUBJECT MATTER IS: ELECTRICAL
SHEETS COVERED BY THIS SEAL:
G-00-008, G-00-009, E-10-101, E-10-102, E-10-501, E-10-701

ETHAN JOSHUA BOGNER LICENSED 25367 12/16/2021 KANSAS PROFESSIONAL ENGINEER

I HEREBY CERTIFY THAT THE FOLLOWING DOCUMENTS WERE 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 KANSAS.

HENRY A. BROWN — 12/16/2021 (DATE)

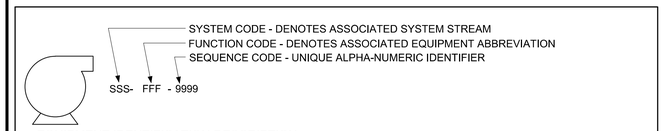
MY LICENSE NUMBER IS: 26350
MY LICENSE EXPIRATION DATE IS: APRIL 30TH, 2022
MY SUBJECT MATTER IS: INSTRUMENTATION & CONTROLS
SHEETS COVERED BY THIS SEAL:
G-00-010, I-10-501, I-10-601, I-10-602

HENRY ALAN BROWN LICENSED PE26350 12/16/2021 KANSAS PROFESSIONAL ENGINEER

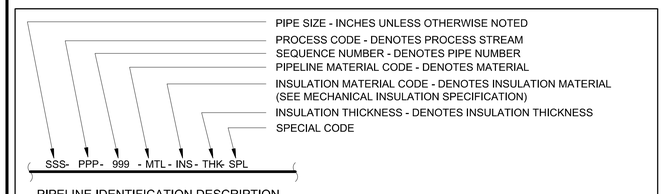
LIST OF UTILITIES

1-800-344-7233	DIG SAFE (ONE CALL)		
1-785-832-3130	CITY OF LAWRENCE PUBLIC WORKS ENGINEERING	DAVID CRONIN	dcronin@lawrenceks.org
1-785-832-3034	CITY OF LAWRENCE TRAFFIC ENGINEERING	DAVID WOOSLEY	dwoosley@lawrenceks.org
1-785-832-7880	CITY OF LAWRENCE MUNICIPAL SERVICES	LEAH MORRIS	lemorris@lawrenceks.org
1-785-832-3142	CITY OF LAWRENCE STORMWATER ENGINEER	MATT BOND	mbond@lawrenceks.org
1-785-832-3190	CITY OF LAWRENCE RIGHT-OF-WAY MANAGER	JACOB BARNES	jbarnes@lawrenceks.org
1-785-594-3847	DOUGLAS COUNTY RURAL WATER DISTRICT #4	CLIFFORD REUSCH	creusch@rwd4.com
1-785-594-6907	BALDWIN CITY PUBLIC WORKS (WATER)	BILL WINEGAR	bwinegar@baldwincity.org
1-785-832-5293	DOUGLAS COUNTY PUBLIC WORKS	KEITH BROWNING	browning@douglas-county.com
1-785-832-3944	BLACK HILLS ENERGY (GAS)	CHUCK HOAG	chuck.hoag@blackhillscorp.com
1-785-865-4862	EVERGY (ELECTRIC)	BOONE HESTON	boone.heston@evergy.com
1-785-276-5377	AT&T (TELEPHONE)	KEITH GATZEMEYER	kg4306@att.com
1-785-312-6922	WOW (CABLE TV)	HARV WAYMIRE	James.Waymire@wideopenwest.com

INDEX OF DRAWINGS

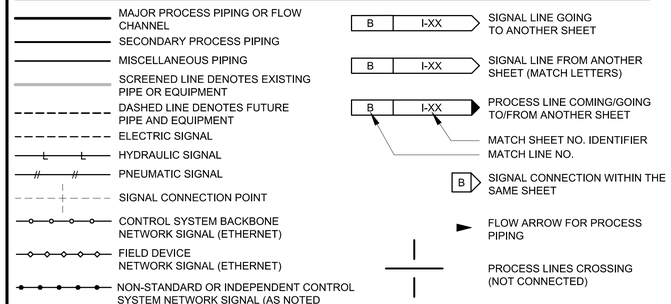


EQUIPMENT IDENTIFICATION DESCRIPTION



PIPELINE IDENTIFICATION DESCRIPTION

LINE SYMBOLS



INSTRUMENT AND I/O ABBREVIATION DEFINITIONS

AE	ANALYZER SENSOR
AIT	ANALYZER INDICATING TRANSMITTER
JL	POWER INDICATING LIGHT
LE	PRIMARY LEVEL ELEMENT SENSOR
LI	LEVEL INDICATOR (LED OR SCREEN)
LIT	LEVEL INDICATING TRANSMITTER
TE	TEMPERATURE SENSOR/RESISTANCE TEMPERATURE DETECTOR
TI	TEMPERATURE INDICATOR (LED OR SCREEN)
TIT	TEMPERATURE INDICATING TRANSMITTER
UA	MULTIVARIABLE/COMMON ALARM/COMMON
UCC	CLOSE COMMAND
UCO	OPEN COMMAND
YI	EVENT INDICATION (LED OR SCREEN)
YLF	FAIL INDICATING LIGHT
YLR	RUNNING INDICATING LIGHT
ZIC	CLOSED INDICATION
ZIO	OPEN INDICATION
ZSO	OPEN POSITION SWITCH

FUNCTION CODE ABBREVIATIONS

BFV	BUTTERFLY VALVE (AWWA)
MXP	SUBMERSIBLE, PROP OR BLENDER MIXER

GENERAL NOTES

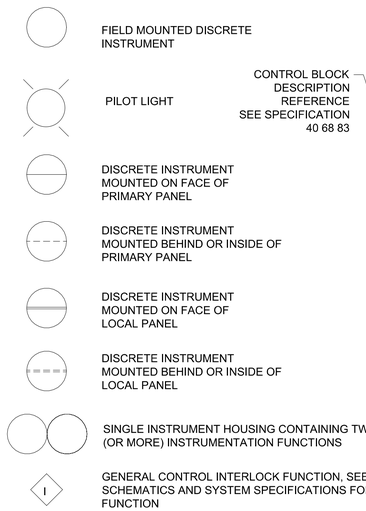
1. IN GENERAL, THE P&ID SYMBOLS AND DEVICE IDENTIFICATIONS ARE BASED ON INTERNATIONAL SOCIETY OF AUTOMATION, STANDARD PRACTICE ANSI/ISA-5.1 (2009). SOME MODIFICATIONS, ADDITIONS, AND ALTERATIONS HAVE BEEN MADE AS NEEDED TO ACCOMMODATE THE PROJECT REQUIREMENTS.
2. SOME CONTROL AND INTERLOCK REQUIREMENTS WHICH CAN BE MORE CLEARLY ILLUSTRATED ON SCHEMATIC DRAWINGS HAVE BEEN OMITTED FROM P&ID DRAWINGS.
3. THIS IS A GENERAL LEGEND SHEET. SOME SYMBOLS AND ABBREVIATIONS MAY NOT BE UTILIZED ON THIS SPECIFIC PROJECT. PIPING AND EQUIPMENT LEGEND APPLIES TO P&ID SHEETS.

INSTRUMENT AND I/O ABBREVIATIONS

MEANINGS OF IDENTIFICATION LETTERS

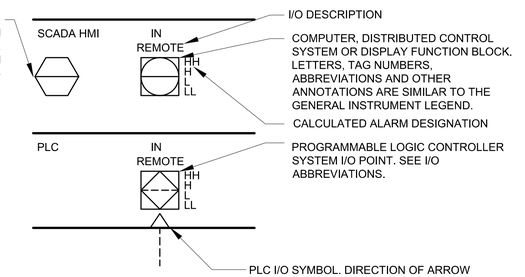
LETTER	FIRST LETTER		SUCCEEDING LETTERS		
	MEASURED OR INITIATING VARIABLE	VARIABLE MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT OR ACTIVE FUNCTION	FUNCTION MODIFIER
A	ANALYSIS		ALARM		
B	BURNER, COMBUSTION		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
C	USER'S CHOICE			CONTROL	CLOSE
D	USER'S CHOICE	DIFFERENTIAL			DEVIATION
E	VOLTAGE (EMF)		SENSOR, PRIMARY ELEMENT		
F	FLOW, FLOW RATE	RATIO (FRACTION)			
G	USER'S CHOICE		GLASS, GAUGE, VIEWING DEVICE		
H	HAND (MANUALLY INITIATED)				HIGH
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER		SCAN		
K	TIME OR TIME-SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT		LOW
M	USER'S CHOICE	MOMENTARY			MIDDLE OR INTERMEDIATE
N	USER'S CHOICE		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
O	USER'S CHOICE		ORIFICE (RESTRICTION)		OPEN
P	PRESSURE OR VACUUM		POINT (TEST CONNECTION)		
Q	QUANTITY	INTEGRATE OR TOTALIZE	INTEGRATE OR TOTALIZE		
R	RADIATION		RECORD		RUN
S	SPEED OR FREQUENCY	SAFETY		SWITCH	STOP
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	
V	VIBRATION OR MECHANICAL ANALYSIS			VALVE, DAMPER OR LOUVER	
W	WEIGHT OR FORCE		WELL, PROBE		
X	UNCLASSIFIED	X-AXIS	ACCESORY DEVICES OR UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y	EVENT, STATE, OR PRESENCE	Y-AXIS		AUXILIARY DEVICES	
Z	POSITION, DIMENSION	Z-AXIS		DRIVE, ACTUATOR OR FINAL CTRL ELEMENT	

GENERAL INSTRUMENT SYMBOLS

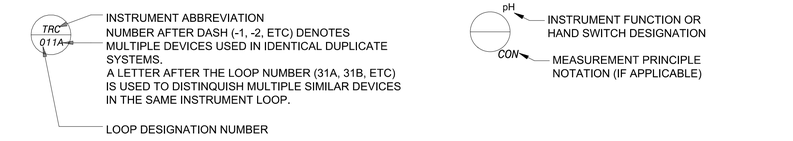


DIGITAL SYSTEMS INTERFACE SYMBOLS

NOTE: REFER TO DETAILED SYSTEM SPECIFICATIONS FOR FUNCTIONAL DESCRIPTION. ALSO SEE I/O SCHEDULES FOR COMPLETE INPUT AND OUTPUT LISTINGS.



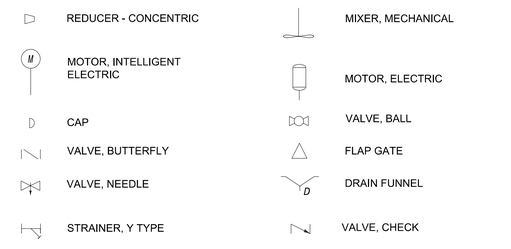
INSTRUMENTATION SYMBOLOGY AND DESIGNATIONS



INSTRUMENT FUNCTIONS

CL2	CHLORINE RESIDUAL
COND	CONDUCTIVITY
pH	pH

SYMBOL LEGEND



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3. THIS IS A GENERAL LEGEND SHEET. SOME SYMBOLS AND ABBREVIATIONS MAY NOT BE UTILIZED ON THIS SPECIFIC PROJECT.

NO.	BY	CHK	APP	DATE	REVISIONS AND RECORD OF USE

THIS DRAWING HAS BEEN SIGNED AND SEALED BY THE PERSON(S) INDICATED ON THE COVER OF THIS DRAWING SET.

BLACK & VEATCH

Black & Veatch Corporation
Kansas City, Missouri

LAWRENCE, KANSAS - UT1984
STRATFORD WATER TOWER REPLACEMENT

INSTRUMENTATION P&ID LEGEND & ABBREVIATIONS

DESIGNED: HAB
DETAILED: DRS
CHECKED: RHD
APPROVED: HAB
DATE: DECEMBER 2021

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO. 402979

G-00-010
SHEET 9 OF 49

BRO75220, 12/15/2021 2:18:13 PM
BRO75220, 12/15/2021 2:18:32 PM
BRO75220
FD10000
D10000
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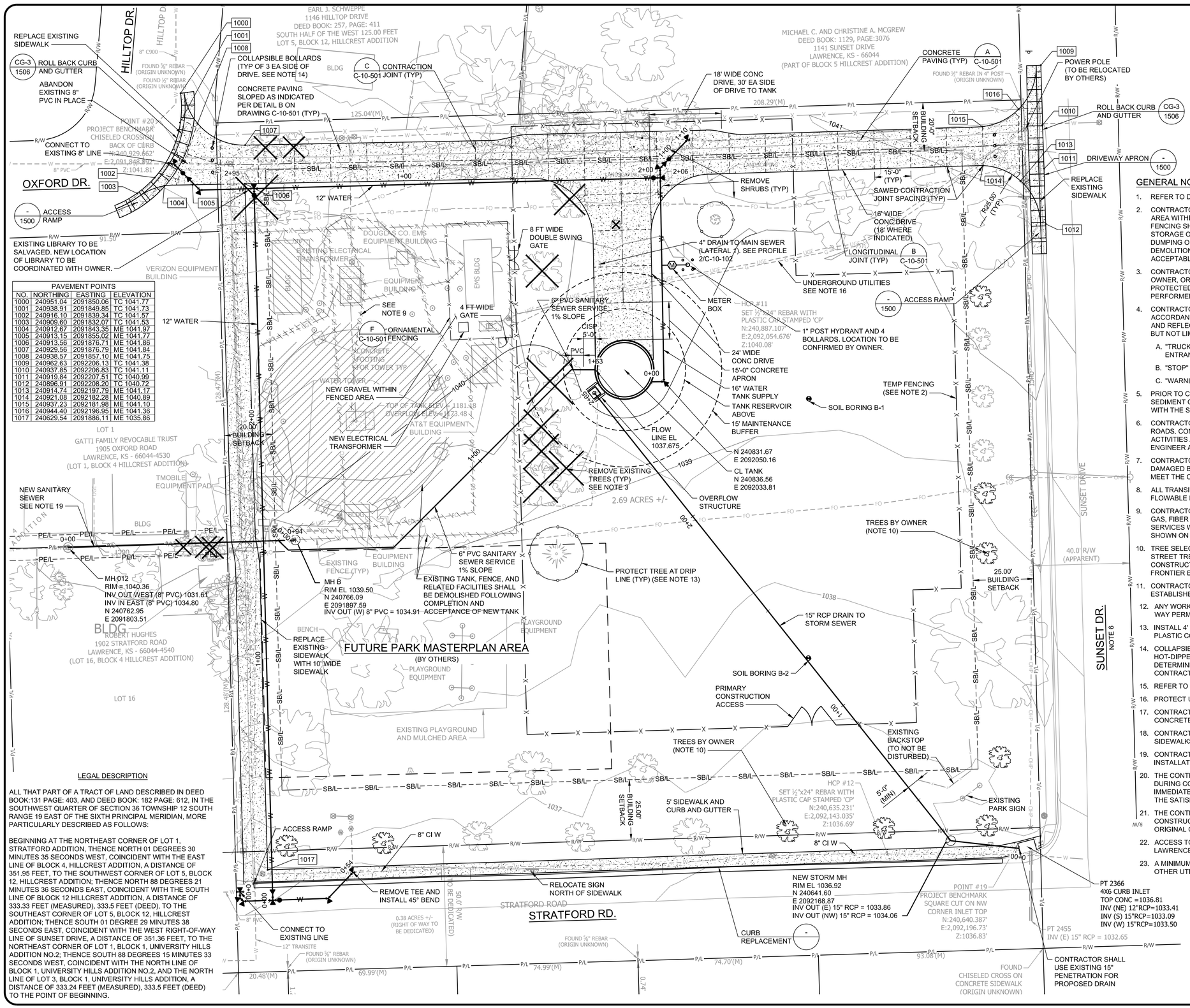

PAVEMENT POINTS			
NO.	NORTHING	EASTING	ELEVATION
1000	240951.04	2091850.06	TC 1041.77
1001	240938.91	2091849.85	TC 1041.73
1002	240916.10	2091839.34	TC 1041.57
1003	240909.60	2091832.07	TC 1041.53
1004	240912.67	2091843.35	ME 1041.97
1005	240913.15	2091855.02	ME 1041.77
1006	240913.56	2091876.71	ME 1041.86
1007	240929.56	2091876.79	ME 1041.84
1008	240938.57	2091857.10	ME 1041.75
1009	240962.63	2092206.13	TC 1041.38
1010	240937.85	2092206.83	TC 1041.11
1011	240919.84	2092207.51	TC 1040.99
1012	240896.91	2092208.20	TC 1040.72
1013	240914.74	2092197.79	ME 1041.17
1014	240921.08	2092182.28	ME 1040.89
1015	240937.23	2092181.98	ME 1041.10
1016	240944.40	2092196.95	ME 1041.36
1017	240629.54	2091886.11	ME 1035.86

GENERAL NOTES:

1. REFER TO DWG G-00-001 FOR LEGENDS, ABBREVIATIONS, & GENERAL NOTES.
2. CONTRACTOR'S STAGING, PARKING, AND MATERIAL STORAGE SHALL BE LIMITED TO THE AREA WITHIN THE LIMITS OF THE TEMPORARY FENCING AS INDICATED. TEMPORARY FENCING SHALL BE 6 FT HIGH AND PROVIDED WITH SCREENING MATERIAL. ADDITIONAL STORAGE OR PARKING AREA SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. NO DUMPING OF EXCESS MATERIALS IS ALLOWED WITHIN THE PARK. DURING TANK DEMOLITION, THE ENTIRE PARK SHALL BE CLOSED WITH TEMPORARY BARRICADES ACCEPTABLE TO OWNER.
3. CONTRACTOR SHALL NOT REMOVE OR TRIM ANY TREES WITHOUT APPROVAL FROM THE OWNER, OR UNLESS NOTED OTHERWISE ON THE DRAWINGS. EXISTING TREES SHALL BE PROTECTED IN A MANNER ACCEPTABLE TO OWNER. TREE REMOVAL SHALL BE PERFORMED BY A CITY LICENSED TREE TRIMMER.
4. CONTRACTOR SHALL ERECT AND MAINTAIN TRAFFIC CONTROL SIGNAGE IN ACCORDANCE WITH PART VI OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES, AND REFLECTIVE PER ASTM D4956 TYPE VI. AT A MINIMUM, SIGNAGE SHALL INCLUDE BUT NOT LIMITED TO THE FOLLOWING:
   A. "TRUCKS ENTERING ROADWAY" SIGNAGE 300 FT EITHER DIRECTION FROM SITE ENTRANCE ON SUNSET DR.
   B. "STOP" SIGNS FOR TRUCKS LEAVING SITE.
   C. "WARNING: TRUCKS CROSSING SIDEWALK AHEAD"
5. PRIOR TO CONSTRUCTION ON-SITE, CONTRACTOR SHALL IMPLEMENT EROSION & SEDIMENT CONTROL MEASURES AS SHOWN ON DWG C-10-103 AND IN ACCORDANCE WITH THE STORM WATER POLLUTION PREVENTION PLAN.
6. CONTRACTOR SHALL IMPLEMENT MEASURES TO PREVENT TRACKING OF MUD ONTO ROADS. CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE ROAD CLEANING ACTIVITIES AT THE DISCRETION OF AND TO THE ACCEPTANCE OF THE OWNER OR ENGINEER AS REQUIRED.
7. CONTRACTOR SHALL REPLACE ALL CURB AND GUTTER, SIDEWALKS, AND PAVING DAMAGED BY CONSTRUCTION ACTIVITIES. ANY EXISTING SIDEWALK THAT DOES NOT MEET THE CITY SIDEWALK STANDARDS SHALL BE REPLACED.
8. ALL TRANSITE AND CAST IRON PIPE TO BE ABANDONED SHALL BE FILLED WITH FLOWABLE FILL AND CAPPED ON EACH END.
9. CONTRACTOR SHALL COORDINATE ABANDONMENT OF THE EXISTING UNDERGROUND GAS, FIBER OPTIC, TELEPHONE, AND ELECTRIC LINES WITH THE OWNING UTILITY. NEW SERVICES WILL BE REQUIRED FOR THE NEW TANK AND EXISTING EMS BUILDING AS SHOWN ON DWG E-10-100.
10. TREE SELECTION AND SPACING IN ACCORDANCE WITH CITY OF LAWRENCE MASTER STREET TREE PLAN. TREES WILL BE FURNISHED AND PLANTED BY OWNER AFTER CONSTRUCTION. TREES WILL BE OF THE FOLLOWING SPECIES: SWAMP WHITE OAK, FRONTIER ELM, KENTUCKY COFFEE, AND SAWTOOTH OAK.
11. CONTRACTOR SHALL SEED ALL DISTURBED AREAS AND MAINTAIN UNTIL GRASS IS ESTABLISHED.
12. ANY WORK PERFORMED WITHIN THE CITY RIGHT OF WAY WILL REQUIRE A RIGHT OF WAY PERMIT.
13. INSTALL 4' (MIN) TALL TEMP WIRE/METAL FENCE 10' (MIN) BEYOND DRIP LINE. ORANGE PLASTIC CONSTRUCTION FENCING IS NOT ACCEPTABLE.
14. COLLAPSIBLE BOLLARDS SHALL BE 32" TALL ABOVEGRADE, MADE FROM 3"X6" TUBING, HOT-DIPPED GALV WITH POWDER COATING AND REFLECTIVE TAPE (COLORS DETERMINED BY OWNER), MANUFACTURED BY MAXIFORCE, OR APPROVED EQUAL. CONTRACTOR SHALL COORDINATE BOLLARD COLOR WITH OWNER.
15. REFER TO DWG E-10-100 FOR THE ELECTRICAL SITE PLAN.
16. PROTECT UTILITIES DURING CONSTRUCTION OF NEW TOWER.
17. CONTRACTOR TO MATCH EXISTING CONTOURS WHEN CONSTRUCTING THE NEW CONCRETE DRIVE. FINAL SITE SHALL MATCH EXISTING SITE CONTOURS.
18. CONTRACTOR SHALL FOLLOW CITY STANDARD SIDEWALKS TO INLET DOWELING FOR SIDEWALKS ADJOINING STORM STRUCTURES.
19. CONTRACTOR SHALL PERFORM ALL WORK WITHIN EXSITING EASEMENTS FOR INSTALLATION OF THE NEW SANITARY SEWER BETWEEN MH B AND MH12.
20. THE CONTRACTOR SHALL PROTECT ALL AREAS FROM DAMAGE WHICH MAY OCCUR DURING CONSTRUCTION. ANY DAMAGE TO NEW AND/OR EXISTING FACILITIES SHALL BE IMMEDIATELY REPAIRED OR REPLACED, AT THE EXPENSE OF THE CONTRACTOR, TO THE SATISFACTION OF THE OWNER.
21. THE CONTRACTOR SHALL SAFEGUARD THE OWNER'S PROPERTY DURING CONSTRUCTION AND SHALL REPLACE ANY DAMAGED PROPERTY OF THE OWNER TO ORIGINAL CONDITION.
22. ACCESS TO THE WATER TOWER SITE SHALL BE COORDINATED WITH CITY OF LAWRENCE MUNICIPAL SERVICES & OPERATIONS DEPARTMENT, 785-832-7800.
23. A MINIMUM OF 5 FT HORIZONTAL SEPARATION BETWEEN SANITARY SEWER AND ALL OTHER UTILITIES SHALL BE MAINTAINED.

PROPERTY SURFACE SUMMARY			
SUMMARY OF EXISTING CONDITIIONS		SUMMARY AFTER PROJECT COMPLETION	
TOTAL BUILDINGS	1,134 ft²	TOTAL BUILDINGS	1,096 ft²
TOTAL PAVEMENT	3,081 ft²	TOTAL PAVEMENT	12,953 ft²
TOTAL IMPERVIOUS	4,215 ft²	TOTAL IMPERVIOUS	14,049 ft²
TOTAL PERVIOUS	112,800 ft²	TOTAL PERVIOUS	102,966 ft²
TOTAL PROPERTY AREA	117,015 ft²	TOTAL PROPERTY AREA	117,015 ft²

LEGAL DESCRIPTION

ALL THAT PART OF A TRACT OF LAND DESCRIBED IN DEED BOOK:131 PAGE: 403, AND DEED BOOK: 182 PAGE: 612, IN THE SOUTHWEST QUARTER OF SECTION 36 TOWNSHIP 12 SOUTH RANGE 19 EAST OF THE SIXTH PRINCIPAL MERIDIAN, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHEAST CORNER OF LOT 1, STRATFORD ADDITION, THENCE NORTH 01 DEGREES 30 MINUTES 35 SECONDS WEST, COINCIDENT WITH THE EAST LINE OF BLOCK 4, HILLCREST ADDITION, A DISTANCE OF 351.95 FEET, TO THE SOUTHWEST CORNER OF LOT 5, BLOCK 12, HILLCREST ADDITION; THENCE NORTH 88 DEGREES 21 MINUTES 36 SECONDS EAST, COINCIDENT WITH THE SOUTH LINE OF BLOCK 12 HILLCREST ADDITION, A DISTANCE OF 333.33 FEET (MEASURED), 333.5 FEET (DEED), TO THE SOUTHEAST CORNER OF LOT 5, BLOCK 12, HILLCREST ADDITION; THENCE SOUTH 01 DEGREE 29 MINUTES 38 SECONDS EAST, COINCIDENT WITH THE WEST RIGHT-OF-WAY LINE OF SUNSET DRIVE, A DISTANCE OF 351.36 FEET, TO THE NORTHEAST CORNER OF LOT 1, BLOCK 1, UNIVERSITY HILLS ADDITION NO.2; THENCE SOUTH 88 DEGREES 15 MINUTES 33 SECONDS WEST, COINCIDENT WITH THE NORTH LINE OF BLOCK 1, UNIVERSITY HILLS ADDITION NO.2, AND THE NORTH LINE OF LOT 3, BLOCK 1, UNIVERSITY HILLS ADDITION, A DISTANCE OF 333.24 FEET (MEASURED), 333.5 FEET (DEED) TO THE POINT OF BEGINNING.

NO.	BY	CHK	APD	REVISIONS AND RECORD OF USE	DATE

THIS DRAWING HAS BEEN SIGNED AND SEALED BY THE PERSON(S) INDICATED ON THE COVER OF THIS DRAWING SET.

BLACK & VEATCH

Black & Veatch Corporation
Kansas City, Missouri

LAWRENCE, KANSAS - UT1984
STRATFORD WATER TOWER REPLACEMENT

CIVIL
OVERALL SITE PLAN

DESIGNED: SNN, GJS
DETAILED: BSG
CHECKED: JJW
APPROVED: AJH
DATE: DECEMBER 2021

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO. 402979

C-10-100
SHEET 10 OF 35

FD9000A
D10000
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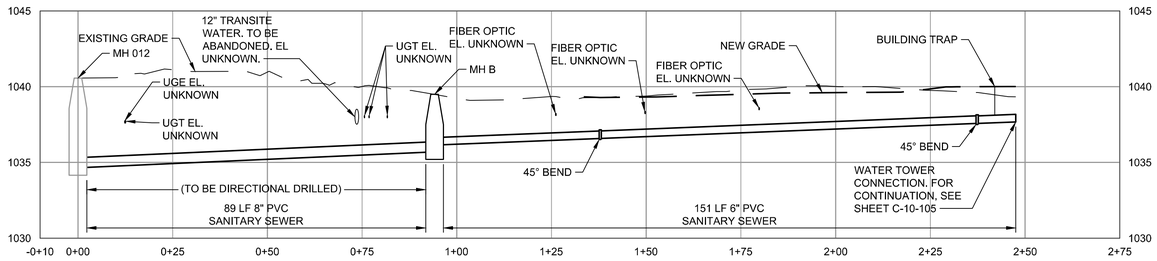
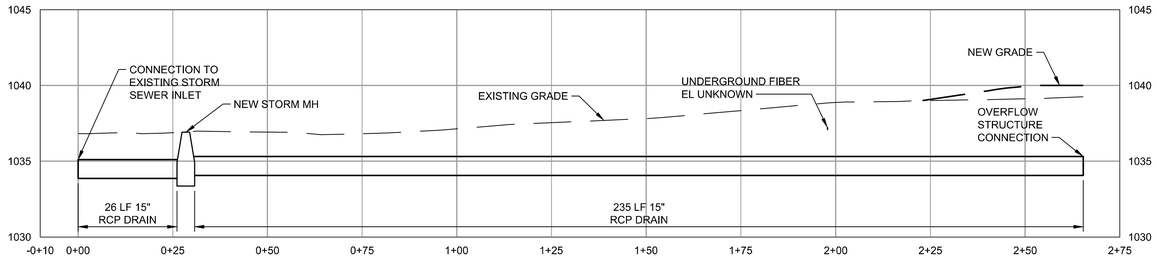


1 MAIN SEWER ALIGNMENT
C-10-100 1"=20'



2 WATER TOWER DRAIN TO STORM SEWER ALIGNMENT
C-10-100 1"=20'

5' 3' 0" 5' 10'
VERTICAL SCALE 1"=5'

20' 10' 0' 20' 40'
HORIZONTAL SCALE 1"=20'

NO.	BY	CHK	APP	DATE	REVISIONS AND RECORD OF USE

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BLACK & VEATCH

Black & Veatch Corporation
Kansas City, Missouri

LAWRENCE, KANSAS - UT1984
STRATFORD WATER TOWER REPLACEMENT

CIVIL
SANITARY SEWER PROFILES

DESIGNED: SNN
DETAILED: BSG
CHECKED: JJW
APPROVED: AJH
DATE: DECEMBER 2021

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
402979

C-10-102
SHEET
12 OF 49

FD9000A
D10000
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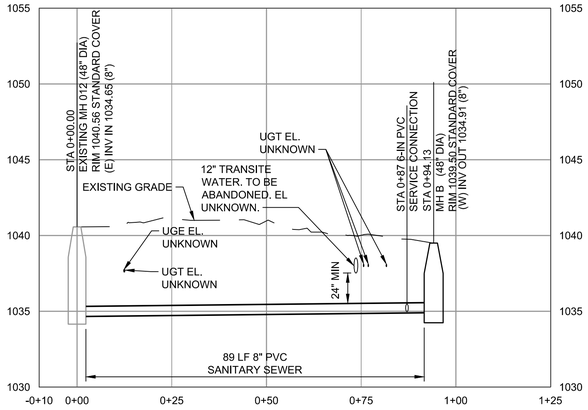
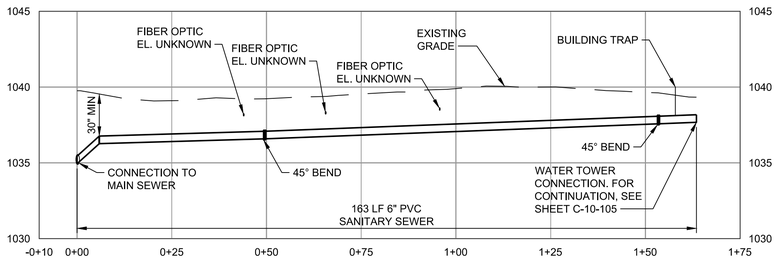
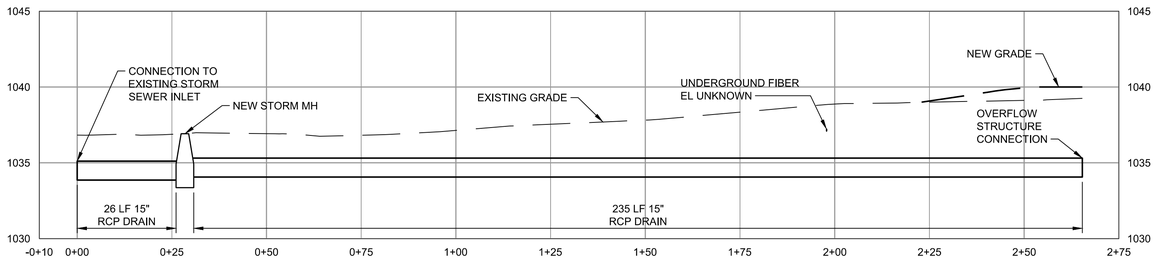


1 MAIN SEWER ALIGNMENT
C-10-100 1"=20'



2 WATER TOWER SERVICE LATERAL ALIGNMENT
C-10-100 1"=20'



3 WATER TOWER DRAIN TO STORM SEWER ALIGNMENT
C-10-100 1"=20'

5' 3' 0" 5' 10'
VERTICAL SCALE 1"=5'

20' 10' 0' 20' 40'
HORIZONTAL SCALE 1"=20'

NO.	BY	CHK	APP	DATE	REVISIONS AND RECORD OF USE

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BLACK & VEATCH

Black & Veatch Corporation
Kansas City, Missouri

LAWRENCE, KANSAS - UT1984
STRATFORD WATER TOWER REPLACEMENT

CIVIL
SANITARY SEWER PROFILES

DESIGNED: SNN
DETAILED: BSG
CHECKED: JJW
APPROVED: AJH
DATE: DECEMBER 2021

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
402979

C-10-102
SHEET
14 OF 35

FD9000A
D10000
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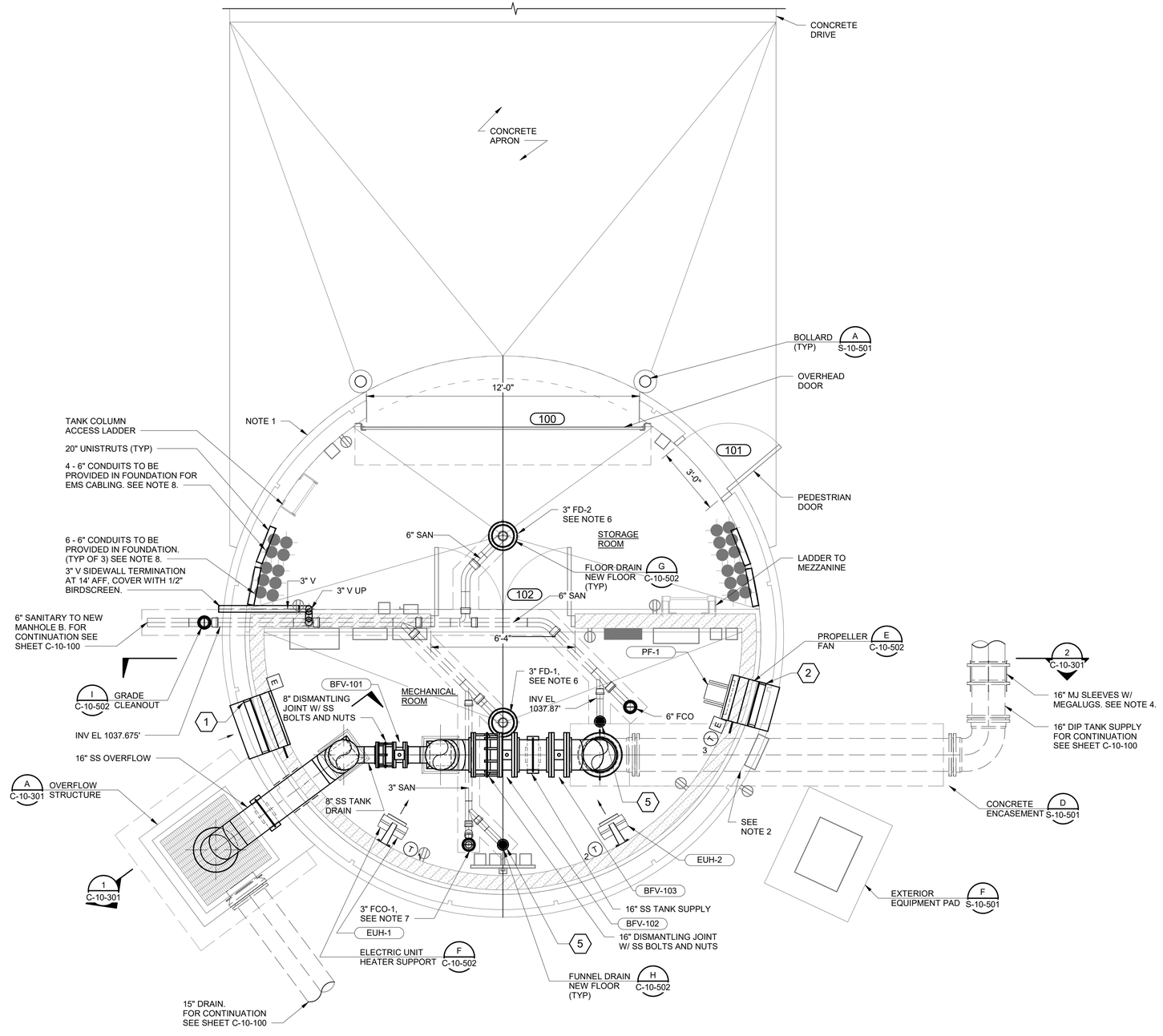

OPERATING FLOOR PLAN

3/8" = 1'-0"

GENERAL NOTES

1. RESERVOIR MANUFACTURER SHALL DETERMINE TOTAL SETTLEMENT OF RESERVOIR FOOTING AND CONTRACTOR SHALL PROVIDE A 2" MINIMUM GAP PLUS SETTLEMENT ALLOWANCE BETWEEN RESERVOIR FOOTING AND PIPE. GAP SHALL BE SEALED TO PREVENT ANY MATERIAL SUCH AS SOIL FROM ENTERING GAP.
2. ALL PIPE PENETRATIONS THROUGH WALLS, FLOORS, CEILINGS, AND ROOFS SHALL BE DESIGNED BY RESERVOIR MANUFACTURER ACCORDING TO CONTRACT SPECIFICATIONS AND AS REQUIRED TO ACCOMMODATE FOR SETTLEMENT. ALL PENETRATIONS SHOULD BE SEALED AND WEATHERPROOFED AS RECOMMENDED BY RESERVOIR MANUFACTURER TO ALLOW FOR SETTLEMENT. SIZES SHALL BE CONFIRMED BY THE RESERVOIR MANUFACTURER TO ACCOMMODATE INSTALLATION OF PIPING INCLUDING FLANGES AND VALVES.
3. DOOR LEAF SIZE TO BE 3'-0" x 7' -2" FOR D101 AND 3'-0" x 7'-2" FOR EACH DOOR LEAF FOR DOUBLE DOOR D102, WITH 2" SOLID FRP FRAMES. OVERHEAD ALUMINUM DOOR D100 TO BE 12'-0" WIDE X 12'-0" HIGH. REFER TO SPECIFICATIONS FOR ADDITIONAL DOOR REQUIREMENTS.
4. ALL PIPE JOINTS FOR THE BURIED 16" DIP PIPING SHALL BE RESTRAINED.
5. CONCRETE PIPE SUPPORTS FOR THE RISER PIPE AND OVERFLOW PIPE TO BE DESIGNED BY RESERVOIR MANUFACTURER
6. FD-1 & FD-2 SHALL BE SMITH 2320 SERIES OR EQUAL.
7. FCO-1 SHALL BE SMITH 4239 SERIES OR EQUAL.
8. CONTRACTOR TO PROVIDE 3 BUNDLES OF SIX 6" SCHEDULE 40 PVC CONDUITS AND 1 BUNDLE OF FOUR 6" SCHEDULE 40 PVC CONDUITS. ALL CONDUITS SHALL BE COMPLETE WITH LONG RADIUS (MIN 24 INCHES) 90 DEGREE BEND AND END CAPS. SIZE AND LOCATION OF THE WALL OPENING SHALL ALLOW THE CONDUIT TO TERMINATE AS CLOSE TO THE SUPPORT COLUMN AS POSSIBLE.

MECHANICAL EQUIPMENT

PF-1:
PROPELLER FAN TO BE GREENHECK MODEL "SE2-18-411-A" OR EQUAL, 1400 CFM, 1/2 HP MOTOR @ 240 VOLT / 1 PHASE; MOUNT BOT EL APPROX 8'-0" AFF. FAN CONTROLLED BY THERMOSTAT (T-3). THERMOSTAT INITIAL SETPOINT @ 90 DEGREES F. ASSOCIATED LOUVERS/DAMPERS SHALL BE PROVEN OPEN BEFORE FAN CAN START.

EUH-1:
ELECTRIC UNIT HEATER TO BE CHROMALOX MODEL "LUH-02-21-34" OR EQUAL, 2.6 KW CAPACITY @ 240 VOLT / 1 PHASE. COMPLETE WITH WALL MOUNT BRACKET. MOUNT BOT EL APPROX 8'-0" AFF. UNIT HEATER TO BE CONTROLLED BY THERMOSTAT (T-1). THERMOSTAT INITIAL SETPOINT @ 50 DEGREES F.

EUH-2:
ELECTRIC UNIT HEATER TO BE CHROMALOX MODEL "LUH-02-21-34" OR EQUAL, 2.6 KW CAPACITY @ 240 VOLT / 1 PHASE. COMPLETE WITH WALL MOUNT BRACKET. MOUNT BOT EL APPROX 8'-0" AFF. UNIT HEATER TO BE CONTROLLED BY THERMOSTAT (T-2). THERMOSTAT INITIAL SETPOINT @ 50 DEGREES F.

ALL TWO POSITION WALL MOUNTED THERMOSTATS SHALL BE HONEYWELL "T631A AIRSWITCH" OR EQUAL.

SHEET KEYNOTES

1. 30"X30" COMBINATION INTAKE LOUVER/DAMPER RUSKIN MODEL "ELC6375DAX" WITH BIRDSCREEN AND MANUFACTURER STANDARD COATING AND FINISH. DAMPER MOTOR TO BE INTERLOCKED WITH PROPELLER FAN (PF-1) TO OPEN WHEN FAN IS ENERGIZED. BOT EL APPROX 4'-0" AFF. REFER TO DETAIL E ON DWG C-10-502. DAMPER OPERATOR SHALL BE BELIMO "NFBUP-S".
2. 24"X24" COMBINATION EXHAUST LOUVER/DAMPER RUSKIN MODEL "ELC6375DAX". DAMPER MOTOR TO BE INTERLOCKED WITH PROPELLER FAN (PF-1) TO OPEN WHEN FAN IS ENERGIZED. BOT EL APPROX 8'-0" AFF. REFER TO DETAIL E ON DWG C-10-502. DAMPER OPERATOR SHALL BE BELIMO "NFBUP-S".
3. NOT USED
4. CAPPED CONDUIT TERMINALS FOR FUTURE CONNECTION.
5. PROVIDE 2" FUNNEL RECEPTOR FOR INSTRUMENTATION DRAIN. FIELD VERIFY LOCATION. FUNNEL RECEPTOR TO BE SMITH FIGURE NUMBER SQ-3-1793 WITH DOME BOTTOM STRAINER.

NO.	BY	CHK	APP'D	DATE	REVISIONS AND RECORD OF USE

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BLACK & VEATCH
Black & Veatch Corporation
Kansas City, Missouri

LAWRENCE, KANSAS - UT1984
STRATFORD WATER TOWER REPLACEMENT

CIVIL/STRUCTURAL
ENLARGED TANK PLAN

DESIGNED:	SNN
DETAILED:	STK
CHECKED:	JJW
APPROVED:	AJH
DATE:	DECEMBER 2021

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
402979

C-10-105
SHEET
15 OF 49

PLOTTED: 12/15/2021 12:41:09 PM
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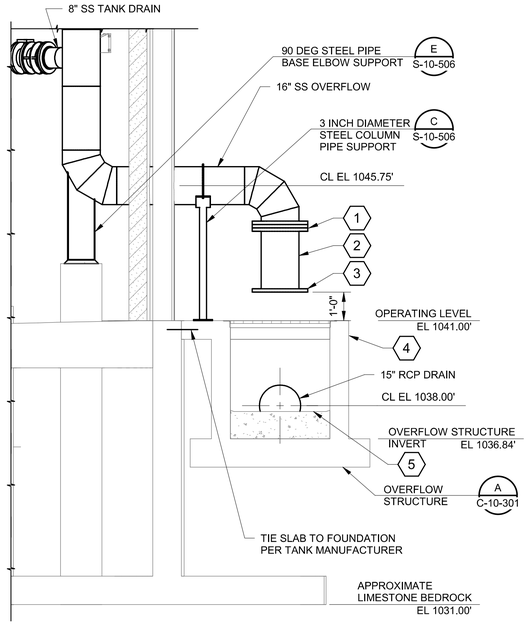
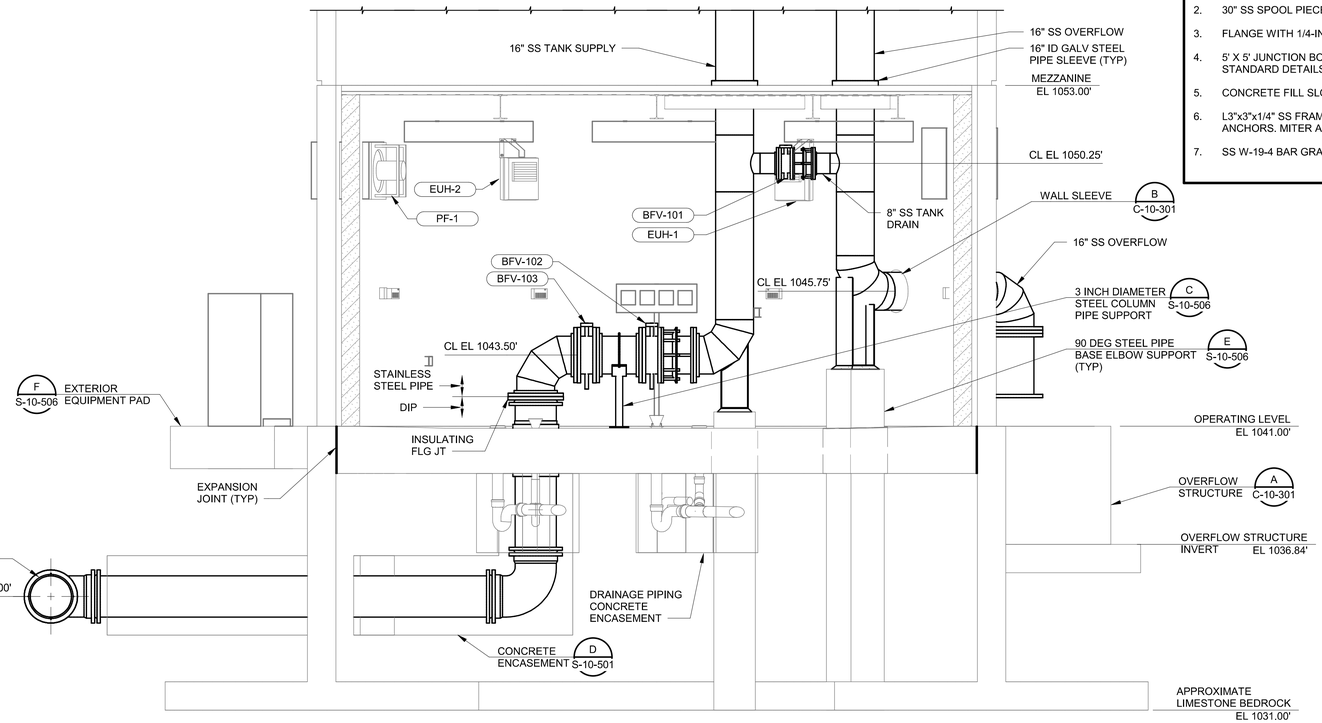
SHEET KEYNOTES

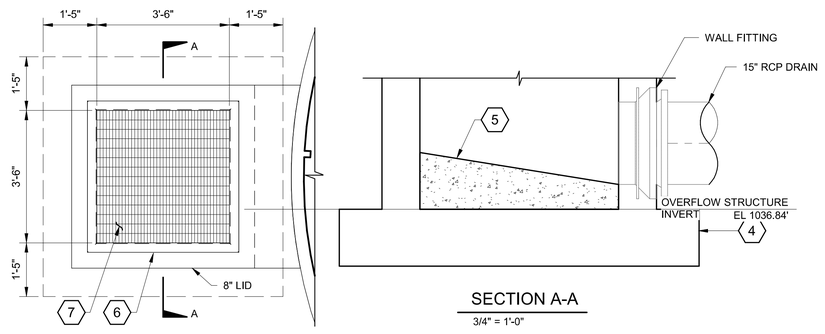
1. 16" TIDEFLEX SERIES 37 INTERIOR CHECK VALVE, OR APPROVED EQUAL
2. 30" SS SPOOL PIECE
3. FLANGE WITH 1/4-INCH SS SCREEN
4. 5' X 5' JUNCTION BOX. REFER TO CITY OF LAWRENCE STANDARD DETAILS.
5. CONCRETE FILL SLOPED TO DRAIN
6. L3"x3"x1/4" SS FRAME. ANCHOR TO CONCRETE WITH 4-5/8" SS ANCHORS. MITER AND WELD CORNERS.
7. SS W-19-4 BAR GRATING WELDED TO ANGLE FRAME



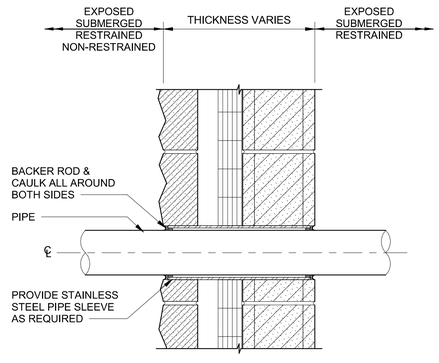
1 C-10-105 SECTION 3/8" = 1'-0"



2 C-10-105 SECTION 3/8" = 1'-0"



A OVERFLOW STRUCTURE DETAIL 1/2" = 1'-0"



B WALL SLEEVE NO SCALE

NO.	BY	CHK	APP	DATE	REVISIONS AND RECORD OF USE

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BLACK & VEATCH

Black & Veatch Corporation
Kansas City, Missouri

LAWRENCE, KANSAS - UT1984
STRATFORD WATER TOWER REPLACEMENT

CIVIL/STRUCTURAL
TANK SECTIONS & DETAILS

DESIGNED:	SNN
DETAILED:	STK
CHECKED:	JJW
APPROVED:	AJH
DATE:	DECEMBER 2021

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
402979

C-10-301
SHEET
16 OF 49

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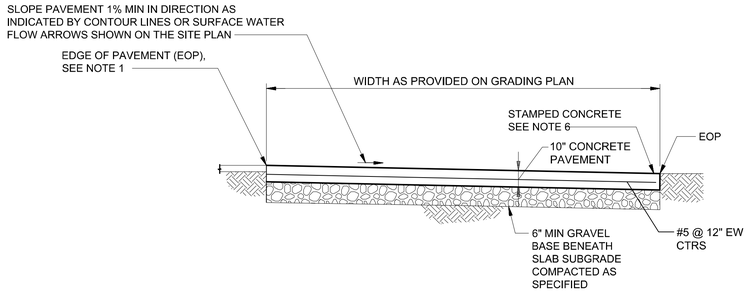
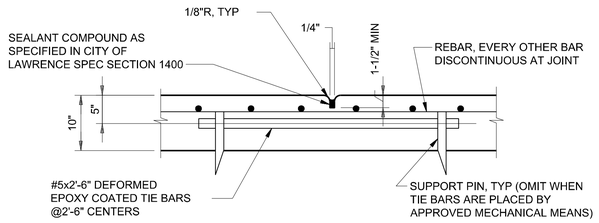


A C-10-100 CONCRETE PAVEMENT (SECTION) DETAIL

1/2" = 1'-0"

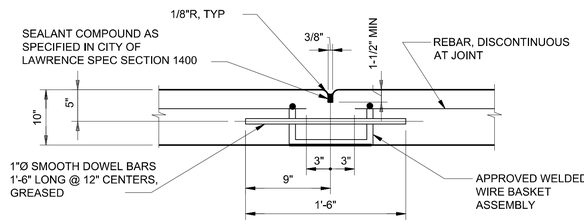
PAVEMENT NOTES:

1. USE 3/4" EXPANSION JOINT MATERIAL BETWEEN CONCRETE PAVEMENT AND ABUTTING SIDEWALKS AND DRIVES, TOPPED WITH HOT POURED SEALING COMPOUND PER CITY OF LAWRENCE SPEC SECTION 1400.
2. CONSTRUCT TRANSVERSE CONSTRUCTION JOINTS PER DETAIL E, THIS DRAWINGS, AT THE END OF EACH DAY'S OPERATION (PLANNED JOINT) OR WHEN THE PLACING OF CONCRETE IS SUSPENDED FOR MORE THAN 30 MINUTES (EMERGENCY JOINT).
3. DO NOT LOCATE EMERGENCY TRANSVERSE CONSTRUCTION JOINTS LESS THAN 6' FROM ANY SAWED CONTRACTION JOINT OR PLANNED CONSTRUCTION JOINT.
4. CONSTRUCTION OR SAWED DUMMY JOINTS SHALL BE SPACED AT A MAXIMUM OF 16 FEET IN BOTH THE LONGITUDINAL AND TRANSVERSE DIRECTIONS. SEE DETAIL C AND D THIS SHEET.
5. FOR PAVEMENT JOINT PLACEMENT SEE SHEET C-10-100.
6. CONCRETE DRIVE SHALL HAVE CONCRETE STAMPING DESIGN, AS APPROVED BY OWNER, ALONG THE PERIMETERS. CONCRETE STAMPING SHALL BE 3 FEET IN WIDTH ON EACH SIDE OF THE EAST/ WEST DRIVE. THE NORTH/SOUTH PORTION OF THE CONCRETE DRIVE LEADING TO THE WATER TOWER SHALL HAVE CONCRETE STAMPING ALONG THE ENTIRE WIDTH OF THE DRIVE.



B C-10-100 SAWED LONGITUDINAL JOINT

NO SCALE

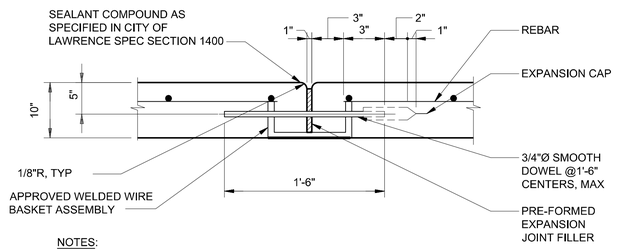


NOTES:

1. SAWED DUMMY JOINT SIMILAR EXCEPT WITH CONTINUOUS REINFORCEMENT.

C C-10-100 SAWED CONTRACTION JOINT

NO SCALE

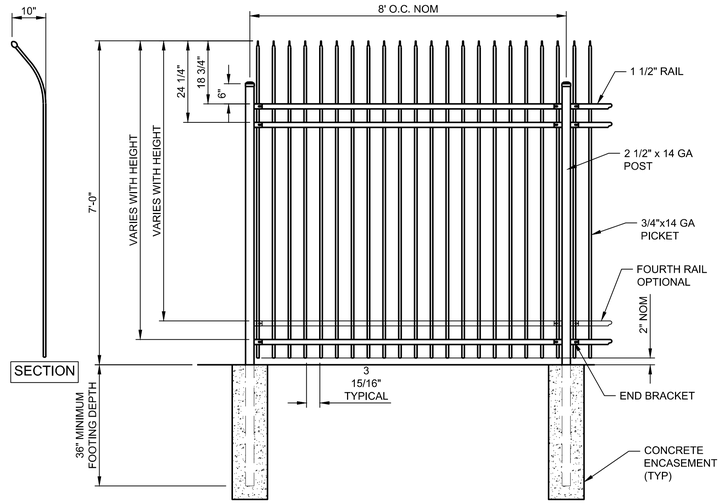


NOTES:

1. SEE DETAIL B, NOTE 2, REGARDING LOCATION OF PAVEMENT CONSTRUCTION JOINTS.

D C-10-100 TRANSVERSE CONSTRUCTION JOINT

NO SCALE



F C-10-101 ORNAMENTAL FENCE DETAIL

NO SCALE

NOTES:

1. ORNAMENTAL FENCING SHALL BE MADE FROM ALUMINUM WITH POWDER COATING (COLOR DETERMINED BY OWNER), MANUFACTURED BY ALUMI-GUARD, OR APPROVED EQUAL.

NO.	BY	CHK	APP	DATE	REVISIONS AND RECORD OF USE

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BLACK & VEATCH

Black & Veatch Corporation
Kansas City, Missouri

LAWRENCE, KANSAS - UT1984
STRATFORD WATER TOWER REPLACEMENT

CIVIL
SITEWORK DETAILS

DESIGNED: SNN
DETAILED: BSG
CHECKED: JJW
APPROVED: AJH
DATE: DECEMBER 2021

0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
402979

C-10-501
SHEET
17 OF 49

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D10000
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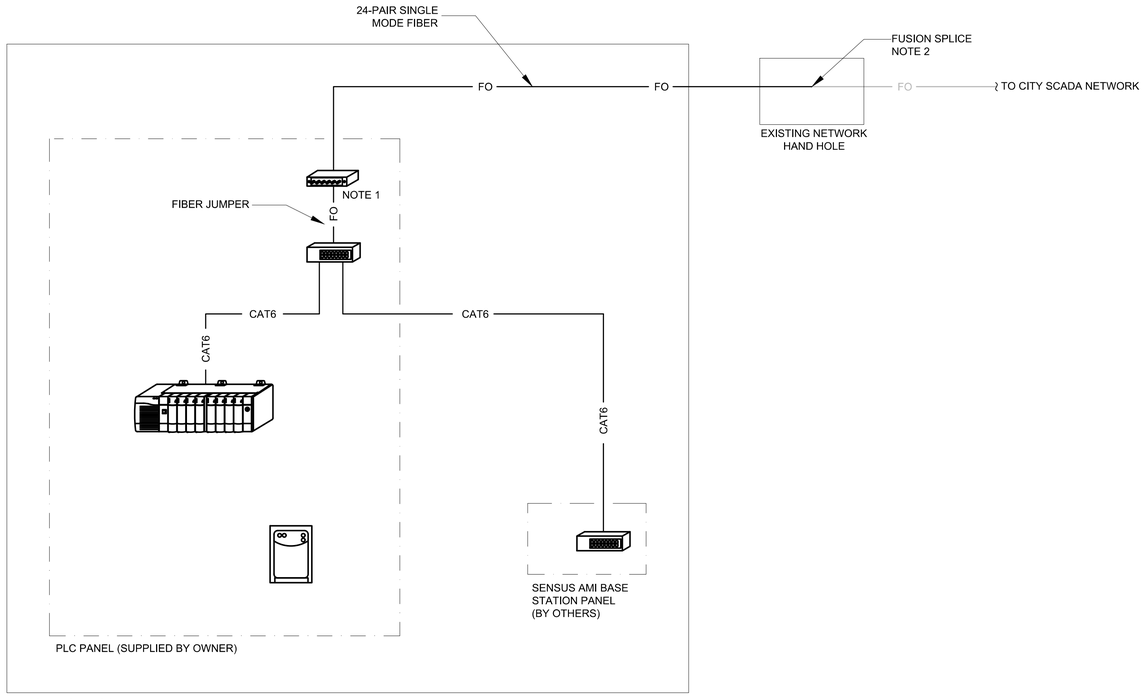

LEGEND

- FIBER OPTIC PATCH PANEL
- PLC
- ETHERNET SWITCH
- UPS

NOTES:

1. CONTRACTOR TO TERMINATE 12 PAIRS OF FIBER IN PATCH PANEL, REMAINING 12 PAIRS OF FIBER TO REMAIN AS SPARE.
2. CONTRACTOR TO SPLICE 12 PAIRS OF FIBER IN EXISTING HAND HOLE, REMAINING 12 PAIRS OF FIBER TO REMAIN AS SPARE.

NO.	BY	CHK	APP	DATE	REVISIONS AND RECORD OF USE

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BLACK & VEATCH

Black & Veatch Corporation
Kansas City, Missouri

LAWRENCE, KANSAS - UT1984
STRATFORD WATER TOWER REPLACEMENT

INSTRUMENTATION
CONTROL BLOCK DIAGRAM

DESIGNED: HAB
DETAILED: MGS
CHECKED: RHD
APPROVED: HAB
DATE: DECEMBER 2021

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
402979

I-10-602
SHEET
35 OF 49

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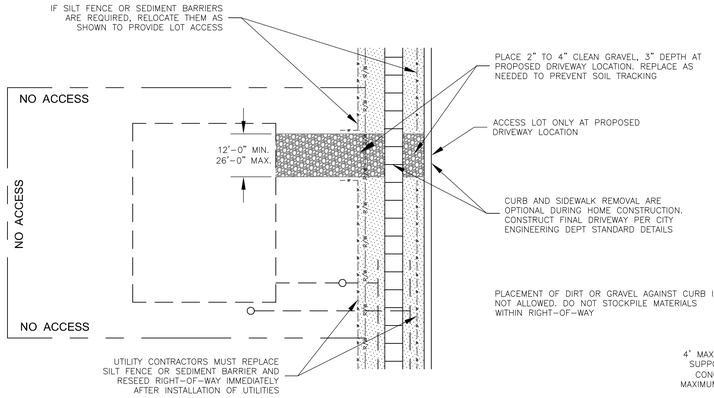
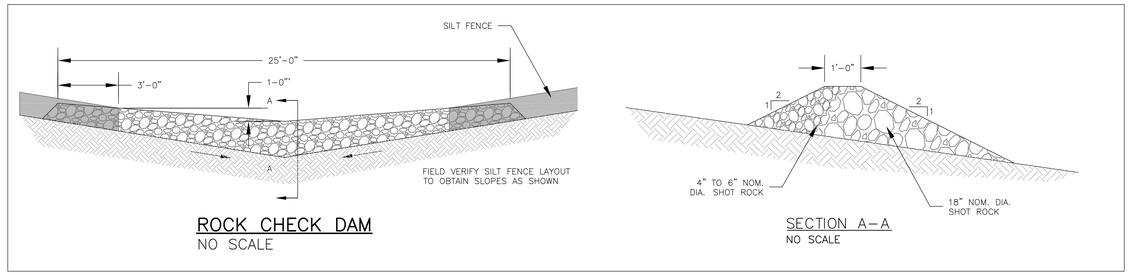


LOT ACCESS DETAIL
APPLIES TO ALL RESIDENTIAL LOTS

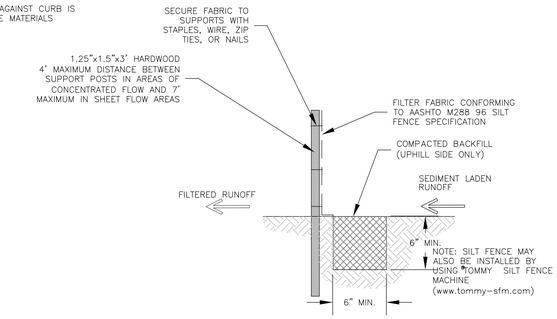


ROCK CHECK DAM
NO SCALE

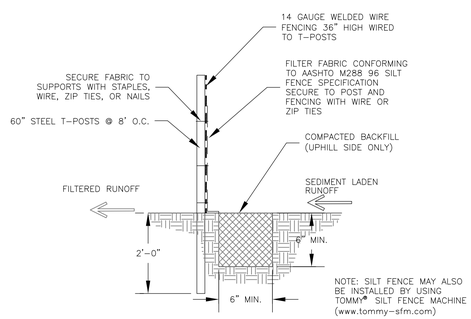
SECTION A-A
NO SCALE

GENERAL NOTES:

1. ALL CONSTRUCTION ACTIVITIES SHALL COMPLY WITH CITY OF LAWRENCE CODE 9-903 REGARDING STORMWATER POLLUTION PREVENTION.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTATION, INSPECTION, AND MAINTENANCE OF ALL BEST MANAGEMENT PRACTICES (BMPs) AS SHOWN ON THE APPROVED STORMWATER POLLUTION PREVENTION PLAN (SWP3) EXCLUDING CONSTRUCTION UNDER THE CONTROL OF SUBSEQUENT OWNERS OF INDIVIDUAL LOTS AND CONSTRUCTION BY UTILITIES.
3. SUBSEQUENT OWNERS OF INDIVIDUAL LOTS ARE RESPONSIBLE FOR CONTINUED IMPLEMENTATION, INSPECTION, AND MAINTENANCE OF ALL BMPs WITHIN THE LOT AS SHOWN ON THE APPROVED SWP3.
4. CONTRACTOR SHALL PROVIDE A COPY OF THE APPROVED SWP3 TO ALL CONTRACTORS, UTILITIES, AND SUBSEQUENT OWNERS OF INDIVIDUAL LOTS PRIOR TO ANY WORK WITHIN THE SUBDIVISION.
5. CONTRACTORS WILL BE RESPONSIBLE FOR THE IMMEDIATE REMOVAL OF SOIL TRACKED ONTO PAVED STREETS.
6. STREET CONTRACTOR WILL BE RESPONSIBLE FOR MARKING ALL LIMITS OF DISTURBANCE (LOD) AND WILL NOT DISTURB VEGETATIVE COVER OUTSIDE OF THESE LIMITS.
7. INSPECTION OF BMP's SHALL OCCUR AT LEAST ONCE EVERY 14 DAYS AND WITHIN 24 HOURS AFTER A RAINFALL EVENT OF 1/2" OR MORE OF RAIN AS MEASURED ON SITE.
8. MAINTENANCE OF BMPs SHALL INCLUDE NECESSARY REPAIRS, REMOVAL OF SEDIMENT, AND ANY NECESSARY MODIFICATIONS TO BMPs AS AUTHORIZED BY CITY OF LAWRENCE.
9. SILT FENCE WILL BE INSTALLED AS SHOWN ON THIS PLAN WITH MODIFICATIONS (AS APPROVED BY THE CITY) AS NECESSARY AT THE TIME OF INSTALLATION TO FIT THE EXISTING CONDITIONS.
10. TOPSOIL MUST BE STOCKPILED UPSTREAM OF SILT FENCE.
11. SILT FENCE SHALL BE RELOCATED IMMEDIATELY DOWNSTREAM OF ANY ADDITIONAL GRADING OR TRENCHING REQUIRED TO COMPLETE WORK SHOWN ON THESE PLANS.
12. R/W SILT FENCE SHOULD BE INSTALLED AT A DISTANCE OF 3' ON THE UPSLOPE SIDE OF FUTURE SIDEWALKS AND AT A DISTANCE OF 8' FROM THE BACK OF CURB IF NO SIDEWALK IS TO BE CONSTRUCTED AND INSTALLED IMMEDIATELY AFTER FINAL STREET GRADING.
13. TEMPORARY CURB INLET SEDIMENT BARRIERS MUST BE INSTALLED IMMEDIATELY AFTER STRUCTURE PLACEMENT AND ONLY REMOVED JUST PRIOR TO PLACEMENT OF CURB AND GUTTER.
14. AFTER INITIAL DETENTION BASIN GRADING ALL DISTURBED AREAS SHALL BE SEEDED WITH A TEMPORARY COVER CROP OF ANNUAL RYE OR WHEAT. TEMPORARY BASIN OUTLET STRUCTURES SHALL BE INSTALLED PER DETAIL THIS SHEET.
15. AFTER VEGETATIVE COVER OF THE REST OF THE SITE IS ESTABLISHED REMOVE TEMPORARY BASIN OUTLET STRUCTURES, REGARDED BASINS TO REMOVE SEDIMENT, AND RESEED. ALL SEEDED AREAS SHALL BE MULCHED PER CITY OF LAWRENCE STANDARD SPECIFICATIONS.



SILT FENCE SLOPE BARRIER DETAIL
NO SCALE



REINFORCED SILT FENCE SLOPE BARRIER DETAIL
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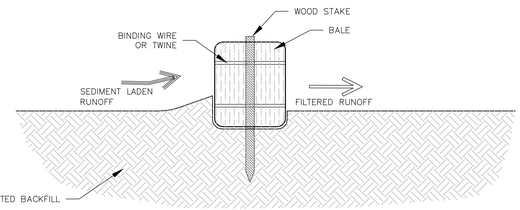
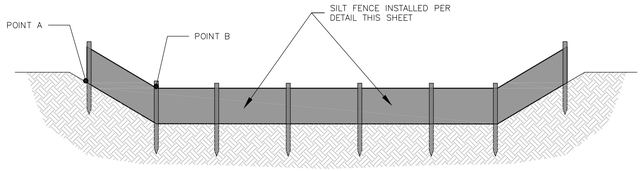
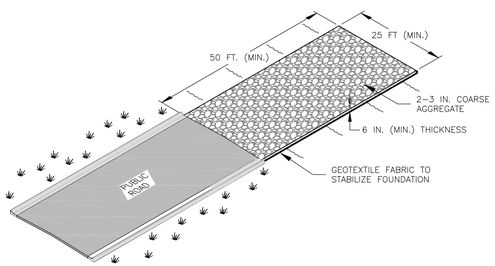


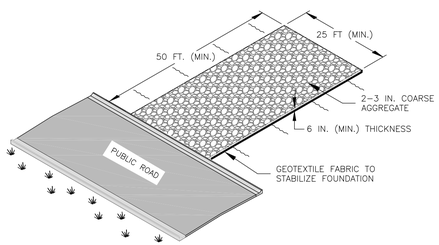
INSTALLATION OF BALE DITCH CHECKS
NO SCALE



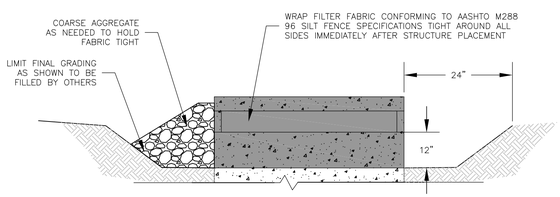
NOTE: POINT A MUST BE HIGHER THAN POINT B SO THAT WATER FLOWS OVER THE BALES AND NOT AROUND THEM.

INSTALLATION OF SILT FENCE DITCH CHECKS
NO SCALE

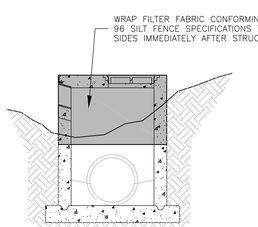




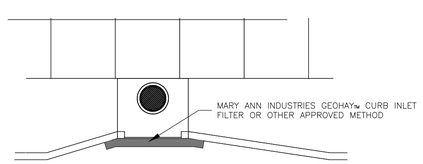
TEMPORARY GRAVEL CONSTRUCTION ENTRANCE PAD
NO SCALE



AREA INLET SEDIMENT BARRIER
NO SCALE



TEMPORARY CURB INLET SEDIMENT BARRIER
NO SCALE



LONG-TERM CURB INLET SEDIMENT BARRIER
NO SCALE

2021 EDITION

SHEET 36 OF 49

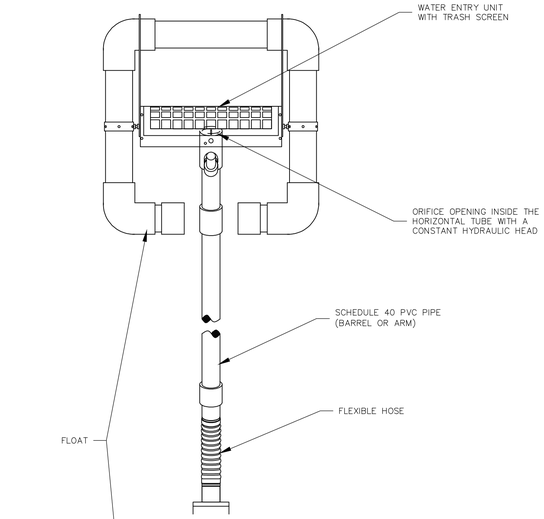
DATE	BY	REVISION
03-01-21	LJM	REPLACES ALL PREVIOUS VERSIONS OF EROSION AND SEDIMENT CONTROL DETAILS
03-01-20	LJM	REPLACES ALL PREVIOUS VERSIONS OF EROSION AND SEDIMENT CONTROL DETAILS

City of Lawrence
MUNICIPAL SERVICES & OPERATIONS

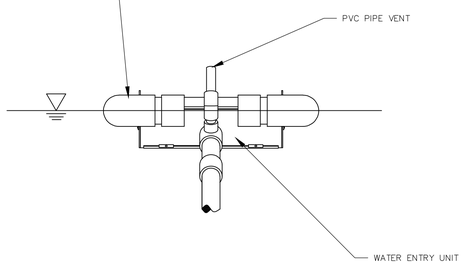
STANDARD DETAILS FOR
EROSION AND SEDIMENT CONTROL

DAVID P. CRONIN, CITY ENGINEER

CRAIG S. OWENS, CITY MANAGER



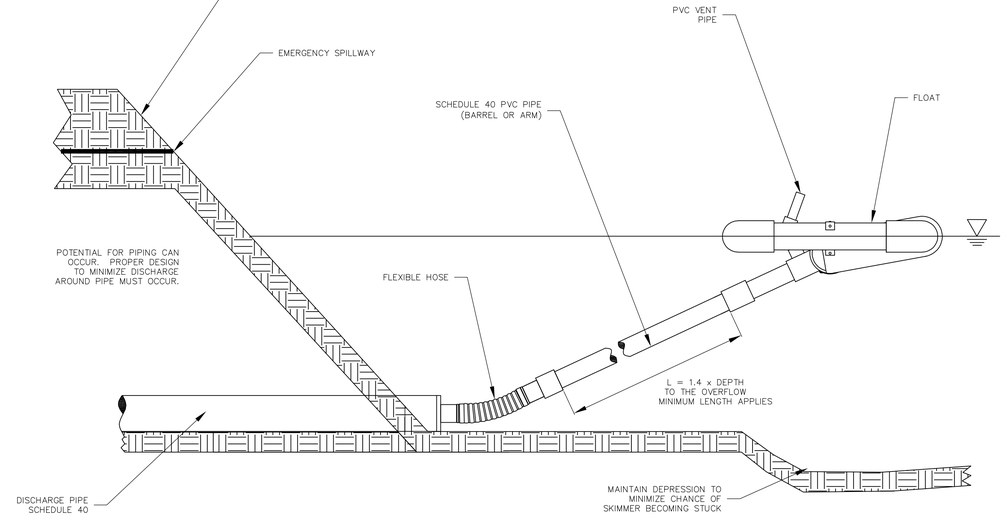
TOP VIEW



END VIEW

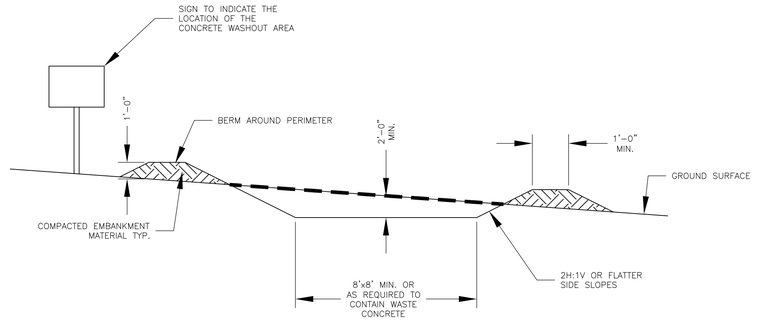
GENERAL NOTES FOR SKIMMER DETAILS

1. PROPER DESIGN MUST BE COMPLETED TO MINIMIZE PIPING AROUND DISCHARGE PIPE.
2. PROPER ORIFICE OPENING MUST BE SELECTED TO ENSURE POND DRAINS IN CORRECT AMOUNT OF TIME. MODIFICATIONS MAY BE REQUIRED IF FIELD CONDITIONS WARRANT A CHANGE.
3. EMBANKMENT MUST BE COMPACTED TO DESIGN SPECIFICATIONS.
4. EMERGENCY SPILLWAY MUST BE CORRECTLY SIZED AND EROSION PROTECTION INSTALLED.
5. EROSION PROTECTION MUST BE INSTALLED ALONG THE EMBANKMENT AND AT THE DISCHARGE END OF THE PIPE.
6. INSPECT SYSTEM REGULARLY TO ENSURE IT IS FUNCTIONING IN A CORRECT MANNER.
7. SKIMMER SIZE DEPENDENT UPON VOLUME OF BASIN TO BE DRAINED AND NUMBER OF DAYS TO DRAIN THE BASIN.



SIDE VIEW

FAIRCLOTH SKIMMER® DISCHARGE SYSTEM WITH EMBANKMENT



NOTES:
1. CONCRETE WASHOUT AREA SHALL BE INSTALLED PRIOR TO ANY CONCRETE PLACEMENT ON SITE.
2. SIGNS SHALL BE PLACED AT THE WASHOUT AREA AS NECESSARY TO CLEARLY INDICATE THE LOCATION OF THE CONCRETE WASHOUT AREA TO OPERATORS OF CONCRETE TRUCKS AND PUMP RIGS.
3. THE CONCRETE WASHOUT AREA SHALL BE REPAIRED AND ENLARGED OR CLEANED OUT AS NECESSARY TO MAINTAIN CAPACITY FOR WASTED CONCRETE.
4. AT THE END OF CONSTRUCTION, ALL CONCRETE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF AT AN ACCEPTED WASTE SITE.
5. WHEN THE CONCRETE WASHOUT AREA IS REMOVED, THE DISTURBED AREA SHALL BE SEEDED AND MULCHED OR OTHERWISE STABILIZED IN A MANNER ACCEPTED BY THE CITY.

CONCRETE WASHOUT AREA

NOT TO SCALE

2021 EDITION

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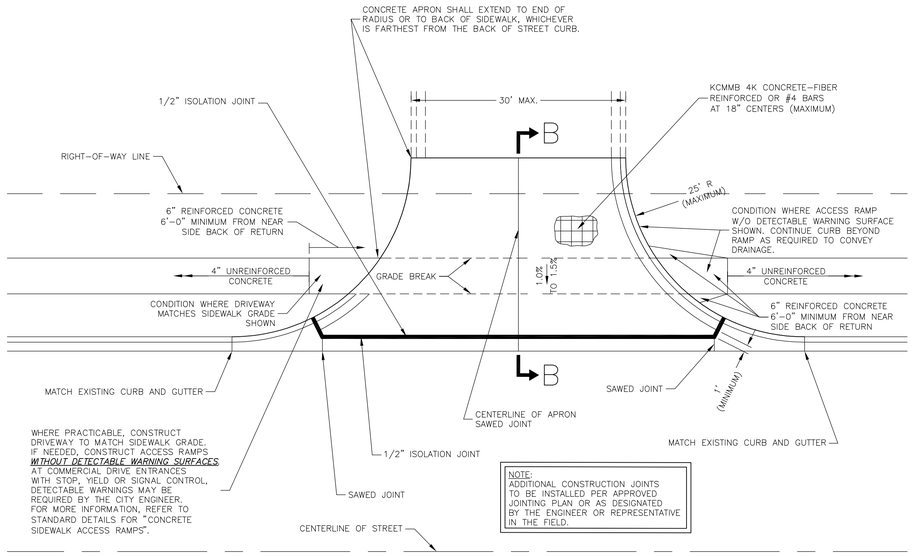
City *of* Lawrence
MUNICIPAL SERVICES & OPERATIONS

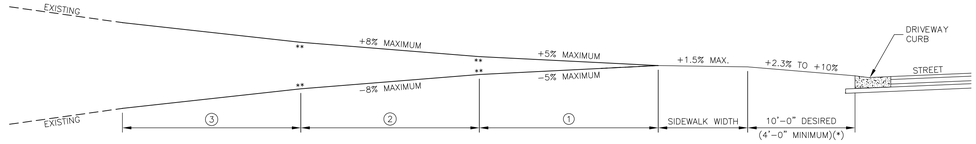
STANDARD DETAILS FOR
EROSION AND SEDIMENT CONTROL

DAVID P. CRONIN
CITY ENGINEER

CRAIG S. OWENS
CITY MANAGER



PLAN



① 10'-0" MINIMUM IS REQUIRED WHEN THE EXISTING GRADE IS GREATER THAN ±8%.

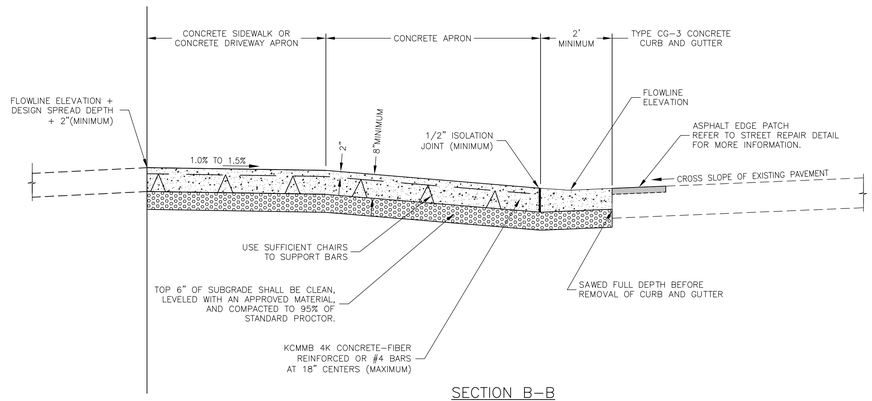
② 10'-0" MINIMUM IS REQUIRED WHEN THE EXISTING GRADE IS GREATER THAN ±15%.

③ 10'-0" MINIMUM IS REQUIRED WHEN THE EXISTING GRADE IS GREATER THAN ±22%.

*0 FEET IS ALLOWED IN URBAN BUSINESS DISTRICTS WITH SIDEWALKS OF 6 FEET MINIMUM WIDTH.

**10 FEET MINIMUM ROUNDING DESIRABLE AT GRADE CHANGES.

PROFILE WITH SIDEWALK (MAXIMUM PERCENT OF GRADE)



SECTION B-B

COMMERCIAL DRIVEWAY APRON

2021 EDITION

SHEET 38 OF 49

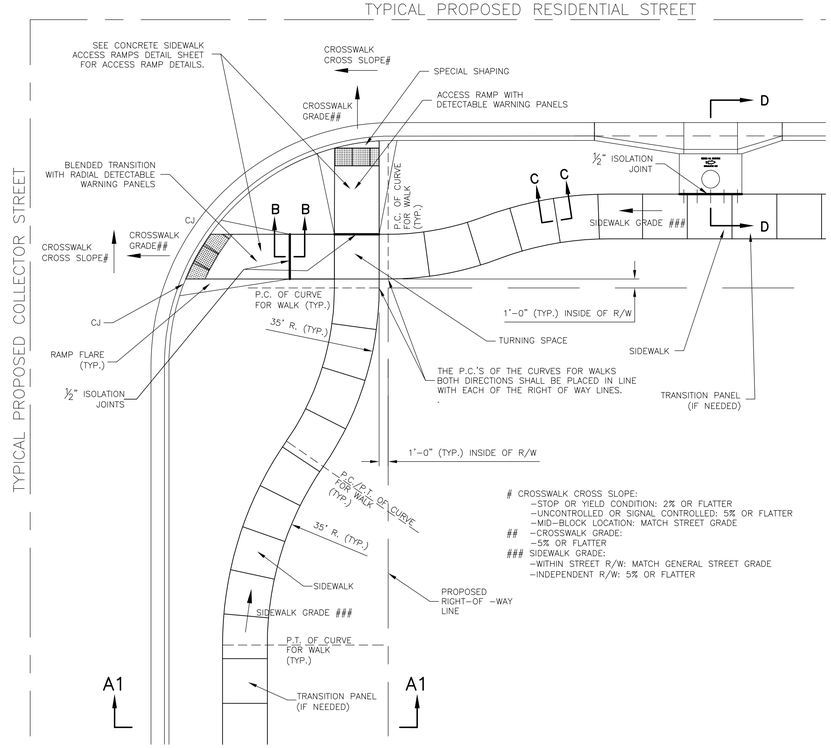
DATE	BY	REVISION
03-01-21	LJM	REPLACES ALL PREVIOUS VERSIONS OF CONCRETE DRIVEWAY DETAILS
03-01-20	LJM	REPLACES ALL PREVIOUS VERSIONS OF CONCRETE DRIVEWAY DETAILS

City *of* Lawrence
MUNICIPAL SERVICES & OPERATIONS

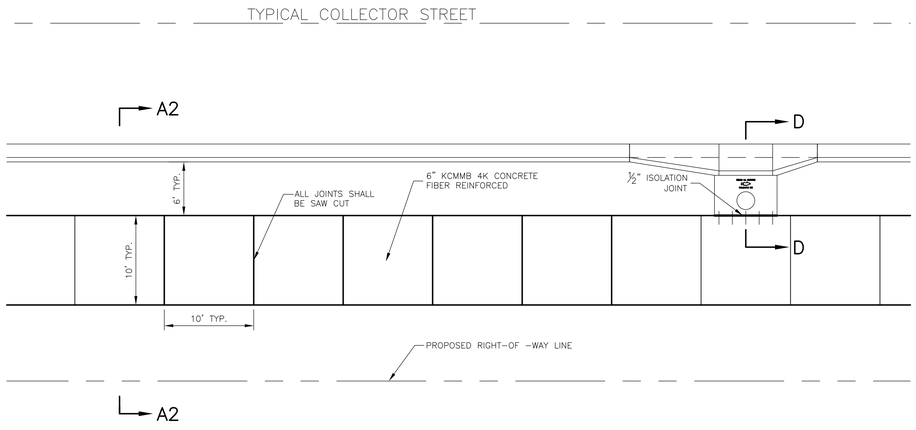
STANDARD DETAILS FOR
CONCRETE COMMERCIAL DRIVEWAYS

DAVID P. CRONIN
CITY ENGINEER

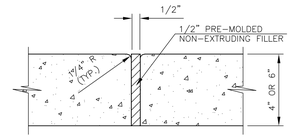
CRAIG S. OWENS
CITY MANAGER



GENERAL SIDEWALK LAYOUT PLAN

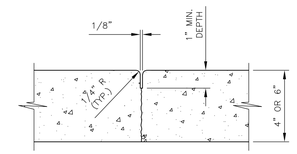


GENERAL SHARED USE PATH LAYOUT PLAN

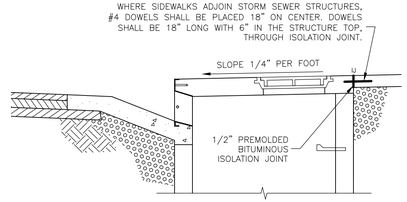


SECTION B–B
ISOLATION JOINT

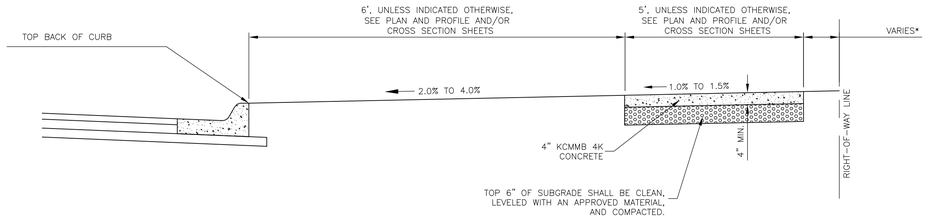
NOTE: A GRADE BREAK SHOULD NOT BE PLACED BETWEEN THE TURNING SPACE AND BOTTOM OF RAMP, UNLESS A LANDING IS REQUIRED FOR SIGNAL PUSH BUTTONS, OR IN THE CASE OF LONG RAMPS, GRADE SHOULD GENERALLY BE CONSTANT BETWEEN GRADE BREAK AT BOTTOM OF RAMP AND TURNING SPACE.



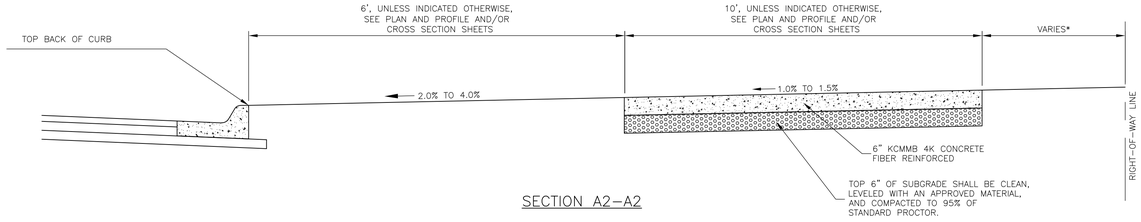
SECTION C–C
CONTRACTION JOINT
(SAWED OR FORMED)



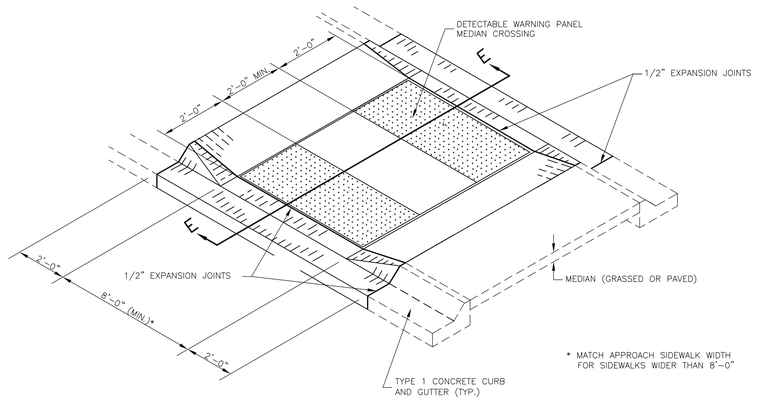
SECTION D–D
SIDEWALK TO INLET DOWELING DETAIL



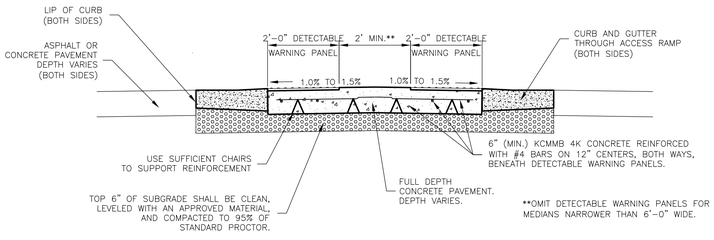
SECTION A1–A1



SECTION A2–A2



MEDIAN RAMP CROSSING PLAN



SECTION E–E

SIDEWALK GENERAL NOTES

1. CONSTRUCTION JOINTS SHALL BE PLACED IN 5'–0" WIDE SIDEWALKS AT A MINIMUM OF 5'–0" INTERVALS. WHEN OTHER WIDTHS OF SIDEWALK ARE USED, CONSTRUCTION JOINTS SHALL BE PLACED AS DIRECTED BY THE CITY ENGINEER OR AN AUTHORIZED REPRESENTATIVE.
2. ISOLATION JOINTS SHALL BE PLACED AT ALL LOCATIONS WHERE SIDEWALK ABUTS EXISTING STRUCTURES AND AS DIRECTED BY THE CITY ENGINEER OR AN AUTHORIZED REPRESENTATIVE.
3. ACCESS RAMPS SHALL BE CONSTRUCTED AT ALL LOCATIONS WHERE SIDEWALKS INTERSECT NEW STREET CONSTRUCTION AND AS OTHERWISE SHOWN ON THE PLANS.
4. ALL SHARED USE PATH JOINTS SHALL BE SAW CUT.
5. ALL SIDEWALKS AND RAMPS MUST BE CONSTRUCTED TO CURRENT PROWAG STANDARDS.
6. THERE SHALL BE NO GRADE BREAKS ON THE RAMP. GRADE SHOULD BE CONSTANT BETWEEN GRADE BREAK AT BOTTOM OF RAMP AND TURNING SPACE.
7. SIDEWALK CURB FOR ADA COMPLIANCE IS SUBSIDIARY TO THE RAMP.
8. GRADING REQUIRED TO FACILITATE DRAINAGE BETWEEN THE SIDEWALK AND CURB IS SUBSIDIARY TO THE RAMP.

2021 EDITION

SHEET 39 OF 49

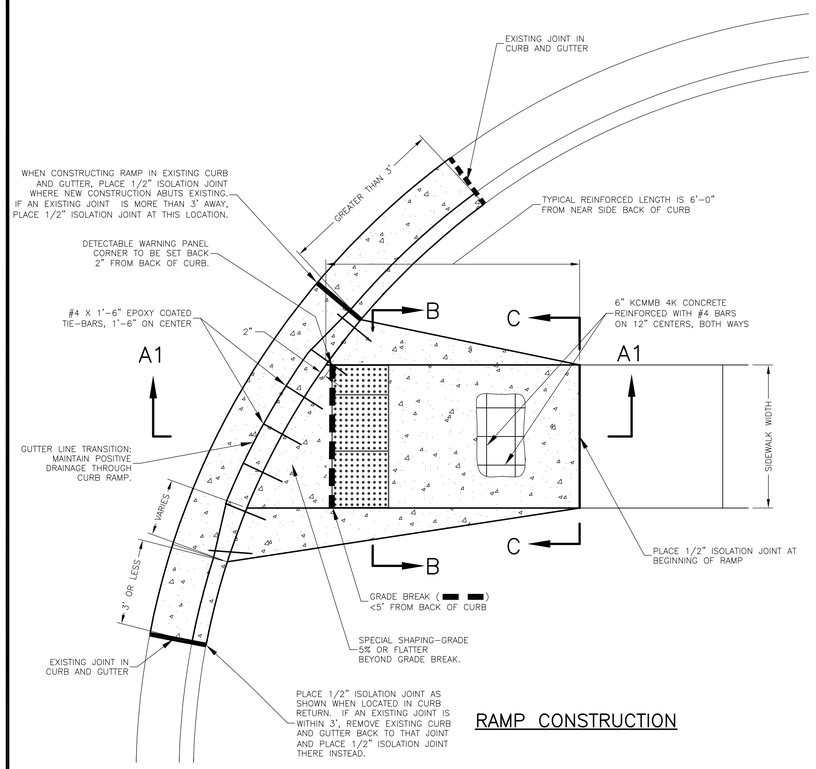
DATE	BY	REVISION
03–01–21	LJM	REPLACES ALL PREVIOUS VERSIONS OF CONCRETE SIDEWALK AND SHARED USE PATH LAYOUTS DETAILS
03–01–20	LJM	REPLACES ALL PREVIOUS VERSIONS OF CONCRETE SIDEWALK AND SHARED USE PATH LAYOUTS DETAILS

City of Lawrence
MUNICIPAL SERVICES & OPERATIONS

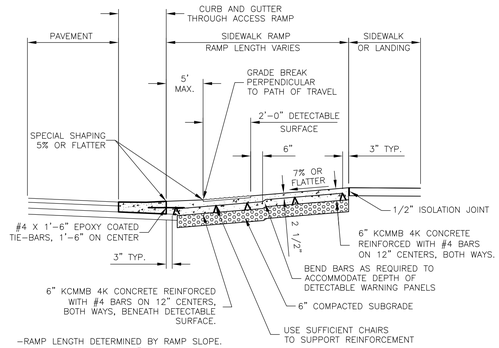
STANDARD DETAILS FOR
CONCRETE SIDEWALK AND SHARED USE PATH LAYOUTS

DAVID P. CRONIN
CITY ENGINEER

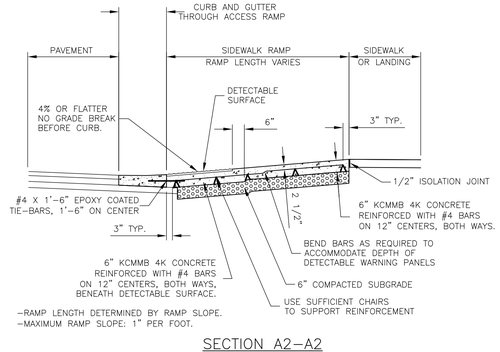
CRAIG S. OWENS
CITY MANAGER



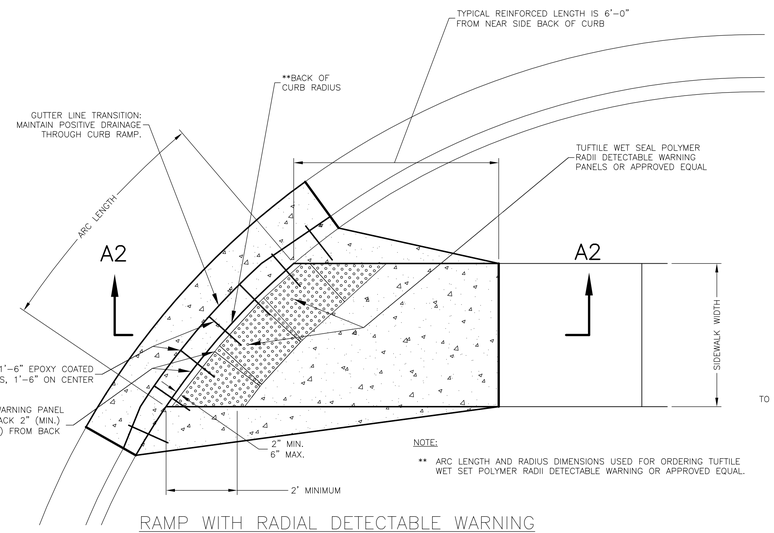
RAMP CONSTRUCTION



SECTION A1-A1



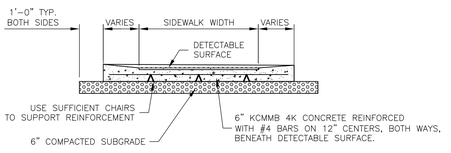
SECTION A2-A2



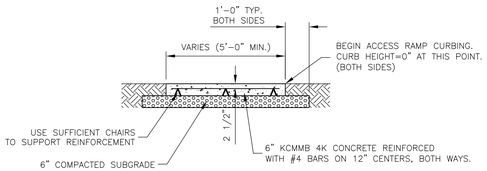
NOTE:

** ARC LENGTH AND RADIUS DIMENSIONS USED FOR ORDERING TUFTILE WET SET POLYMER RADII DETECTABLE WARNING OR APPROVED EQUAL.

RAMP WITH RADIAL DETECTABLE WARNING



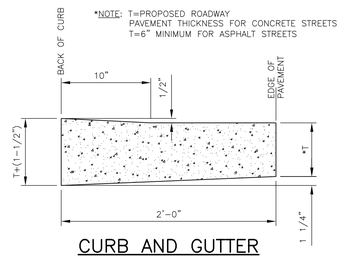
SECTION B-B



SECTION C-C

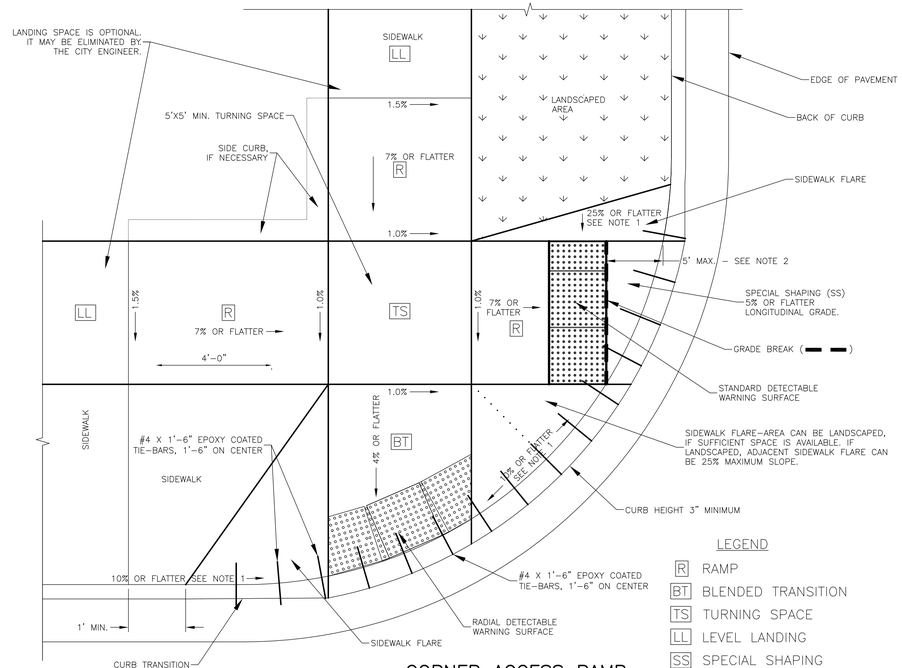
NOTES

1. FLARED SIDES SHALL BE 10% OR FLATTER SLOPE, IF ADJACENT TO SIDEWALK, AND 25% OR FLATTER SLOPE, IF ADJACENT TO LANDSCAPED AREAS.
2. IF THE SPECIAL SHAPING DISTANCE EXCEEDS 5' FROM THE BACK OF CURB, THEN REFER TO THE "BLENDED TRANSITION DETECTABLE WARNING SURFACE DETAIL". IF USING RADIAL DETECTABLE WARNINGS, BLENDED TRANSITION SHOULD HAVE A 4% OR FLATTER SLOPE.
3. DETECTABLE WARNING DOMES SHALL BE ALIGNED PERPENDICULAR TO THE GRADE BREAK BETWEEN THE RAMP RUN AND STREET, UNLESS A BLENDED TRANSITION AND USING RADIAL DOMES.
4. DETECTABLE WARNINGS SHALL CONTINUOUSLY EXTEND FOR A MINIMUM OF 24" IN THE PATH OF TRAVEL.
5. DIMENSIONS SHOWN IN THIS DRAWING ARE TARGET DESIGN VALUES. ALL SIDEWALKS AND RAMPS MUST BE CONSTRUCTED TO CURRENT PROWAG STANDARDS.
6. IF GRADES DO NOT ALLOW RAMP TO BE CONSTRUCTED BASED ON SLOPES SHOWN, OVERALL LENGTH MAY BE LIMITED TO 15'. EXACT LIMITS TO BE APPROVED BY THE ENGINEER.
7. COMPACTED SUBGRADE SHALL BE CLEAN, LEVELED WITH AN APPROPRIATE MATERIAL, AND COMPACTED.
8. THE TERMS "RAMP" AND "BLENDED TRANSITION" REFER TO THE GEOMETRIC REQUIREMENTS OF PROWAG, NOT PAY ITEMS. THE FIRST 6'-0" OF A RAMP OR BLENDED TRANSITION SHALL BE "REINFORCED CONCRETE SIDEWALK". BEYOND 6'-0", THE RAMP OR BLENDED TRANSITION, SHALL BE "CONCRETE SIDEWALK". DETECTABLE WARNINGS SHALL BE MEASURED SEPARATELY.
   TYPICAL BID ITEMS ARE:
   -CONCRETE SIDEWALK (4"), SY
   -CONCRETE RECREATIONAL PATH (6" FIBER REINFORCED), SY
   -INTEGRAL CONCRETE SIDEWALK AND RETAINING WALL, LF
   -REINFORCED CONCRETE SIDEWALK (ADJACENT TO CURB), SF
   -DETECTABLE WARNING PANELS, SF
   -DETECTABLE WARNING PANELS (RADIAL, XX FT. RADIUS), SF
   -CONCRETE MEDIAN REINFORCED SIDEWALK CROSSING, SF
9. SIDEWALK CURB FOR ADA COMPLIANCE IS SUBSIDIARY TO THE RAMP.
10. GRADING REQUIRED TO FACILITATE DRAINAGE BETWEEN THE SIDEWALK AND CURB IS SUBSIDIARY TO THE RAMP

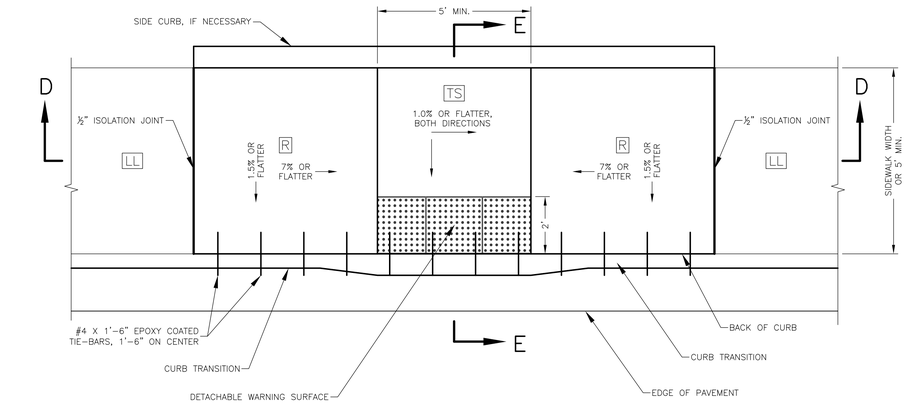


CURB AND GUTTER THROUGH ACCESS RAMP

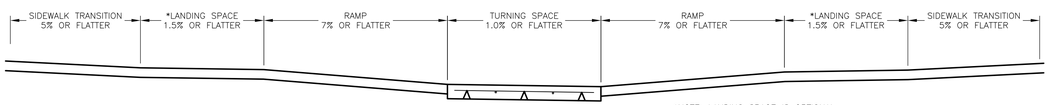
PAID AS CURB TYPE ADJACENT TO CURB RAMP BY LINEAR FOOT



CORNER ACCESS RAMP

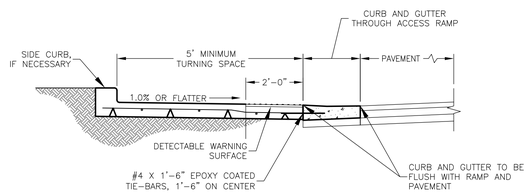


PARALLEL RAMP



*NOTE: LANDING SPACE IS OPTIONAL. IT MAY BE ELIMINATED BY THE CITY ENGINEER.

SECTION D-D



SECTION E-E

2021 EDITION

SHEET 40 OF 49

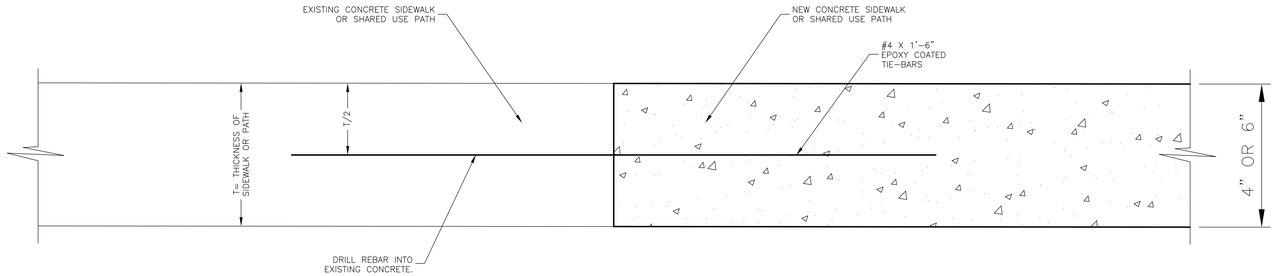
DATE	BY	REVISION
03-01-21	LJM	REPLACES ALL PREVIOUS VERSIONS OF CONCRETE SIDEWALK ACCESS RAMPS DETAILS
03-01-20	LJM	REPLACES ALL PREVIOUS VERSIONS OF CONCRETE SIDEWALK ACCESS RAMPS DETAILS

City of Lawrence
MUNICIPAL SERVICES & OPERATIONS

STANDARD DETAILS FOR CONCRETE SIDEWALK ACCESS RAMPS

DAVID P. CRONIN
CITY ENGINEER

CRAIG S. OWENS
CITY MANAGER



SECTION A–A

CONCRETE SIDEWALK AND SHARED USE PATH REPAIR GENERAL NOTES

1. REPAIRS SHALL BE PERFORMED FROM EXISTING JOINT TO EXISTING JOINT. ISOLATED REPAIRS WITHIN AN EXISTING PANEL SUCH AS FILLING CRACKS OR GROUTING UTILITY POTHOLES SHALL NOT BE PERMITTED.

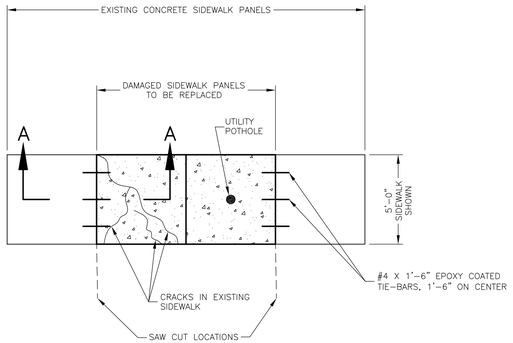
2. ACCESS RAMP REPAIRS SHALL INCLUDE THE FULL REMOVAL AND REPLACEMENT OF THE EXISTING RAMP INCLUSIVE OF ACCOMPANYING CURB AND GUTTER. ISOLATED REPAIRS WITHIN AN EXISTING ACCESS RAMP SUCH AS FILLING CRACKS OR GROUTING UTILITY POTHOLES SHALL NOT BE PERMITTED.

3. ADJACENT PANELS DAMAGED DURING CONSTRUCTION ACTIVITIES SHALL BE REMOVED AND REPLACED.

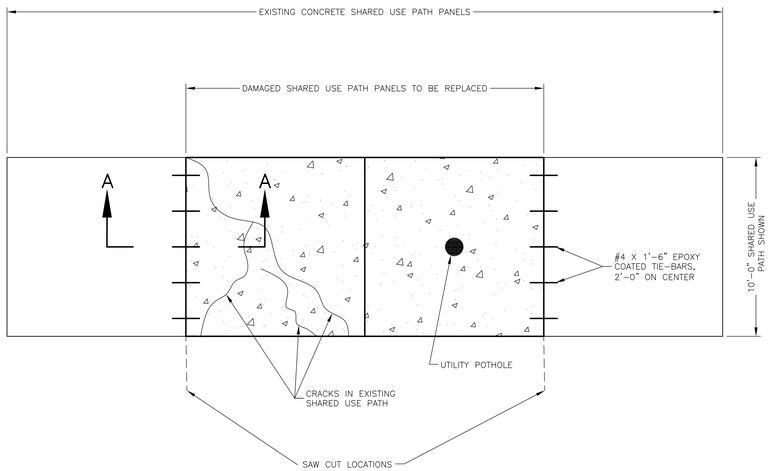
4. REPLACEMENT SIDEWALK, SHARED USE PATH AND ACCESS RAMPS SHALL BE CONSTRUCTED TO APPLICABLE CITY OF LAWRENCE CONSTRUCTION AND MATERIAL SPECIFICATIONS AND STANDARD DETAILS.

5. THE WIDTH AND LOCATION OF REPLACEMENT SIDEWALK AND SHARED USE PATH SHALL BE VARIED TO MATCH THE WIDTH AND LOCATION OF EXISTING SIDEWALKS AND SHARED USE PATHS IN THE VICINITY. HOWEVER, WIDTH SHALL NOT BE REDUCED TO LESS THAN 4 FEET.

6. SIDEWALK AND SHARED USE PATH CROSS SLOPE MAY BE VARIED THROUGH A GRADUAL TRANSITION TO MATCH EXISTING, ADJOINING PANELS.



EXISTING SIDEWALK PLAN



EXISTING SHARED USE PATH PLAN

SAW CUT AND JOINT DETAILS

2021 EDITION

SHEET 41 OF 49

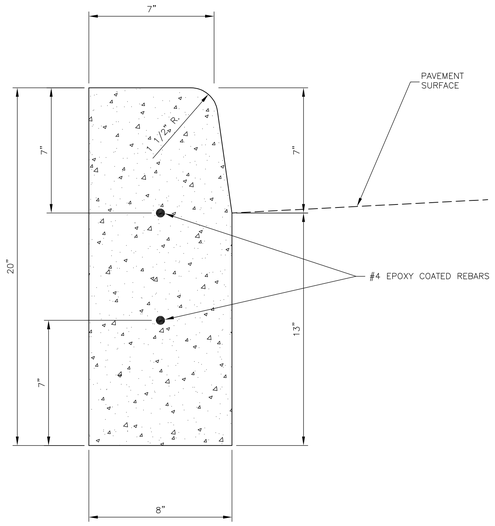
DATE	BY	REVISION
03-01-21	LJM	REPLACES ALL PREVIOUS VERSIONS OF CONCRETE SIDEWALK AND SHARED USE PATH REPAIR DETAILS
03-01-20	LJM	NEW DETAIL

City *of* Lawrence
MUNICIPAL SERVICES & OPERATIONS

STANDARD DETAILS FOR
CONCRETE SIDEWALK AND SHARED USE PATH REPAIR

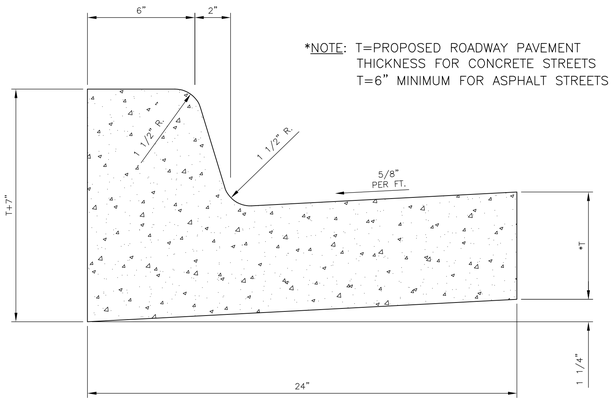
DAVID P. CRONIN
CITY ENGINEER

CRAIG S. OWENS
CITY MANAGER

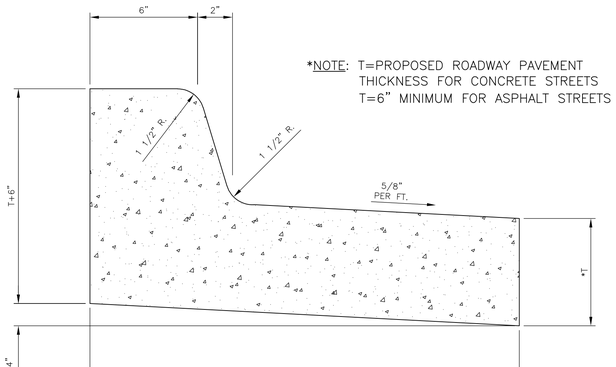


STRAIGHT CURB
(TYPE C–1)

*NOTE: T=PROPOSED ROADWAY PAVEMENT THICKNESS FOR CONCRETE STREETS T=6" MINIMUM FOR ASPHALT STREETS

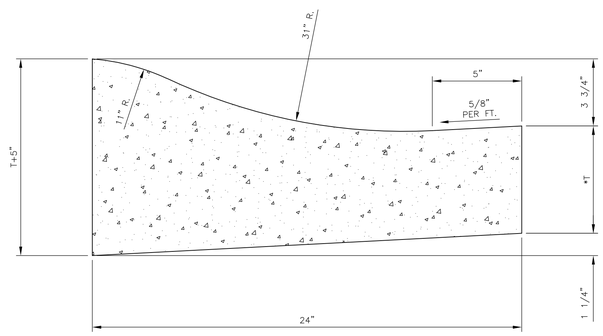


STRAIGHT BACK CURB AND GUTTER
(TYPE CG–1)



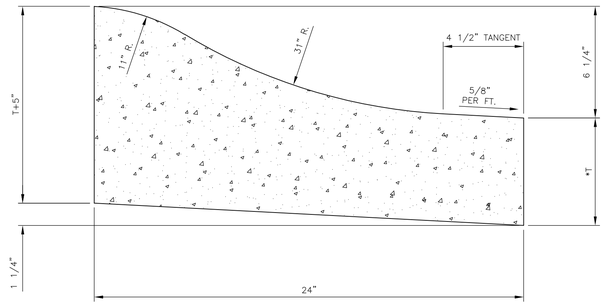
STRAIGHT BACK DRY CURB AND GUTTER
(TYPE CG–1, DRY)

*NOTE: T=PROPOSED ROADWAY PAVEMENT THICKNESS FOR CONCRETE STREETS T=6" MINIMUM FOR ASPHALT STREETS



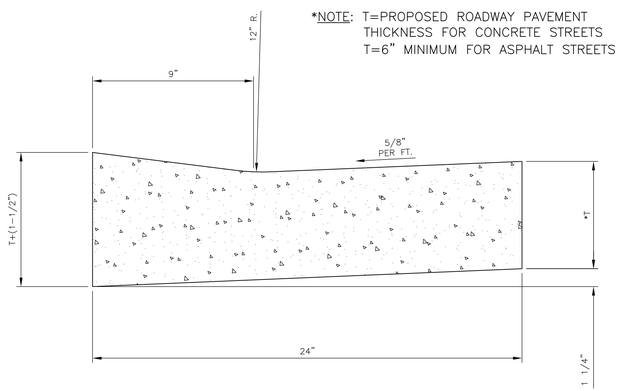
ROLL BACK CURB AND GUTTER
(TYPE CG–2)

*NOTE: T=PROPOSED ROADWAY PAVEMENT THICKNESS FOR CONCRETE STREETS T=6" MINIMUM FOR ASPHALT STREETS



ROLL BACK CURB AND GUTTER
(TYPE CG–2, DRY)

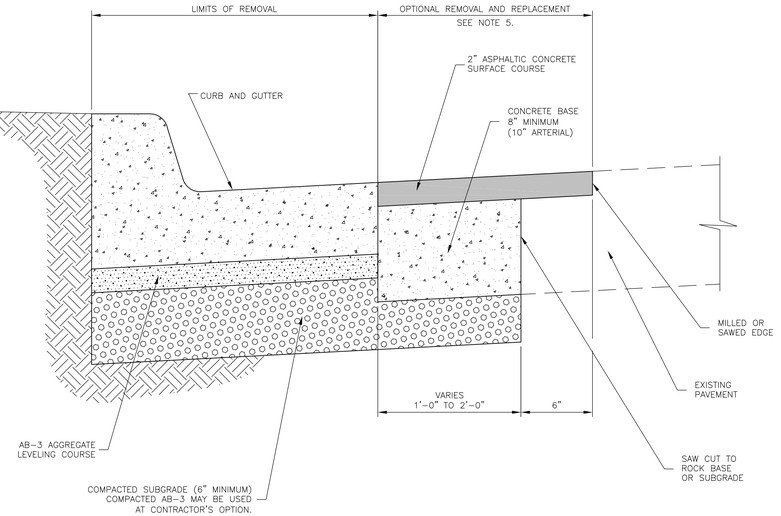
*NOTE: T=PROPOSED ROADWAY PAVEMENT THICKNESS FOR CONCRETE STREETS T=6" MINIMUM FOR ASPHALT STREETS



CURB AND GUTTER THROUGH DRIVEWAYS
(TYPE CG–3)

CURB AND GUTTER GENERAL NOTES

1. TYPE CG–2 OR CG–2 DRY ROLL BACK CURB AND GUTTER MAY BE USED ONLY ON RESIDENTIAL STREETS. CURB CUTS FOR DRIVEWAYS ARE NOT REQUIRED WITH ROLL BACK CURB AND GUTTER.
2. INSTALL JOINTS IN ACCORDANCE WITH STANDARD SPECIFICATIONS.
3. CONCRETE SHALL CONFORM TO STANDARD SPECIFICATIONS, SECTION 2000.
4. ASPHALTIC CONCRETE SURFACE COURSE SHALL CONFORM TO STANDARD SPECIFICATIONS, SECTION 1300.
5. PAVEMENT REMOVAL AND REPLACEMENT BEYOND THE LIMITS OF CURB AND GUTTER REMOVAL IS AT THE CONTRACTOR'S OPTION AND COST.
6. ALL CURB JOINTS SHALL BE SAWED AND SEALED TO THE FLOWLINE WITH JOINT SEALING THAT CONFORMS TO THE STANDARD SPECIFICATIONS, SECTION 1400.
7. FOR THE CONCRETE GUTTER THROUGH CURB RAMP DETAIL, REFER TO THE STANDARD DETAILS FOR "CONCRETE SIDEWALK ACCESS RAMPS". CURB THROUGH ACCESS RAMP TO BE PAID BY LINEAR FOOT AS SAME TYPE ADJACENT TO THE RAMP.



CURB REPLACEMENT DETAIL
(NOTE: TO BE USED ONLY WHEN EXISTING CURB AND GUTTER IS REMOVED AND REPLACED, BUT STREET PAVEMENT REMAINS IN PLACE)

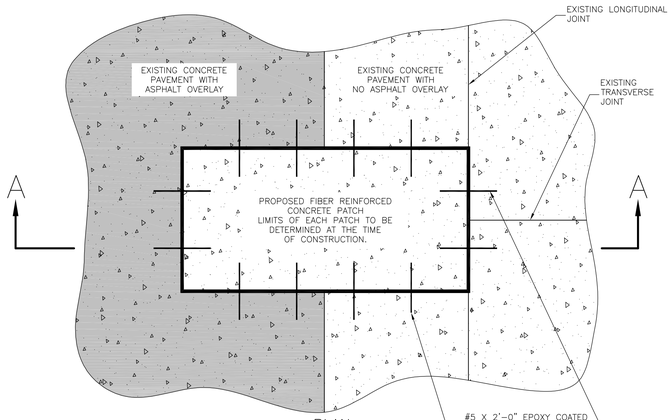
2021 EDITION

DATE	BY	REVISION
03–01–21	LJM	REPLACES ALL PREVIOUS VERSIONS OF CONCRETE CURB AND GUTTER DETAILS
03–01–20	LJM	REPLACES ALL PREVIOUS VERSIONS OF CONCRETE CURB AND GUTTER DETAILS

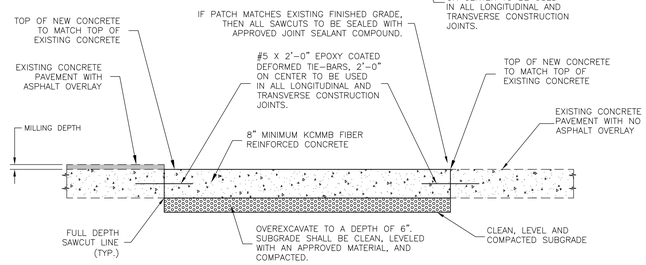
City of Lawrence
MUNICIPAL SERVICES & OPERATIONS

STANDARD DETAILS FOR
CONCRETE CURB AND GUTTER

DAVID P. CRONIN, CITY ENGINEER
CRAIG S. OWENS, CITY MANAGER

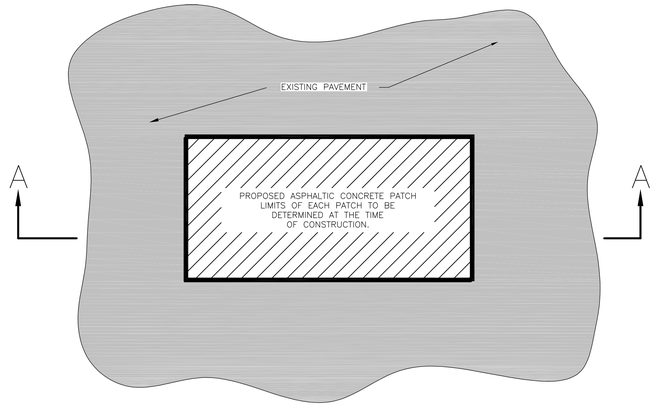


PLAN



SECTION A–A

PORTLAND CEMENT CONCRETE PATCHING DETAILS



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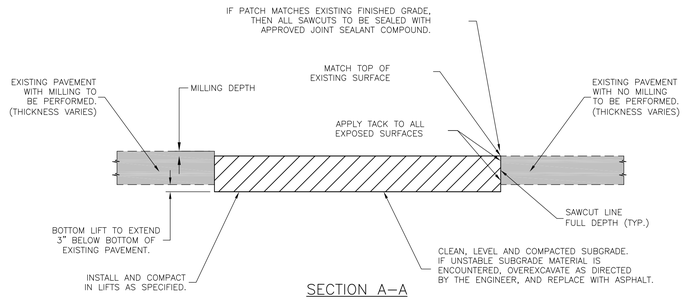
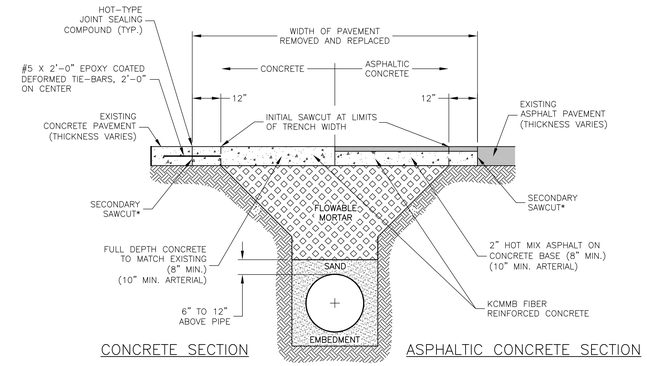
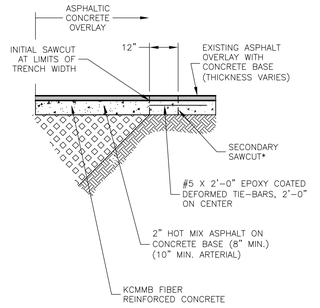


SECTION A–A

ASPHALTIC CONCRETE PATCHING DETAILS



CONCRETE SECTION ASPHALTIC CONCRETE SECTION

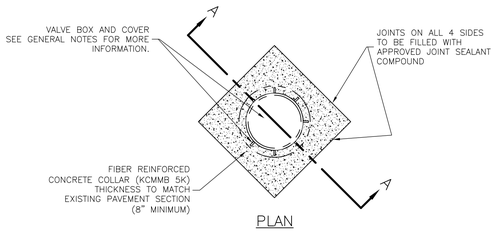


CONCRETE WITH ASPHALT OVERLAY SECTION

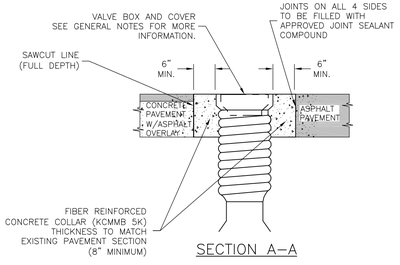
NOTES

1. ALL PAVEMENT SAW CUTS SHALL BE MADE TO FULL DEPTH OF PAVEMENT THICKNESS AND PAVEMENT REMOVED WITHOUT DAMAGE TO ADJACENT PAVEMENT.
2. ALL TRENCHING AND BACKFILL SHALL BE ACCOMPLISHED TO PAVING SUBGRADE PRIOR TO INITIATION OF SECOND SAW CUT AND ADDITIONAL PAVEMENT REMOVAL.
3. PRIOR TO INSTALLATION OF FLOWABLE MORTAR AND NEW PAVEMENT, PAVEMENT SHALL BE OVERCUT TO EXTEND BEYOND ANY LOCATION THAT BECOMES UNDERMINED WITH APPARENT VOIDS UNDER PAVEMENT.
4. BARS SHALL BE DRILLED AND GROUTED INTO EXISTING CONCRETE PAVEMENT.
5. DRILLING AND GROUTING SHALL BE PER KDOT SPECIFICATIONS SECTION 842.
6. TRENCH BACKFILL SHALL BE FLOWABLE FILL FROM TWO (2) FEET BEHIND THE BACK OF CURB ON EACH SIDE OF THE STREET (INCLUSIVE OF GRAVEL DRIVES AND ALLEYS)
7. FOR OVERLAYED BRICK STREETS, THE BRICKS NEED TO BE CLEANED AND PALLETED. CONTACT THE CITY OF LAWRENCE STREET DIVISION TO SCHEDULE PICKUP. THE REMAINING TRENCH SHOULD BE TREATED AS PER THE ASPHALT OVERLAY DETAIL.
8. FOR BRICK STREETS, THE BRICK NEEDS TO BE REPLACED.

PERMANENT PAVEMENT REMOVAL AND REPLACEMENT DETAILS



PLAN

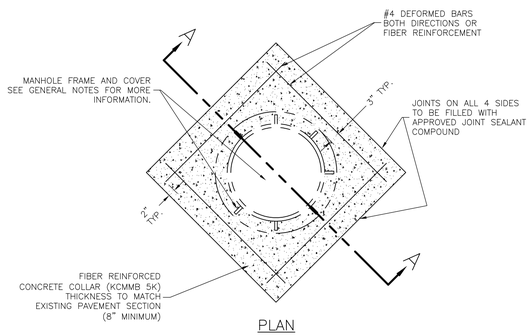


SECTION A–A

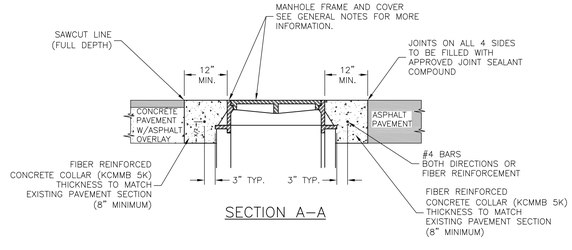
GENERAL NOTES

1.) ADJUST VALVE BOX FRAME AND COVER TO FINISH GRADE AND SLOPE.
2.) THE ORIENTATION OF THE REINFORCED CONCRETE COLLAR SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD.
3.) ALL ITEMS SHOWN ABOVE ARE SUBSIDIARY TO THE BID ITEM "VALVE ADJUSTMENT".

STANDARD VALVE ADJUSTMENT DETAILS



PLAN

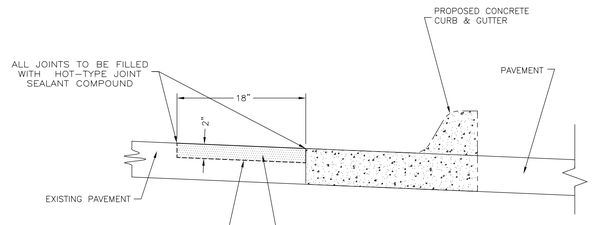


SECTION A–A

GENERAL NOTES

1.) ADJUST MANHOLE FRAME AND COVER TO FINISH GRADE AND SLOPE WITH CONCRETE ADJUSTMENT RINGS AND LEVELING MORTAR AS REQUIRED.
2.) THE ORIENTATION OF THE REINFORCED CONCRETE COLLAR SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD.
3.) ALL ITEMS SHOWN ABOVE ARE SUBSIDIARY TO THE BID ITEM "MANHOLE ADJUSTMENT".

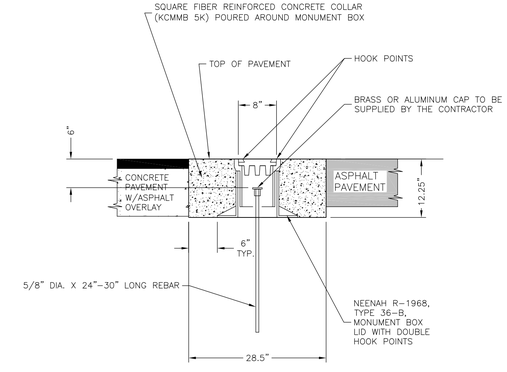
STANDARD MANHOLE ADJUSTMENT DETAILS



ASPHALTIC CONCRETE EDGE PATCH DETAIL ADJACENT TO PROPOSED CONCRETE CURB AND GUTTER OR PAVEMENT

GENERAL NOTES

1.) ADJUST MONUMENT BOX TO FINISH GRADE AND SLOPE WITH CONCRETE ADJUSTMENT RINGS AND LEVELING MORTAR AS REQUIRED.
2.) THE ORIENTATION OF THE REINFORCED CONCRETE COLLAR SHALL BE DETERMINED BY THE CITY SURVEYOR IN THE FIELD.
3.) ALL ITEMS SHOWN ABOVE ARE SUBSIDIARY TO THE BID ITEM "MONUMENT BOX INSTALL/ADJUSTMENT".
4.) JOINT SEALANT SUBSIDIARY TO OTHER BID ITEMS.
5.) TACK COAT SUBSIDIARY TO OTHER BID ITEMS.
6.) ASPHALTIC CONCRETE EDGE PATCH SUBSIDIARY TO OTHER BID ITEMS.



TYPE 1 MONUMENT BOX DETAIL

GENERAL NOTES

1.) ADJUST MONUMENT BOX TO FINISH GRADE AND SLOPE WITH CONCRETE ADJUSTMENT RINGS AND LEVELING MORTAR AS REQUIRED.
2.) THE ORIENTATION OF THE REINFORCED CONCRETE COLLAR SHALL BE DETERMINED BY THE CITY SURVEYOR IN THE FIELD.
3.) ALL ITEMS SHOWN ABOVE ARE SUBSIDIARY TO THE BID ITEM "MONUMENT BOX INSTALL/ADJUSTMENT".
4.) OPTION TO INSTALL BY CORING METHOD AS APPROVED BY THE ENGINEER.

2021 EDITION

SHEET 43 OF 49

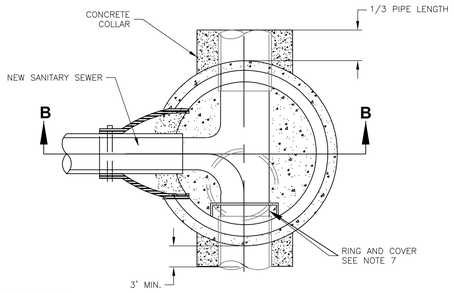
DATE	BY	REVISION
03-01-21	LJM	REPLACES ALL PREVIOUS VERSIONS OF STREET REPAIR DETAILS
03-01-20	LJM	REPLACES ALL PREVIOUS VERSIONS OF STREET REPAIR DETAILS

City of Lawrence
MUNICIPAL SERVICES & OPERATIONS

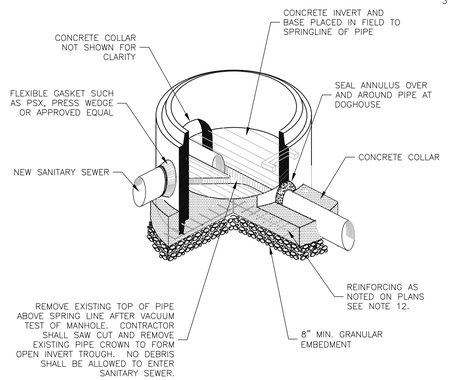
STANDARD DETAILS FOR
STREET REPAIR

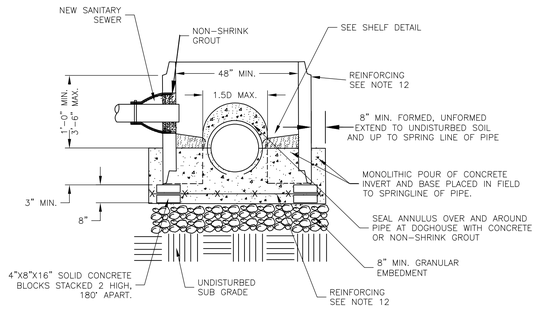
DAVID P. CRONIN
CITY ENGINEER

CRAIG S. OWENS
CITY MANAGER



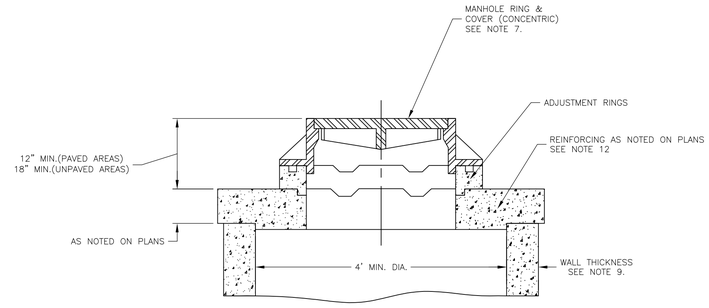
PLAN VIEW



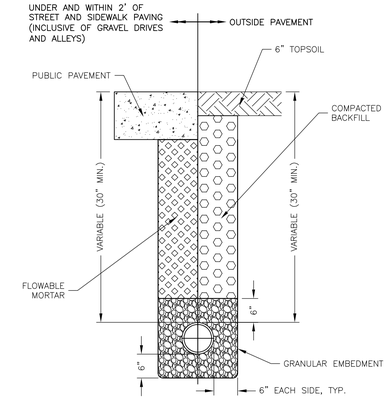


SECTION B-B

STANDARD DOGHOUSE MANHOLE
N.T.S.



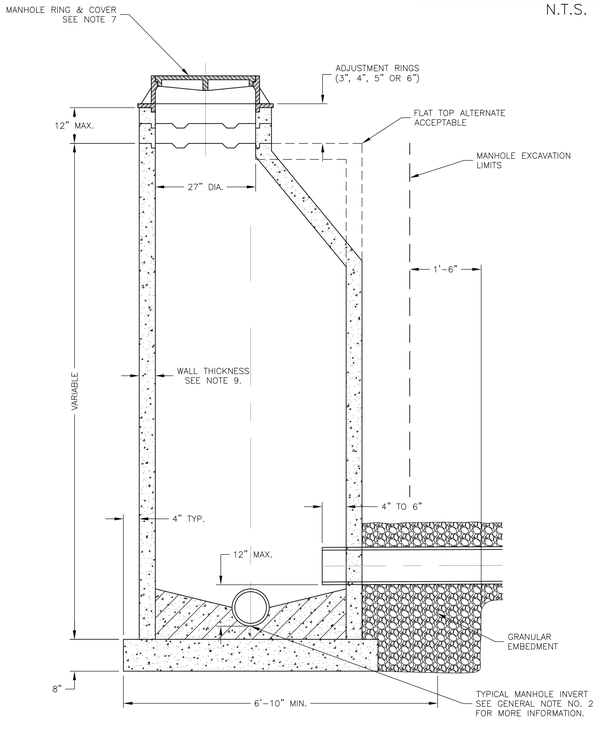
STANDARD PRECAST MANHOLE (SHALLOW TYPE)
N.T.S.



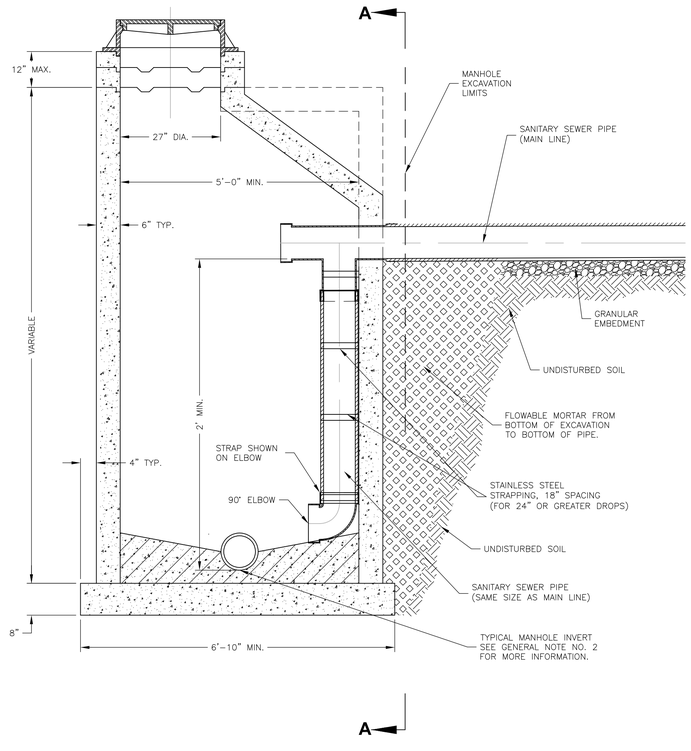
NOTES

1. FLOWABLE MORTAR MATERIALS AND PLACEMENT LIMITS SHALL CONFORM TO SECTION 1102E AND 1107B OF THE CITY OF LAWRENCE CONSTRUCTION AND MATERIAL SPECIFICATIONS SECTION 1100-GRADING RESPECTIVELY.
2. COMPACTED BACKFILL SHALL CONFORM TO SECTION 1107B AND 1108 OF THE CITY OF LAWRENCE CONSTRUCTION AND MATERIAL SPECIFICATIONS SECTION 1100-GRADING.
3. DETAIL SHOWN SHALL GOVERN IN NEW CONSTRUCTION. THE CITY OF LAWRENCE STANDARD DETAILS FOR STREET REPAIR-PAVEMENT REMOVAL AND REPLACEMENT DETAILS FOR TRENCHING WITHIN EXISTING ROADWAYS SHALL GOVERN WITHIN EXISTING PAVEMENT.

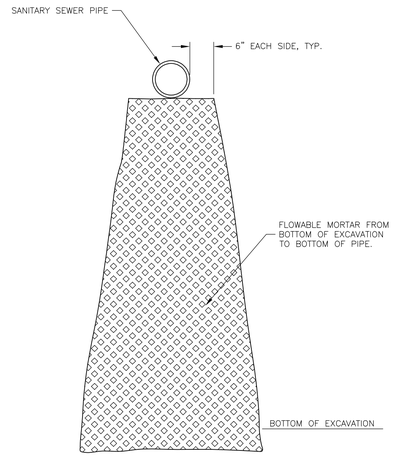
SANITARY SEWER TRENCH DETAILS
N.T.S.



STANDARD PRECAST MANHOLE (ECCENTRIC CONE)
N.T.S.



STANDARD DROP MANHOLE SECTION (FOR 8" OR 10" MAINS ONLY)
N.T.S.



SECTION A-A

NOTES

1. PRECAST MANHOLES SHALL CONFORM TO ASTM C-478 AND THE KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT MINIMUM STANDARDS OF DESIGN.
2. PIPE(S) SHALL BE TEMPORARILY PLUGGED PRIOR TO FORMING INVERTS. INVERTS SHALL BE FORMED WITH KCMMB 4K CONCRETE OR GROUT PER SPECIFICATIONS.
3. STANDARD DEPTH MANHOLE IS 6'-0". LESSER DEPTH TO BE PAID FOR AS STANDARD 6'-0" MANHOLE.
4. GRANULAR EMBEDMENT SHALL BE PLACED FROM THE OUTSIDE FACE OF THE MANHOLE TO A DISTANCE OF 18" BEYOND THE LIMITS OF EXCAVATION FOR THE MANHOLE, AS SHOWN.
5. COMPRESSION TYPE PIPE TO MANHOLE CONNECTIONS SHALL BE A-LOK, MANHOLE PIPE CONNECTORS, OR APPROVED EQUAL.
6. D.I.P., V.C.P., OR TRUSS PIPE TO PIPE CONNECTIONS SHALL BE FERNCO RUBBER GASKET COUPLING OR APPROVED EQUAL.
7. MANHOLE RINGS AND LIDS SHALL BE DEETER FOUNDRY MODEL 1048, OR APPROVED EQUAL, WITH CASING INSIDE DIAMETER OF TWENTY-FOUR (24) INCHES, LID OUTSIDE DIAMETER OF TWENTY-FIVE AND ONE-QUARTER (25.25) INCHES, AND LID SEATING THICKNESS OF ONE AND ONE-HALF (1.5) INCHES PLUS/MINUS ONE-EIGHTH (0.125) OF AN INCH.
8. BEFORE FINAL ACCEPTANCE OF THE PROJECT, A 2"X4" PIECE OF LUMBER, 6'-0" TO 8'-0" TALL, OR A STEEL FENCE POST, 5'-0" TO 6'-0" TALL, SHALL BE PLACED ADJACENT TO EACH MANHOLE, IN ORDER TO LOCATE THESE STRUCTURES FOR CONTRACTORS DURING FUTURE DEVELOPMENT.
9. THE WALL THICKNESS FOR MANHOLES UNDER 16'-0" DEEP SHALL BE 1/12 OF THE INTERNAL SHELL DIAMETER, OR 4", WHICHEVER IS GREATER. THE WALL THICKNESS FOR MANHOLES 16'-0" DEEP OR GREATER SHALL BE 1/12 OF THE INTERNAL SHELL DIAMETER PLUS 1" OR 5", WHICHEVER IS GREATER.
10. IF THE SANITARY SEWER PIPE HAS A DEFLECTION IN IT, SUCH PIPE SHALL BE ROTATED SO THAT THE DEFLECTION IS ON IT'S SIDE.
11. ANY SANITARY SEWER PIPE FOUND TO HAVE MORE THAN A 5% DEFLECTION WILL BE REJECTED.
12. ALL REINFORCING SHALL BE AS NOTED ON PLANS AND/OR SHOP DRAWINGS AND SHALL CONFORM TO CITY OF LAWRENCE MUNICIPAL SERVICES AND OPERATIONS DEPARTMENT SPECIFICATIONS FOR SANITARY SEWER, SECTION 2510.3.7.
13. LIFT HOLES IN PRE-CAST STRUCTURES SHALL BE PATCHED WITH NON-SHRINK GROUT AFTER TESTING.

2021 EDITION

SHEET 44 OF 49

DATE	BY	REVISION
03-01-21	LJM	REPLACES ALL PREVIOUS VERSIONS OF SANITARY SEWER DETAILS
03-01-20	LJM	REPLACES ALL PREVIOUS VERSIONS OF SANITARY SEWER DETAILS

ANDREW PAUL ENSZ LICENSED 18805 KANSAS PROFESSIONAL ENGINEER

City of Lawrence
MUNICIPAL SERVICES & OPERATIONS

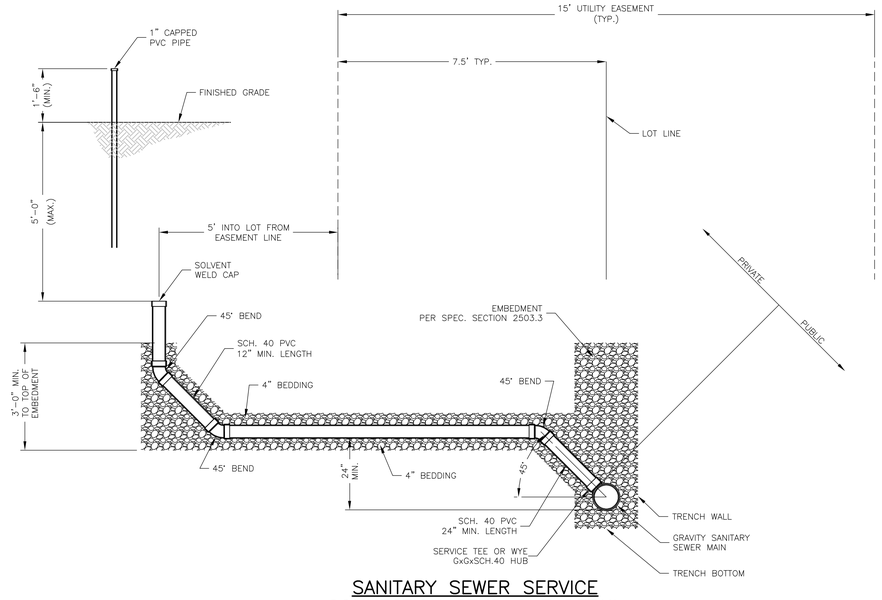
STANDARD DETAILS FOR
SANITARY SEWER-GRAVITY

1 OF 2

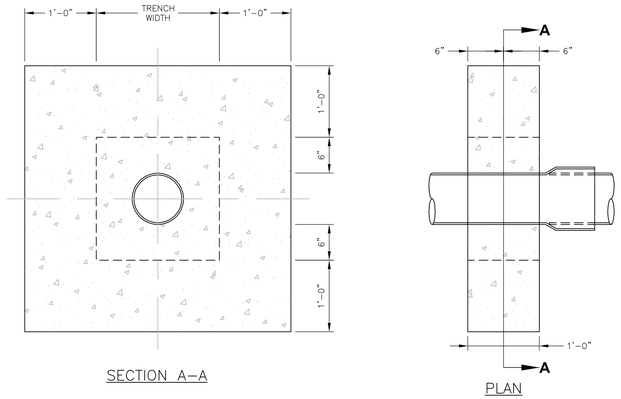
ANDREW P. ENSZ
PROGRAM MANAGER

CRAIG S. OWENS
CITY MANAGER

GENERAL NOTES:
1. SERVICE TEE OR WYE SHALL BE INSTALLED SO THAT SERVICE CONNECTION IS A MINIMUM OF 45° FROM HORIZONTAL.
2. SOLVENT WELDED CONNECTIONS ARE REQUIRED FOR THE ENTIRE SERVICE CONNECTION FROM THE TEE TO THE CAP.
3. MINIMUM GRADE FOR SERVICE LATERALS ARE 1.00% FOR SIX (6) INCH AND 2.00% FOR FOUR (4) INCH SERVICE LINES
4. LOCATION OF TEE OR WYE CONNECTION BY STATION AND HORIZONTAL LENGTH OF STUB OUT TO BE NOTED ON CONSTRUCTION DRAWINGS OF SANITARY SEWER MAIN CONSTRUCTION.



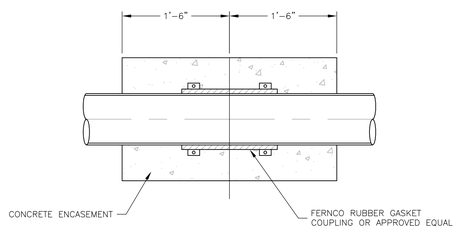
SANITARY SEWER SERVICE
CONNECTION STUB OUT DETAIL
N.T.S.



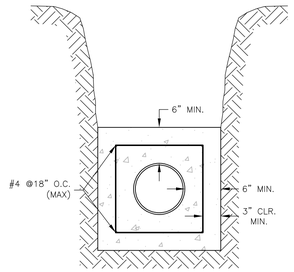
SECTION A–A

PLAN

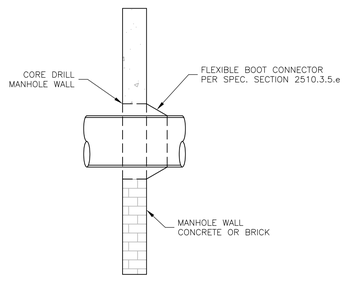
CONCRETE PIPE ANCHOR DETAIL
N.T.S.



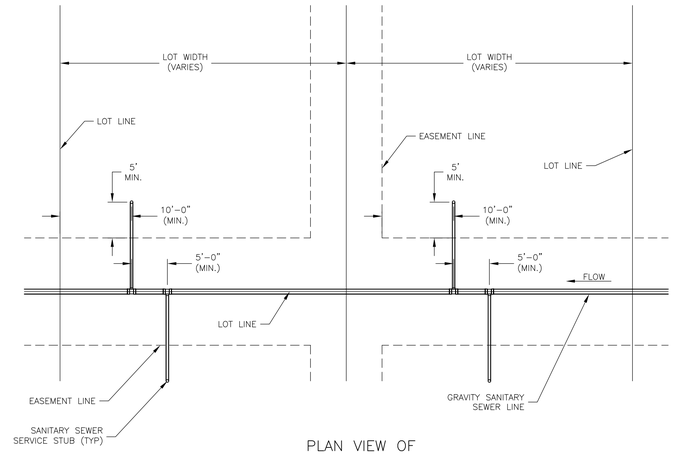
DIP, VCP OR TRUSS PIPE CONNECTION
(REPAIRS ONLY)
N.T.S.



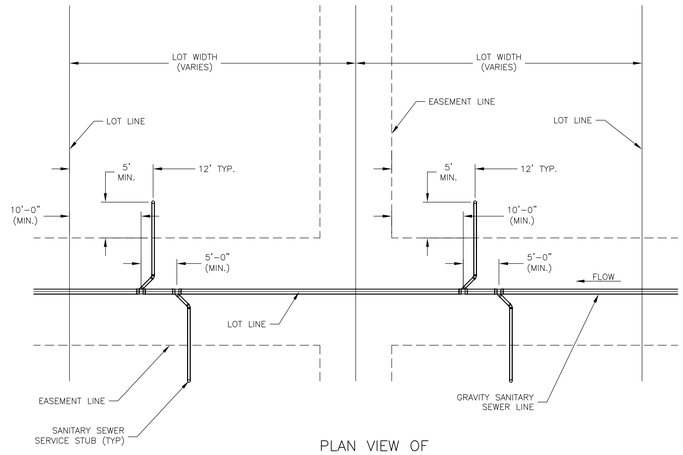
CONCRETE
ENCASEMENT DETAIL
N.T.S.



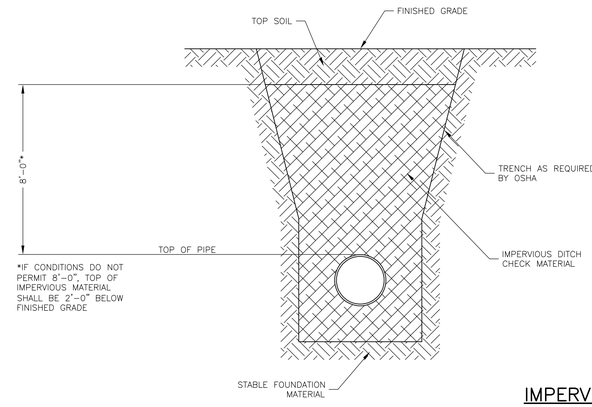
CONNECTION TO EXISTING MANHOLE
N.T.S.



PLAN VIEW OF
SANITARY SEWER SERVICE
TEE CONNECTION STUB OUT LOCATIONS
BACK LOT LINE EXAMPLE SHOWN

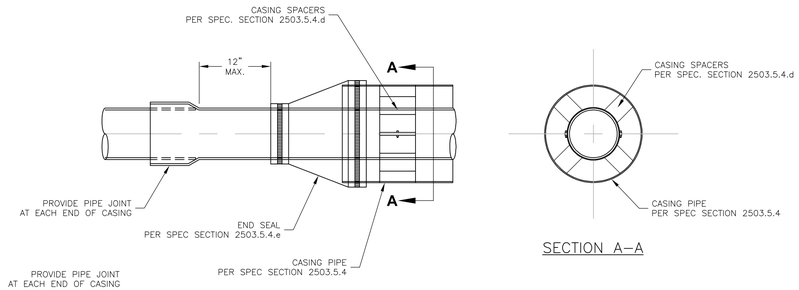


PLAN VIEW OF
SANITARY SEWER SERVICE
WYE CONNECTION STUB OUT LOCATIONS
BACK LOT LINE EXAMPLE SHOWN



IMPERVIOUS DITCH CHECK
N.T.S.

IMPERVIOUS DITCH CHECKS SHALL BE PLACED WHERE SHOWN ON THE PLANS. LENGTHS SHALL BE A MINIMUM OF 10 L.F. FLOWABLE FILL IS REQUIRED FOR PVC PIPE. FOR OTHER PIPE TYPES, CLAY MATERIAL OR FLOWABLE FILL MAY BE USED AT THE CONTRACTORS OPTION. FLOWABLE FILL MATERIAL TO COMPLY WITH CITY OF LAWRENCE CONSTRUCTION AND MATERIALS SPECIFICATION SECTION 1100, CURRENT EDITION. CLAY MATERIAL SHALL BE FREE OF CLODS, CLUMPS, DEBRIS, ORGANIC MATERIAL, AND STONES, COMPACTED SO AS TO OBTAIN 95% OF STANDARD PROCTOR MAXIMUM DENSITY AS DETERMINED BY ASTM D698.



SECTION A–A

CASING PIPE DETAIL
N.T.S.

GENERAL NOTE:
1. CATHODIC AND CORROSION PROTECTION SHALL BE PROVIDED FOR ALL CASING CONDUITS. ONE 32 LB SACRIFICIAL ANODE PACKAGE PER 100 FEET OF CASING PIPE SHALL BE PROVIDED AT EACH END OF THE CASING. SACRIFICIAL, MAGNESIUM ANODES SHALL BE ATTACHED TO THE CASING PIPE BY A #12 A.W.G. GROUNDING WIRE AT EACH END OF THE CASING.

ANDREW PAUL ENSZ LICENSED 18805 KANSAS PROFESSIONAL ENGINEER

2021 EDITION

SHEET 45 OF 49

DATE	BY	REVISION
03-01-21	LJM	REPLACES ALL PREVIOUS VERSIONS OF SANITARY SEWER DETAILS
03-01-20	LJM	REPLACES ALL PREVIOUS VERSIONS OF SANITARY SEWER DETAILS

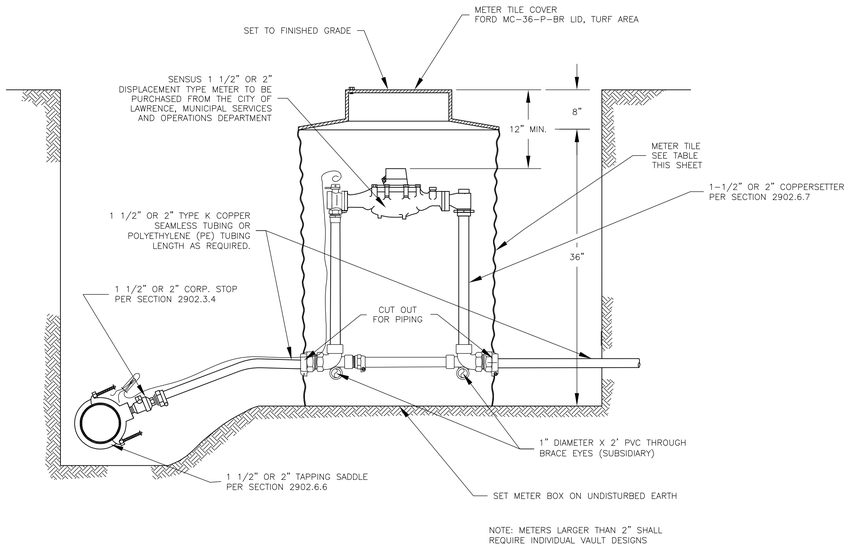
City of Lawrence
MUNICIPAL SERVICES & OPERATIONS

STANDARD DETAILS FOR
SANITARY SEWER–GRAVITY

2 OF 2

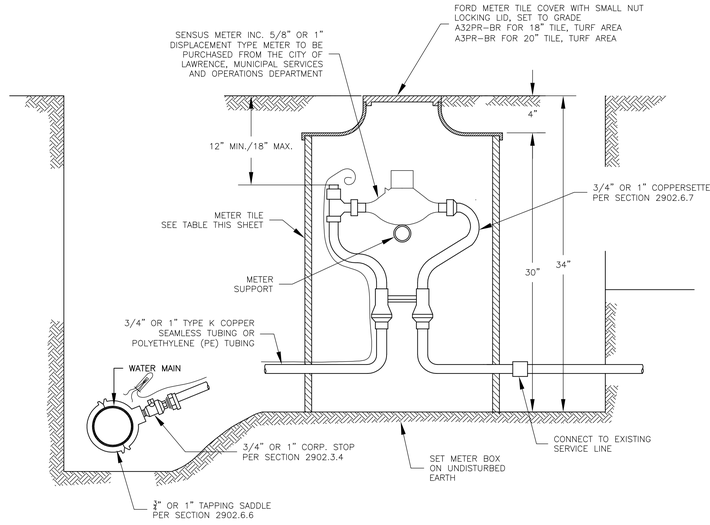
ANDREW P. ENSZ
PROGRAM MANAGER

CRAIG S. OWENS
CITY MANAGER



NOTE: METERS LARGER THAN 2" SHALL REQUIRE INDIVIDUAL VAULT DESIGNS

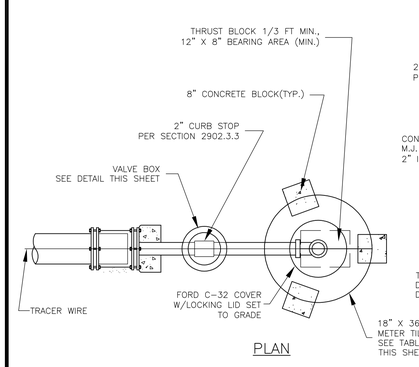
TYPICAL 1-1/2" OR 2" SERVICE CONNECTION
N.T.S.

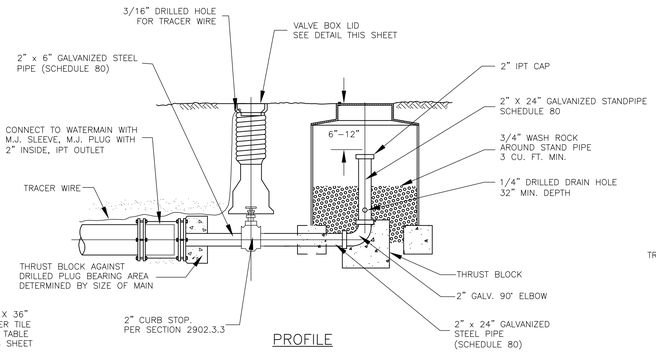


TYPICAL 3/4" AND 1" SERVICE CONNECTION
N.T.S.

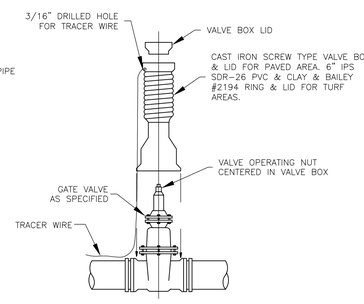
METER SIZE	SERVICE LINE SIZE*	METER SETTER	METER BOX SIZE/ ACCEPTABLE PRODUCTS	METER BOX COVER SIZE/ ACCEPTABLE PRODUCTS
5/8"	3/4"	FORD VB-81W-44-33-NL	18"X30"/ADS 1805AAH OR ADS 18050012H OR HANCOR MP-NL1-18-002 OR MPPL1-18-012 OR OLDCASTLE 00182009	18"/FORD A32PR-BR
1"	1"	FORD VB-84W-44-44-NL	20"/OLDCASTLE 00202013	20"/FORD A3PR-BR
1 1/2"	1 1/2"	FORD VBH76-18-44-66-NL	36"/OLDCASTLE 00362003 OR ADS OR HANCOR N-12 HDPE OR CONTECH A2000 PVC	36"/FORD MC-36-P-BR
2"	2"	FORD VBH77-18-44-77-NL		
3"	4"	METERS LARGER THAN 2" SHALL REQUIRE INDIVIDUAL VAULT DESIGNS. THE DESIGN ENGINEER SHALL SUBMIT PLANS FOR THE VAULT DESIGN TO THE ENGINEER FOR REVIEW AND APPROVAL ON A CASE-BY-CASE BASIS.		
4" +	MATCH METER DIAMETER			
*PUBLIC SERVICE LINE DIAMETER. CUSTOMER MAY INCREASE SERVICE LINE DIAMETER BEYOND THE SETTER.				

APPROVED WATER SERVICE MATERIALS

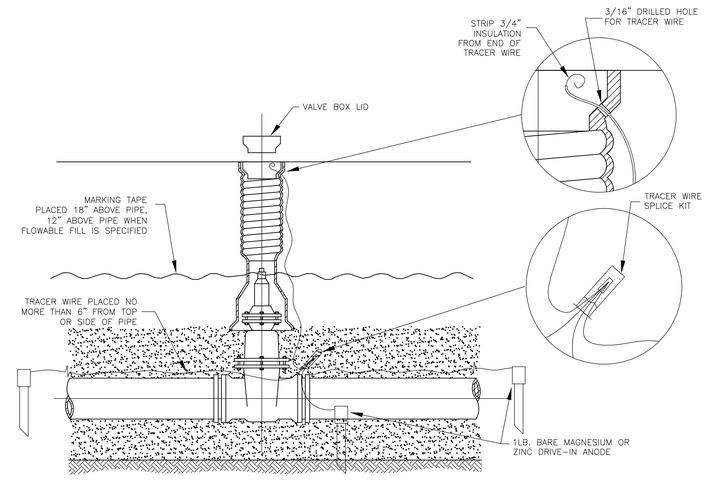




BLOWOFF DETAIL
N.T.S.



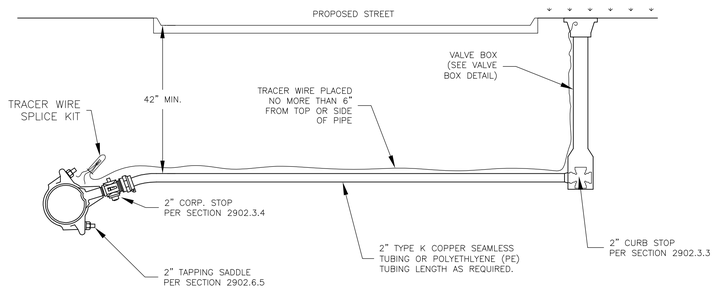
VALVE AND VALVE BOX DETAIL
N.T.S.



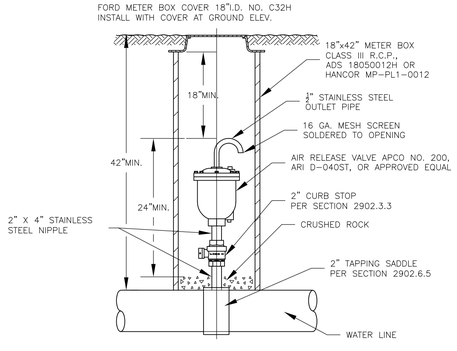
*NOTE:

1. ANODES SHALL BE A MINIMUM OF ONE POUND (1 LB.) BARE MAGNESIUM OR ZINC DRIVE-IN GROUNDING ANODE ROD AND SHALL BE DRIVEN INTO THE GROUND AT THE SAME ELEVATION AS THE WATERLINE. ANODES SHALL BE PLACED AT THE BEGINNING AND THE END OF THE WATERLINE, AT EVERY VALVE BOX OR TEST STATION, AT ALL DEAD ENDS, AT THE END OF SERVICE LINES , AND/OR AT LEAST EVERY FIVE HUNDRED FEET (500')
2. SPLICE CONNECTIONS SHALL BE COPPERHEAD INDUSTRIES LLC SNAKEBITE LOCKING WIRE CONNECTOR; COPPERHEAD INDUSTRIES SCB-01SR DIRECT BURY, COPPERHEAD INDUSTRIES LLC 3WB-01 DRYCONN THREE-WAY DIRECT BURY LUG CONNECTOR, OR 3M DBR/Y-6 DIRECT BURY.
3. TRACER WIRE SHALL BE 12AWG COPPER CLAD STEEL (CCS), MINIMUM BREAK LOAD OF 280 LBS. WITH BLUE 30MIL HDPE JACKET FOR OPEN TRENCH INSTALLATIONS OR 12AWG COPPER CLAD STEEL (CCS), MINIMUM BREAK LOAD OF 1,100 LBS. WITH BLUE 45 MIL HDPE JACKET FOR DIRECTIONAL DRILL INSTALLATION. TRACER WIRE SHALL BE PLACED NO FURTHER THAN 6" TO THE SIDE OR ABOVE THE WATERLINE. TRACER WIRE SHALL BE ACCESSIBLE AT VALVE BOX OR TEST STATIONS AT LEAST EVERY 500'.
4. MARKING TAPE SHALL BE INSTALLED 18" ABOVE PVC PIPE OR DUCTILE IRON PIPE. MARKER TAPE SHALL BE AT LEAST 3" IN WIDTH, BLUE IN COLOR WITH BLACK LETTERING STATING, "CAUTION BURIED WATERLINE BELOW."
5. TRACER WIRE SHALL BE REQUIRED ON ALL POLYETHYLENE (PE) TUBING SERVICE LINES. SPLICE SERVICE LINE TRACER WIRE TO TRACER WIRE AT THE EXISTING WATERMAIN WITH APPROVED CONNECTOR. IF NO TRACER WIRE IS IN PLACE ON THE EXISTING WATERMAIN, TIE SERVICE LINE TRACER WIRE TO 1LB MIN. ANODE AT EXISTING WATERMAIN.
6. ALL PUBLIC SERVICE LINES SHALL BE INSTALLED IN A MATTER THAT ALLOWS FOR LOCATION OF SAID INFRASTRUCTURE BY THE DEPARTMENT POST-CONSTRUCTION. MIXED MATERIALS (I.E. COPPER AND POLYETHYLENE) FROM THE WATER MAIN TO THE WATER METER SHALL NOT BE PERMITTED WITHOUT THE ADDITION OF A TRACER WIRE.

TRACER WIRE/MARKER TAPE DETAIL
N.T.S.



2" STREET SERVICE CROSSING
N.T.S.



AIR RELEASE VALVE DETAIL
N.T.S.

2021 EDITION

SHEET 46 OF 49

DATE	BY	REVISION
03-01-21	LJM	REPLACES ALL PREVIOUS VERSIONS OF WATERLINE DETAILS
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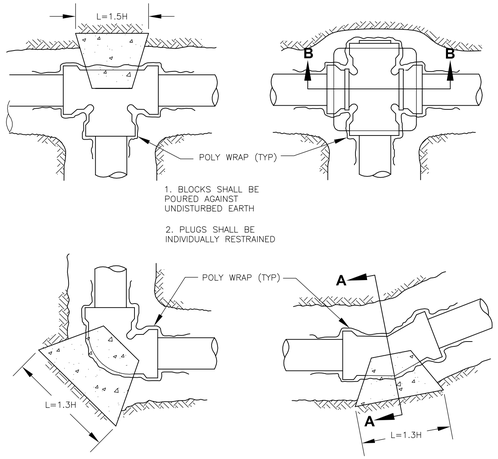
City of Lawrence
MUNICIPAL SERVICES & OPERATIONS

STANDARD DETAILS FOR
WATERLINE

1 OF 2

ANDREW P. ENSZ
PROGRAM MANAGER

CRAIG S. OWENS
CITY MANAGER



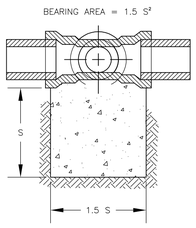
NOTES:
1. BLOCKS SHALL BE POURED AGAINST UNDISTURBED EARTH. PLUGS SHALL BE INDIVIDUALLY RESTRAINED. ALL CONCRETE USED FOR THRUST BLOCKS AND ENCASEMENT SHALL BE CLASS A CONCRETE.

2. PIPE AND FITTINGS WITHIN 2 FEET OF CONCRETE BLOCKING SHALL BE WRAPPED IN 8 MIL POLY WRAP WITH 18" MINIMUM OVERLAP AT SEAM. (TYPICAL ALL BLOCKING INSTALLATIONS EXCEPT BLOCKING FOR FIRE HYDRANT BASE)

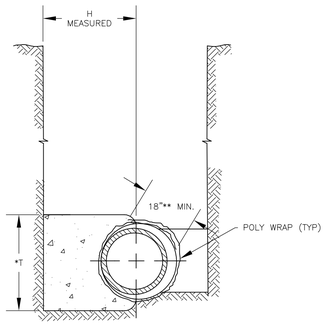
LINE SIZE	BEARING AREA IN SQUARE FEET				
	TEE or DEAD END	90° ELLS	45° ELLS	22 1/2 ° ELLS	11 1/4 ° ELLS
4"	2.7	3.8	2.1	1.1	0.5
6"	5.6	7.9	4.3	2.2	1.1
8"	9.6	13.6	7.4	3.8	1.9
10"	14.5	20.5	11.1	5.7	2.8
12"	20.5	29.0	15.7	8.0	4.0

BEARING AREA BASED ON THE FOLLOWING:
DESIGN PRESSURE: 150 psi
SOIL BEARING CAPACITY: 1500 PSF
SAFETY FACTOR: 1.5

THRUST BLOCK DETAILS
N.T.S.



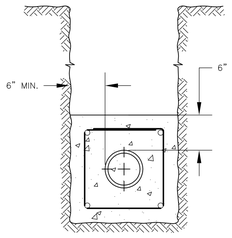
SECTION B–B



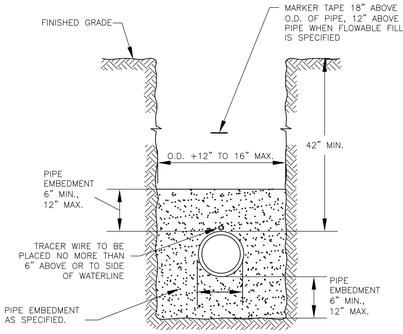
* AS REQUIRED TO OBTAIN THE MINIMUM BEARING AREA SHOWN IN THE TABLE. IN NO CASE SHALL THIS BE LESS THAN THE O.D. OF THE PIPE. BEARING AREA = L x T

** POLYWRAP OVERLAP AT SEAM

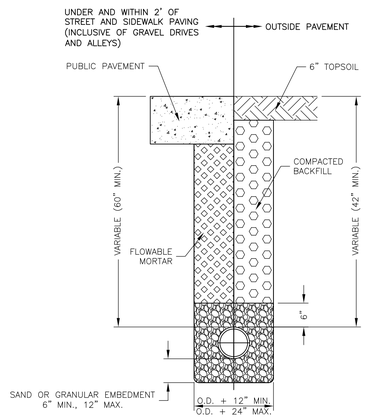
SECTION A–A



CONCRETE ENCASEMENT DETAIL
N.T.S.



TYPICAL TRENCH SECTION
N.T.S.



NOTES
1. FLOWABLE MORTAR MATERIALS AND PLACEMENT LIMITS SHALL CONFORM TO SECTIONS 1102E AND 1107B OF THE CITY OF LAWRENCE CONSTRUCTION AND MATERIAL SPECIFICATIONS SECTION 1100–GRADING RESPECTIVELY.
2. COMPACTED BACKFILL SHALL CONFORM TO SECTION 1107B AND 1108 OF THE CITY OF LAWRENCE CONSTRUCTION AND MATERIAL SPECIFICATIONS SECTION 1100–GRADING.
3. DETAIL SHOWN SHALL GOVERN IN NEW CONSTRUCTION. THE CITY OF LAWRENCE STANDARD DETAILS FOR STREET REPAIR–PAVEMENT REMOVAL AND REPLACEMENT DETAILS FOR TRENCHING WITHIN EXISTING ROADWAYS SHALL GOVERN WITHIN EXISTING PAVEMENT.

WATERLINE TRENCH DETAILS
N.T.S.

*IF CONDITIONS DO NOT PERMIT 8'–0", TOP OF IMPERVIOUS MATERIAL SHALL BE 2'–0" BELOW FINISHED GRADE

IMPERVIOUS DITCH CHECKS SHALL BE PLACED WHERE SHOWN ON THE PLANS. LENGTHS SHALL BE A MINIMUM OF 10 L.F. FLOWABLE FILL IS REQUIRED FOR PVC PIPE. FOR OTHER PIPE TYPES, CLAY MATERIAL OR FLOWABLE FILL MAY BE USED AT THE CONTRACTORS OPTION. FLOWABLE FILL MATERIAL TO COMPLY WITH CITY OF LAWRENCE CONSTRUCTION AND MATERIALS SPECIFICATION SECTION 1100, CURRENT EDITION. CLAY MATERIAL SHALL BE FREE OF CLODS, CLUMPS, DEBRIS, ORGANIC MATERIAL, AND STONES, COMPACTED SO AS TO OBTAIN 95% OF STANDARD PROCTOR MAXIMUM DENSITY AS DETERMINED BY ASTM D698.

IMPERVIOUS DITCH CHECK
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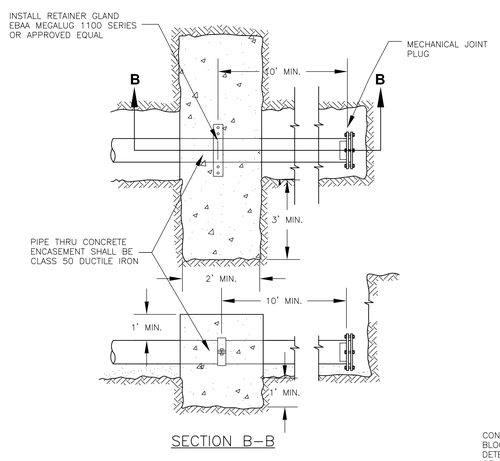
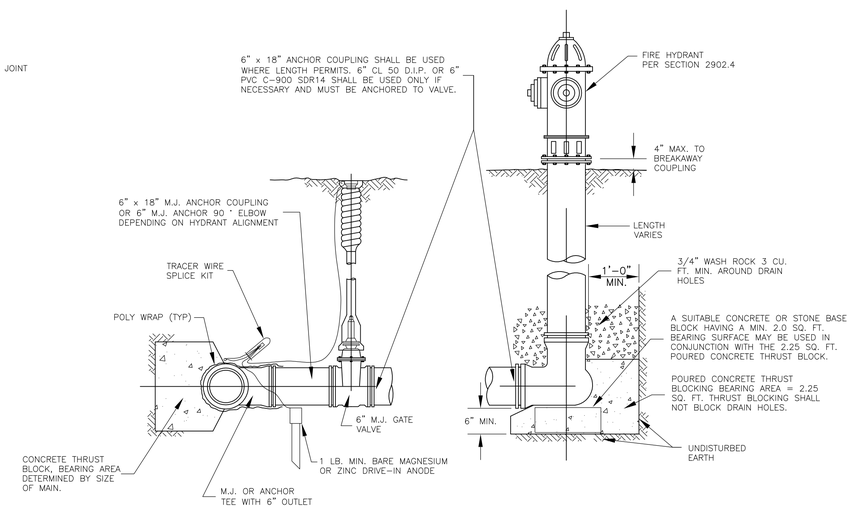
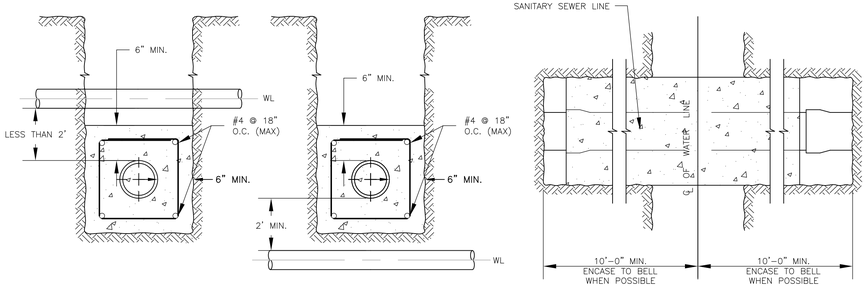


SECTION B–B

STRADDLE OR END BLOCKING
N.T.S.



FIRE HYDRANT ASSEMBLY DETAIL WITH TEST STATION
N.T.S.



WATERLINE ABOVE | WATERLINE BELOW | PLAN

CONCRETE ENCASEMENT OF SANITARY SEWER LINE CROSSING WATER LINE
N.T.S.

2021 EDITION

SHEET 47 OF 49

DATE	BY	REVISION
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City of Lawrence
MUNICIPAL SERVICES & OPERATIONS

STANDARD DETAILS FOR
WATERLINE

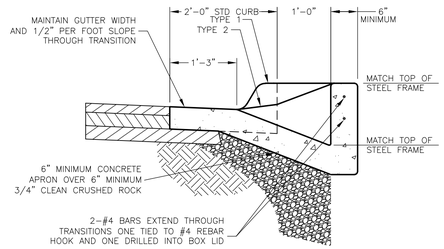
2 OF 2

ANDREW P. ENSZ
PROGRAM MANAGER

CRAIG S. OWENS
CITY MANAGER

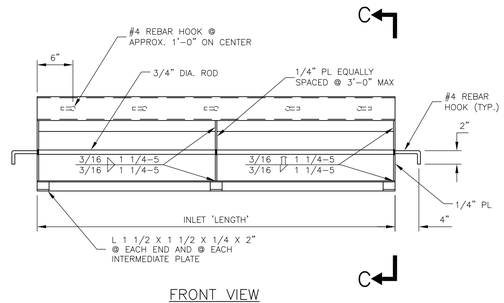
CURB INLET GENERAL NOTES

1. STANDARD DRAWINGS SHALL APPLY ONLY TO STRUCTURES WITHIN THE FOLLOWING LIMITS:
   A. INSIDE PLAN DIMENSIONS SHALL NOT EXCEED 40 SQUARE FEET.
   B. WALL HEIGHT SHALL NOT EXCEED 10 VERTICAL FEET..
2. THE MINIMUM WIDTH OF ALL STRUCTURES SHALL BE 4 FEET OR AS REQUIRED FOR PIPE CLEARANCE.
3. STEPS ARE REQUIRED IN ALL STRUCTURES WITH WALL HEIGHT GREATER THAN 4 FEET.
4. FRAMES, LIDS, CASTINGS, STEPS, INVERT, SUBSURFACE DRAINS, PIPE CONNECTIONS AND OTHER ITEMS SHOWN SHALL BE CONSIDERED SUBSIDIARY TO EACH STANDARD STRUCTURE.
5. SUBSURFACE DRAINS ARE REQUIRED IN ALL STRUCTURES IN THE PUBLIC RIGHT-OF-WAY WITH WALL HEIGHT GREATER THAN 3 FEET. ONE DRAIN PER WALL SHALL BE INSTALLED ONLY IN WALLS WHICH ARE PERPENDICULAR TO THE STREET CENTERLINE.
6. CURB INLETS WITH INSIDE PLAN DIMENSIONS EXCEEDING 25 SQUARE FEET SHALL HAVE TYPE II RING AND COVER. CURB INLETS IN PAVED AREAS SHALL HAVE TYPE II RING AND COVER.
7. WHERE SIDEWALKS ADJOIN STORM SEWER STRUCTURES, #4 DOWELS SHALL BE PLACED 18" ON CENTER. DOWELS SHALL BE 18" LONG WITH 6" IN THE STRUCTURE TOP, THROUGH ISOLATION JOINT.
8. CURB INLET DIMENSIONS SHALL BE STATED AS 'LENGTH' x 'WIDTH' ON ALL CONSTRUCTION NOTES.
9. THE MINIMUM LENGTH OF CURB INLET OPENING SHALL BE 5 FEET.
10. CURB INLET FRAME TOP CHANNEL SHALL BE FABRICATED FROM 0.15 MAX. CARBON, FORMING QUALITY, OR A36 HOT ROLLED STEEL PLATE.
11. ALL FLAT PLATE AND RODS SHALL BE M1020 MERCHANT QUALITY OR A36 HOT ROLLED STEEL.
12. ALL CURB INLET FRAME MATERIALS SHALL BE FREE FROM RUST AND MILL SCALE.
13. ALL WELDING SHALL CONFORM TO THE PROVISIONS OF THE AWS "STRUCTURAL WELDING CODE."
14. CURB INLET FRAMES SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION PER ASTM A123.
15. CURB INLET FRAMES SHALL BE SLOPED TO MATCH THE STREET CENTERLINE GRADE.
16. STAMPING TOOLS SHALL BE APPROVED PRIOR TO USE. A FULL SIZE FABRICATION PATTERN MAY BE OBTAINED FROM THE MUNICIPAL SERVICES AND OPERATIONS DEPARTMENT. FOR CAST-IN-PLACE INLETS, A STAMPING TOOL MAY BE BORROWED FROM THE DEPARTMENT PER AN APPROVED SCHEDULE.
17. ALL DIMENSIONS AND SIDE SLOPES SHOWN WITHIN THE "TYPICAL TRENCH SECTION DETAILS" ARE TYPICAL. ANY DEVIATION FROM THESE DIMENSIONS MUST BE APPROVED BY THE PROJECT ENGINEER PRIOR TO BEGINNING THE TRENCHING WORK, OR AS SOON AS PRACTICABLE.
18. FLOWABLE FILL QUANTITY IS CALCULATED BASED ON A TYPICAL TRENCH SIDE SLOPE OF 1:1. A SIDE SLOPE FLATTER THAN 1:1 (IF REQUIRED TO ENSURE STABILITY AND SAFETY OF THE TRENCHES) MUST BE APPROVED BY THE PROJECT ENGINEER IN THE FIELD PRIOR TO BEGINNING EXCAVATION FOR TRENCHES, OR AS SOON AS PRACTICABLE. THE INTENT IS TO KEEP THE FLOWABLE FILL QUANTITY TO A MINIMUM.
19. FLOWABLE FILL SHALL BE PLACED TO BOTTOM OF THE PAVEMENT, STABILIZED BASE, OR GRANULAR BASE AS DIRECTED BY ENGINEER.
20. CONCRETE FOR INVERT AND COLLARS SHALL MEET CITY SPECIFICATIONS SECTION 2000 – CONCRETE
21. LIFT HOLES IN PRE-CAST STRUCTURES SHALL BE PATCHED WITH NON-SHRINK GROUT.

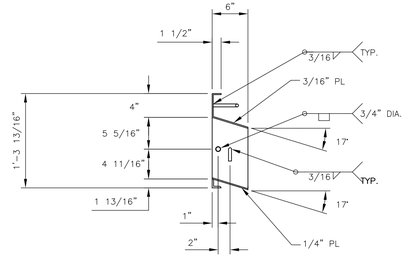


SECTION A–A

CURB TRANSITION

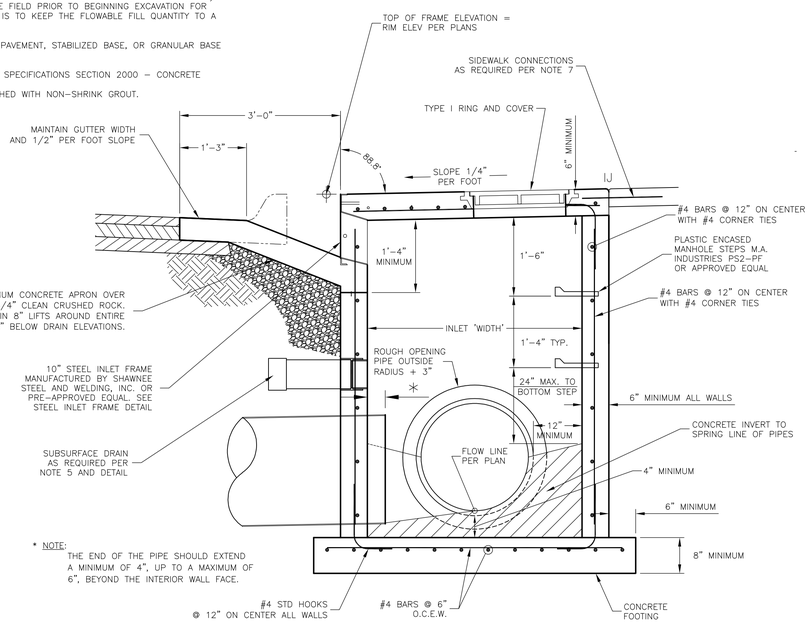


FRONT VIEW

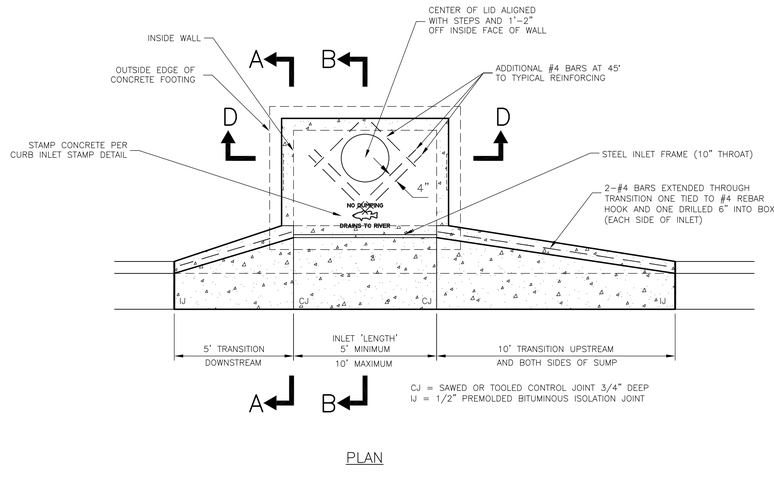


SECTION C–C

STEEL INLET FRAME

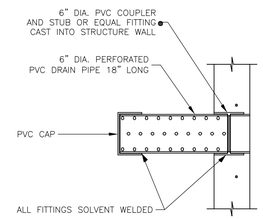


SECTION B–B



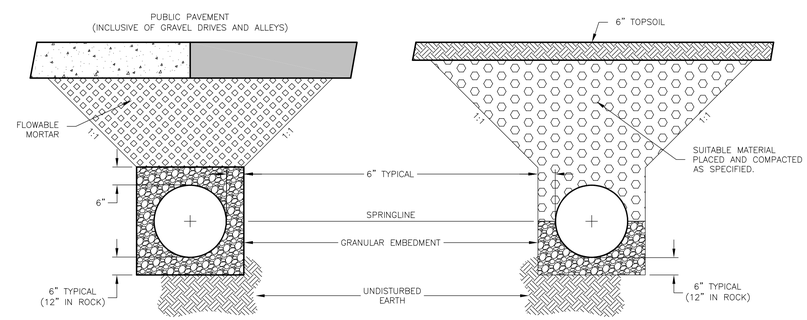
PLAN

STANDARD CURB INLET



SECTION

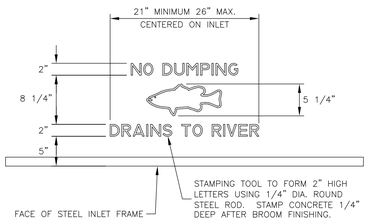
SUBSURFACE DRAIN



UNDER AND WITHIN 2' OF STREET AND SIDEWALK PAVING

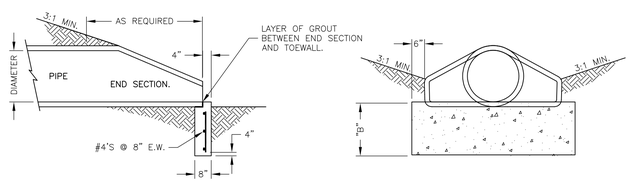
OUTSIDE PAVEMENT

TYPICAL TRENCH SECTIONS



PLAN

CURB INLET STAMP



SIDE VIEW

FRONT VIEW

STANDARD END SECTION

2021 EDITION SHEET 48 OF 49

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City of Lawrence
MUNICIPAL SERVICES & OPERATIONS

STANDARD DETAILS FOR
STORM SEWER CURB INLETS

DAVID P. CRONIN
CITY ENGINEER

CRAIG S. OWENS
CITY MANAGER