PARK MEADOWS - MIXED USE DEVELOPMENT

SITUATED IN THE NORTH HALF OF SECTION 3, TOWNSHIP 6 SOUTH, RANGE 67
WEST OF THE 6TH P.M.
CITY OF LONE TREE, COUNTY OF DOUGLAS, STATE OF COLORADO

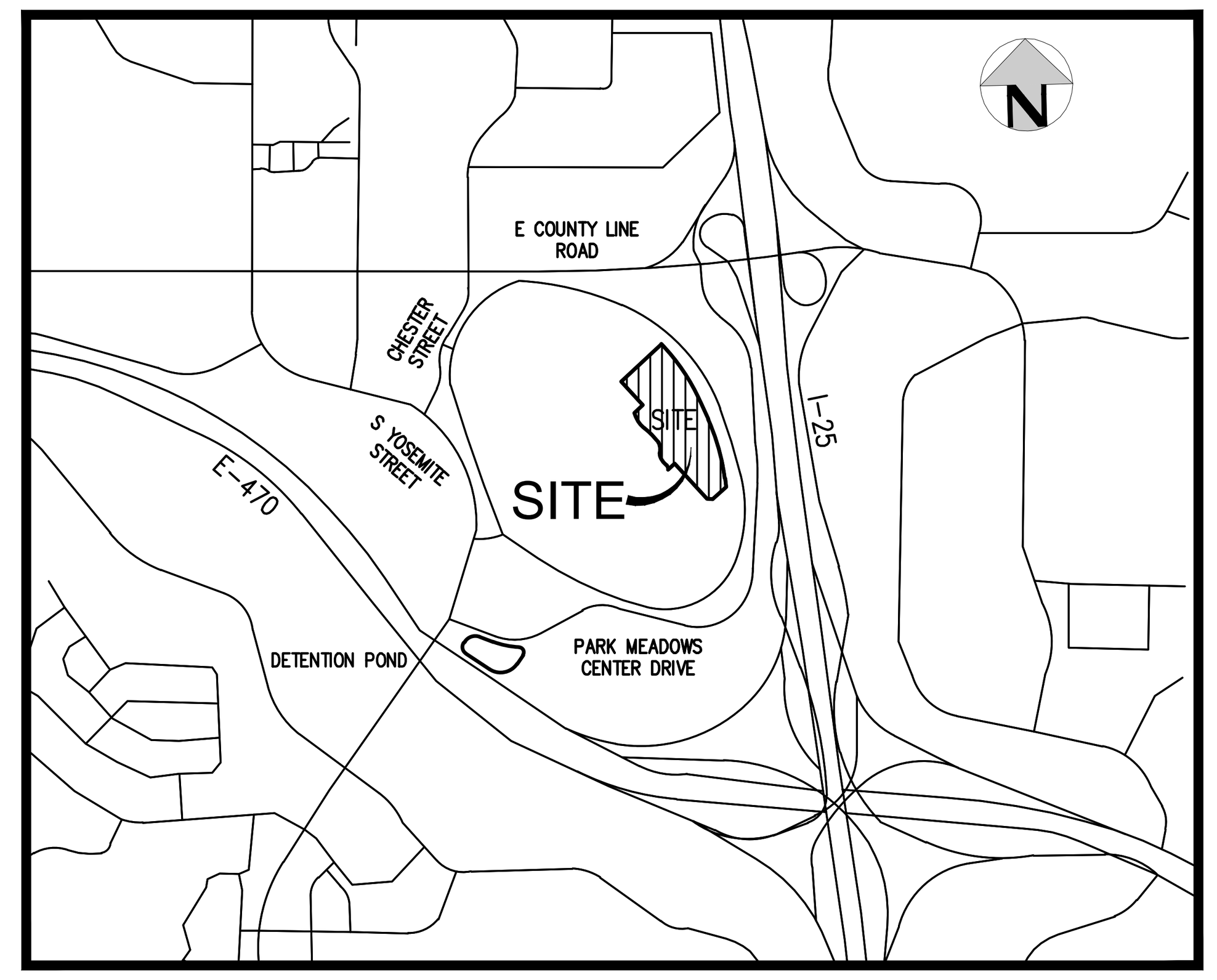
STORM SEWER PLANS

PROJECT ADDRESS:

8405 PARK MEADOWS DRIVE
LONE TREE, CO 80124

GENERAL NOTES:

1. ALL WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH THESE PLANS AND SPECIFICATIONS, STANDARDS, COLORADO DEPARTMENT OF TRANSPORTATION (CDOT) STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, AND CDOT M & S STANDARDS, LATEST EDITIONS.
2. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL REQUIRED PERMITS FROM CITY OF LONE TREE, SOUTHGATE WATER AND SANITATION DISTRICT, CDOT, OR OTHER APPLICABLE AGENCIES.
3. EXISTING UTILITIES SHOWN ON THE PLANS ARE LOCATED FROM THE BEST AVAILABLE INFORMATION. THE CONTRACTOR SHALL CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO A MINIMUM OF TWO BUSINESS DAYS PRIOR TO CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE TO REPAIR (AT NO EXPENSE TO THE OWNER) DAMAGE TO ANY AND ALL UTILITIES.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF THE GENERAL PUBLIC DURING THE PROJECT DURATION.
5. THE CONTRACTOR SHALL PROTECT ALL EXISTING TREES, UNLESS OTHERWISE INDICATED. ALL TREE REMOVAL SHALL BE APPROVED BY THE OWNER, ARBORIST, OR ENGINEER PRIOR TO DEMOLITION.
6. ROCK MULCH, IF PLACED UPSTREAM OF CONCRETE FLATWORK OR GRASSED AREA, SHALL BE PLACED ON TOP OF FINISHED GRADE SHOWN ON THESE PLANS OR OTHERWISE DESIGNED AND CONSTRUCTED TO ADEQUATELY DRAIN AND NOT HOLD WATER. ALL LANDSCAPE EDGE MATERIALS SHALL NOT PREVENT DRAINAGE TO PASS THROUGH.
7. SITE GRADING SHALL BE PERFORMED IN ACCORDANCE WITH THESE PLANS AND SPECIFICATIONS, AND THE RECOMMENDATIONS SET FORTH IN THE GEOTECHNICAL ENGINEERING REPORT.
8. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT HANDRAILS, STAIRS, CURB RAMPS, AND RAMPS ARE INSTALLED IN CONFORMANCE WITH ALL APPLICABLE LOCAL STATE AND/OR FEDERAL REGULATIONS AND STANDARDS, INCLUDING BUT NOT LIMITED TO, THE AMERICANS WITH DISABILITIES ACT (ADA), THE FAIR HOUSING ACT (FHA) AND THE AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI).
9. CROSS SLOPES ALONG THE ACCESSIBLE ROUTE OR AT LANDINGS SHALL NOT EXCEED 2% IN ANY DIRECTION.
10. LONGITUDINAL SLOPES ALONG THE ACCESSIBLE ROUTE SHALL NOT EXCEED 5%, OR 8.33% ON RAMPS. RAMPS, EXCEPT CURB RAMPS, SHALL HAVE HANDRAILS ON BOTH SIDES.
11. GUTTER SLOPES AT THE CURB RAMPS SHALL NOT EXCEED FIVE PERCENT.
12. ALL GRADES ARE FINISHED GRADE UNLESS OTHERWISE NOTED.
13. ALL GRADES ADJACENT TO THE BUILDINGS SHALL BE AT MINIMUM 8" BELOW FINISHED FLOOR ELEVATION UNLESS OTHERWISE NOTED.
14. NON-PAVED GRADES ADJACENT TO BUILDINGS SHALL SLOPE AWAY FROM ALL BUILDINGS AT A MINIMUM OF 10% FOR 10'. ALL PAVED GRADES ATTACHED TO BUILDINGS SHALL SLOPE AWAY FROM ALL BUILDINGS AT A MINIMUM OF 1% UNLESS OTHERWISE NOTED.
15. ALL GRADES FOR WALLS ARE FINISHED GRADE ELEVATIONS AT BOTTOM OF FRONT FACE (BW) AND TOP BACK OF WALL (TW). THE WALL ELEVATIONS DO NOT INDICATE FOUNDATION DEPTHS OR ELEVATIONS. RETAINING WALL DETAILS SHALL BE PROVIDED BY OTHERS.
16. REFER TO STRUCTURAL PLANS FOR BUILDING FOUNDATION STEP LOCATIONS WHEN APPLICABLE.
17. PORTIONS OF STAIRS THAT DO NOT MEET THE MINIMUM 4" RISER HEIGHT (DUE TO AN ADJACENT SLOPING PUBLIC WAY) SHALL HAVE A DISTINCTIVE MARKING STRIPE, 1"-2" IN WIDTH, WITH A SLIP-RESISTANT SURFACE, IN ACCORDANCE WITH CURRENT INTERNATIONAL BUILDING CODE REGULATIONS.
18. TOP STEP ELEVATIONS FOR STOOPS AND PATIOS ARE SHOWN FOR REFERENCE ONLY. TOP OF STEPS AND PATIO ELEVATIONS TO BE COORDINATED WITH ARCHITECTURAL PLANS/DETAILS AND AS-BUILT STOOP/PATIO ELEVATIONS.
19. ELECTRICAL TRANSFORMER PADS ARE TO BE SET A MINIMUM OF 2" ABOVE THE ADJACENT FINISHED GRADE AROUND THE PERIMETER OF THE PAD. CONTRACTOR SHALL PROVIDE A CONCRETE TURNDOWN AS NECESSARY. CONTRACTOR TO VERIFY POSITIVE DRAINAGE AWAY FROM, AND AROUND, ALL ELECTRICAL PADS.
20. CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT ALL EXISTING MANHOLES, INLETS, AND FIRE HYDRANTS THAT ARE TO REMAIN ARE ADJUSTED TO MATCH THE PROPOSED GRADE.



VICINITY MAP
SCALE: 1"=1000'

SHEET INDEX

ABBREVIATIONS

BOP	BOTTOM OF PIPE
BS	BOTTOM OF STEP
BW	BOTTOM OF WALL (FG)
CONC	CONCRETE
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
DR	DOOR
DS	DOWNSPOUT
E	EAST, EASTING
EGL	ENERGY GRADE LINE
EL	ELEVATION
EOA	EDGE OF ASPHALT
EOC	EDGE OF CONCRETE
EOP	EDGE OF PAVEMENT
ESMT	EASEMENT
EX	EXISTING
FES	FLARED END SECTION
FF	FINISHED FLOOR
FG	FINISHED GRADE
FH	FIRE HYDRANT
FL	FLOW LINE
GB	GRADE BREAK
GV	GATE VALVE
HC	HANDICAP
HGL	HYDRAULIC GRADE LINE
HORZ	HORIZONTAL
HP	HIGH POINT
INV	INVERT
LP	LOW POINT
LSD	LANDSCAPE DRAIN
MAX	MAXIMUM
MH	MANHOLE
MIN	MINIMUM
MJ	MECHANICAL JOINT
N	NORTH, NORTHING
PR	PROPOSED
PVC	POLYVINYL CHLORIDE
RCP	REINFORCED CONCRETE PIPE
ROW	RIGHT OF WAY
SAN	SANITARY
SS	SANITARY SEWER
STA	STATION
STM	STORM
TB	THRUST BLOCK
TBC	TOP/BACK OF CURB
TOP	TOP OF PIPE
TS	TOP OF STEP
TW	TOP OF WALL (FG)
TYP	TYPICAL
VERT	VERTICAL
WAT	WATER

CITY OF LONE TREE ACCEPTANCE BLOCK

THESE DRAWINGS HAVE BEEN REVIEWED BY THE CITY OF LONE TREE FOR TEMPORARY EROSION AND SEDIMENT CONTROL IMPROVEMENTS ONLY.

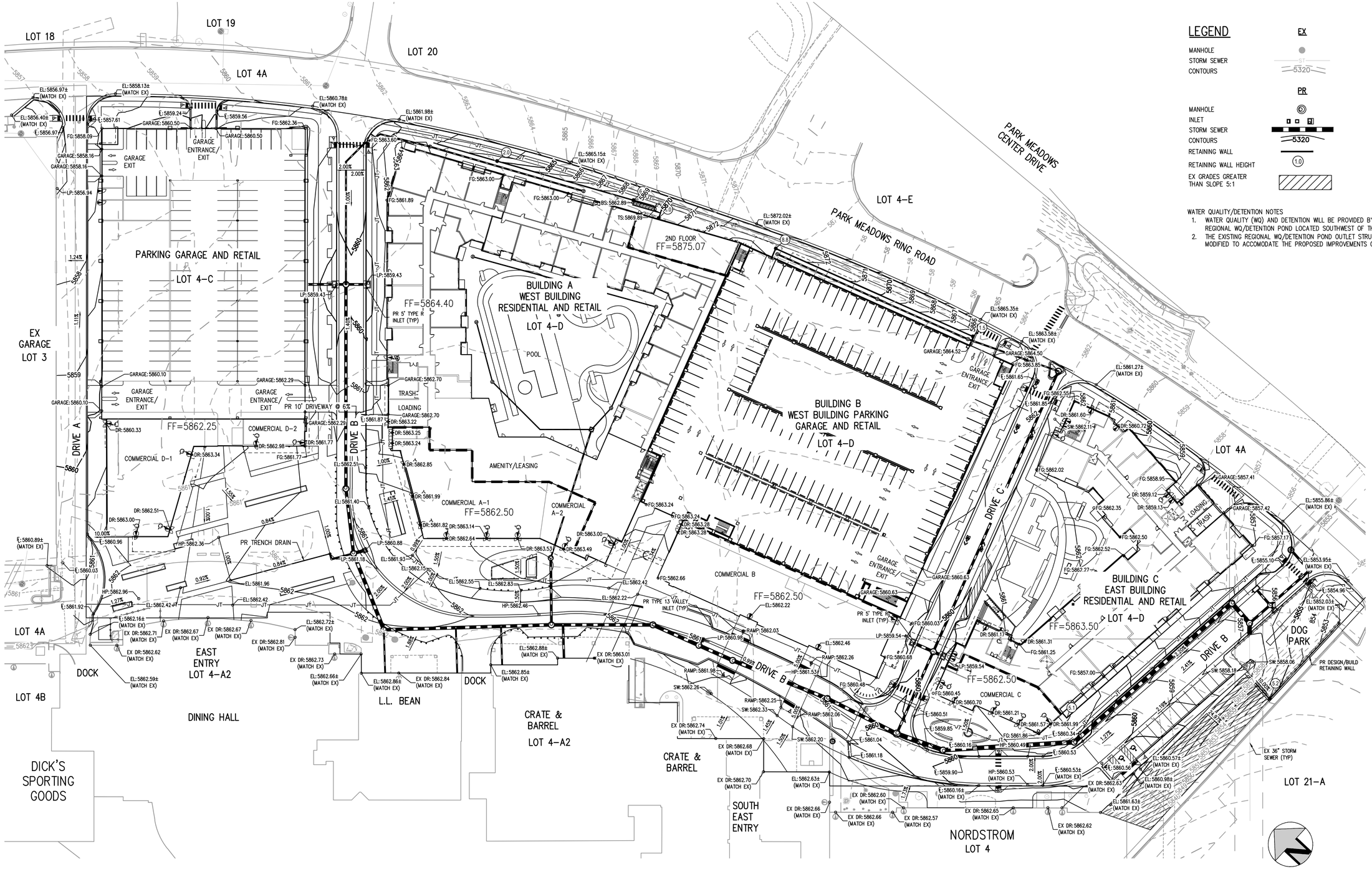
DEVELOPMENT SERVICES DEPARTMENT DATE

811 Know what's below. Call before you dig.

HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
Denver, Colorado 80203
P: 303.623.6300 F: 303.623.6311
HarrisKocherSmith.com

ISSUE DATE: 11-11-2022	PROJECT #: 220407
DATE	REVISION COMMENTS
01-27-2023	PER CITY COMMENTS
03-17-2023	ISSUED FOR CONSTRUCTION

COLORADO LICENSED
MARK A. WEST
38561
03/20/2023
PROFESSIONAL ENGINEER



LEGEND

	EX	PR
MANHOLE	●	◎
INLET		
STORM SEWER	ST	
CONTOURS	5320	5320
RETAINING WALL		
RETAINING WALL HEIGHT		(1.0)
EX GRADES GREATER THAN SLOPE 5:1		

WATER QUALITY/DETENTION NOTES

1. WATER QUALITY (WQ) AND DETENTION WILL BE PROVIDED BY THE EXISTING REGIONAL WQ/DETENTION POND LOCATED SOUTHWEST OF THE SITE.
2. THE EXISTING REGIONAL WQ/DETENTION POND OUTLET STRUCTURE WILL BE MODIFIED TO ACCOMODATE THE PROPOSED IMPROVEMENTS OUTLINED HEREIN.

Know what's below. Call before you dig.

SCALE: 1" = 40'

DESIGNED BY: LME
CHECKED BY: JDO
DRAWN BY: LME

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PARK MEADOWS MALL, LLC /
PARK MEADOWS ANCHOR ACQUISITION, LLC

PARK MEADOWS - MIXED USE DEVELOPMENT
OVERALL GRADING PLAN

COLORADO LICENSED
MARK A. WEST
38561
03/20/2023
PROFESSIONAL ENGINEER

PROJECT #: 220407
SHEET NUMBER
ST2
2 OF 15

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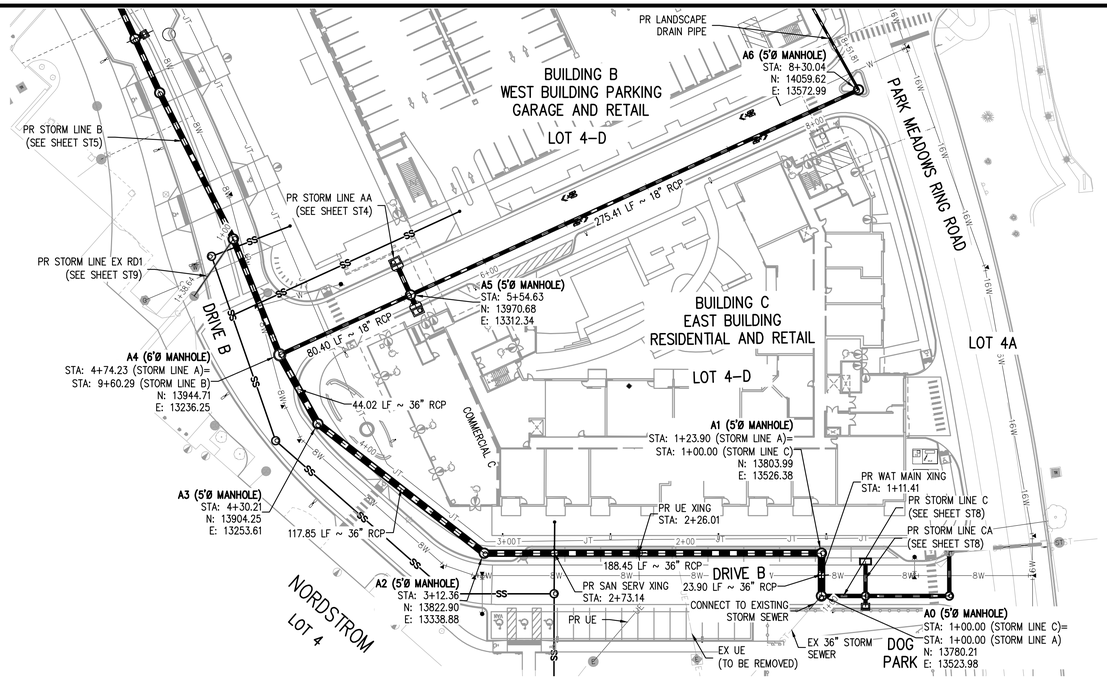
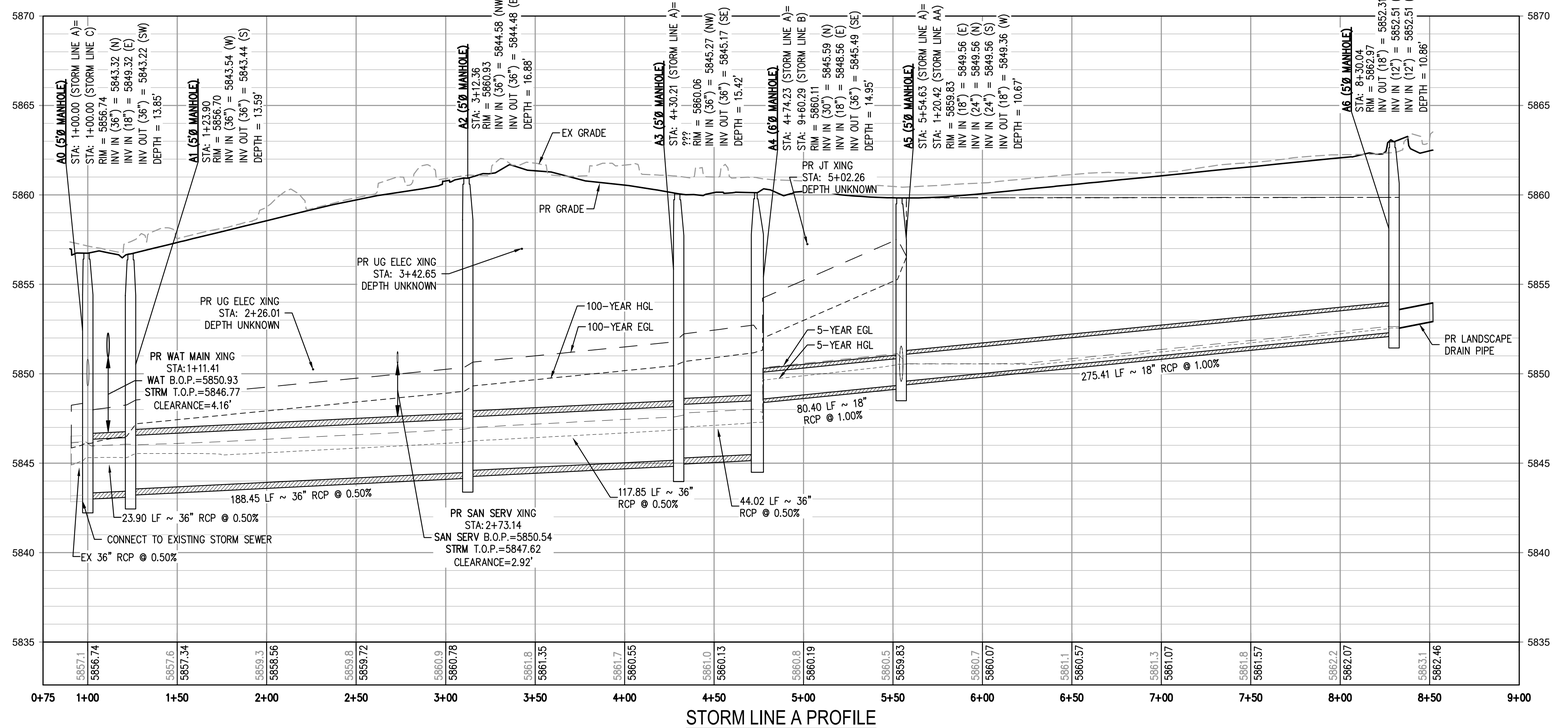


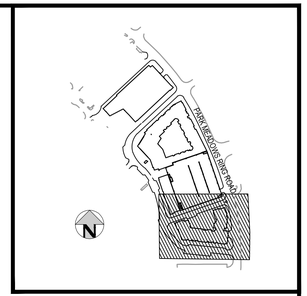
STORM LINE A PLAN

SCALE: 1" = 40'



STORM LINE A PROFILE

HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 4'



KEY MAP

SCALE: 1"=400'

LEGEND

	EX
MANHOLE	
HYDRANT	
STREET LIGHT	
UNDERGROUND ELECTRIC	UE
WATER	W
IRRIGATION WATER	IR
GAS	G
STORM SEWER	ST
SANITARY SEWER	SS
UNDERGROUND TELECOMM	UT
TO BE DEMOLISHED	

	PR
MANHOLE	
HYDRANT	
DOMESTIC WATER SERVICE	
FIRE WATER SERVICE	
INLET	
STREET LIGHT	
UNDERGROUND ELECTRIC	UE
GAS	G
WATER	8W
STORM SEWER	
SANITARY SEWER	SS
SANITARY SERVICE	

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3. PIPE LENGTHS ARE MEASURED FROM CENTER OF STRUCTURE TO CENTER OF STRUCTURE FOR CYLINDRICAL MANHOLES AND TO THE INSIDE FACE OF INLETS AND OTHER BOX STRUCTURES. PIPE LENGTHS ARE MEASURED TO THE END OF THE STRUCTURE FOR ALL FLARED END SECTIONS.
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PARK MEADOWS MALL, LLC /
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PARK MEADOWS - MIXED USE DEVELOPMENT
STORM LINE A P&P

COLORADO LICENSED
MARK A. WEST
38561
03/20/2023
PROFESSIONAL ENGINEER

PROJECT #: 220407
SHEET NUMBER
ST3
3 OF 15

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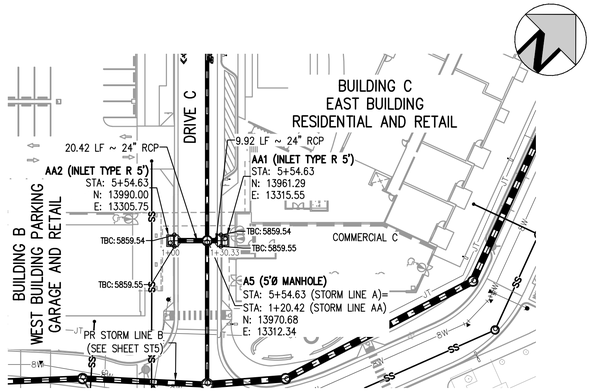
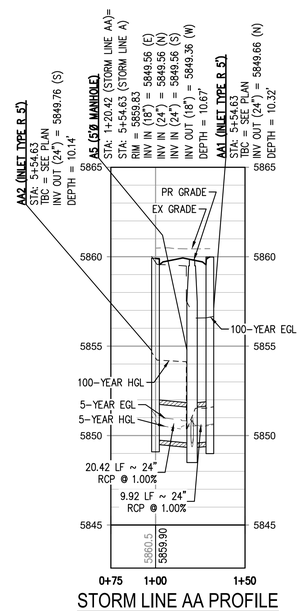


STORM LINE AA PLAN

SCALE: 1" = 40'



STORM LINE AA PROFILE

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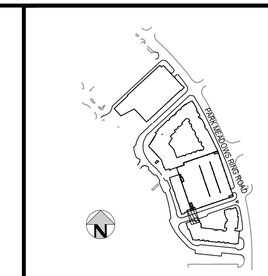
VERTICAL SCALE: 1" = 4'



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LEGEND

	EX
MANHOLE	
HYDRANT	
STREET LIGHT	
UNDERGROUND ELECTRIC	UE
WATER	W
IRRIGATION WATER	IR
GAS	G
STORM SEWER	ST
SANITARY SEWER	SS
UNDERGROUND TELECOMM	UT
TO BE DEMOLISHED	

	PR
MANHOLE	
HYDRANT	
DOMESTIC WATER SERVICE	
FIRE WATER SERVICE	
INLET	
STREET LIGHT	
UNDERGROUND ELECTRIC	UE
GAS	G
WATER	8W
STORM SEWER	
SANITARY SEWER	SS
SANITARY SERVICE	

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FILEPATH: K:\220407\ENGINEERING\UTILITIES\STORM\SW - PLAN & PROFILES.DWG LAYOUT: STORM LINE AA
7 XREFs: e-base, e-utl, keymap, p-base, p-storm, p-utl, stamp-park meadows
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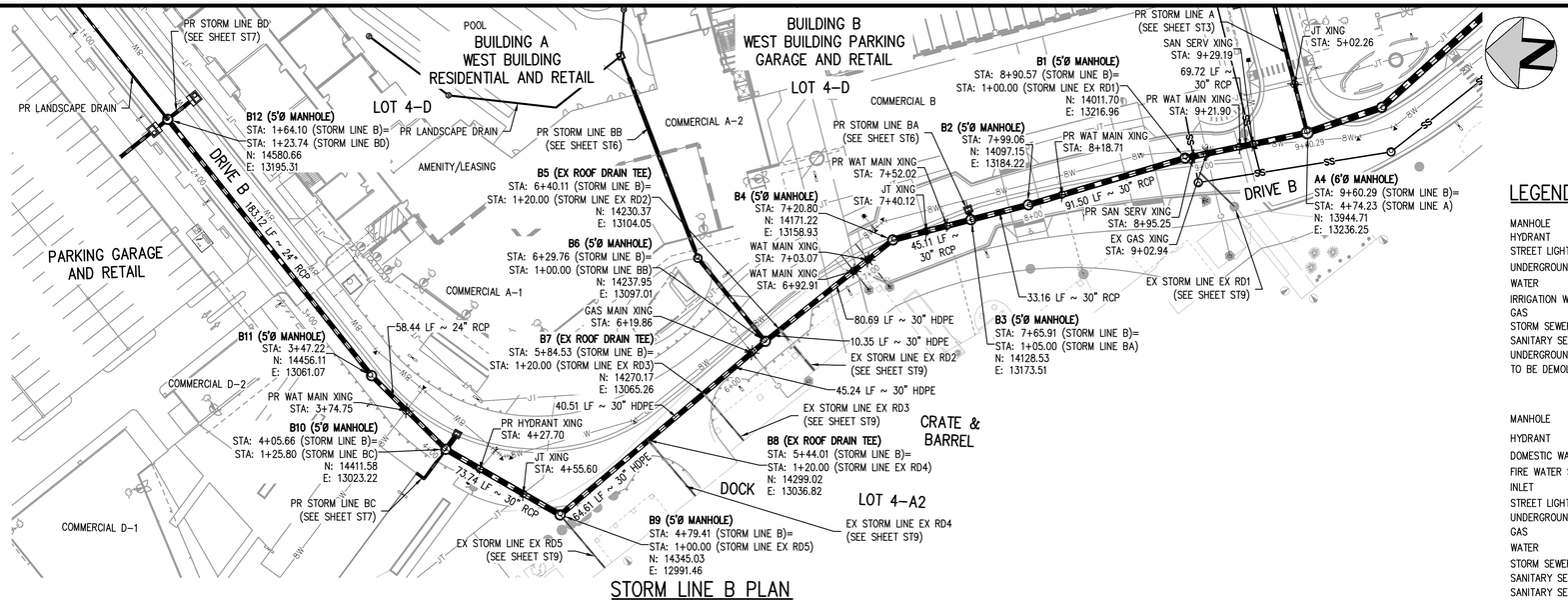
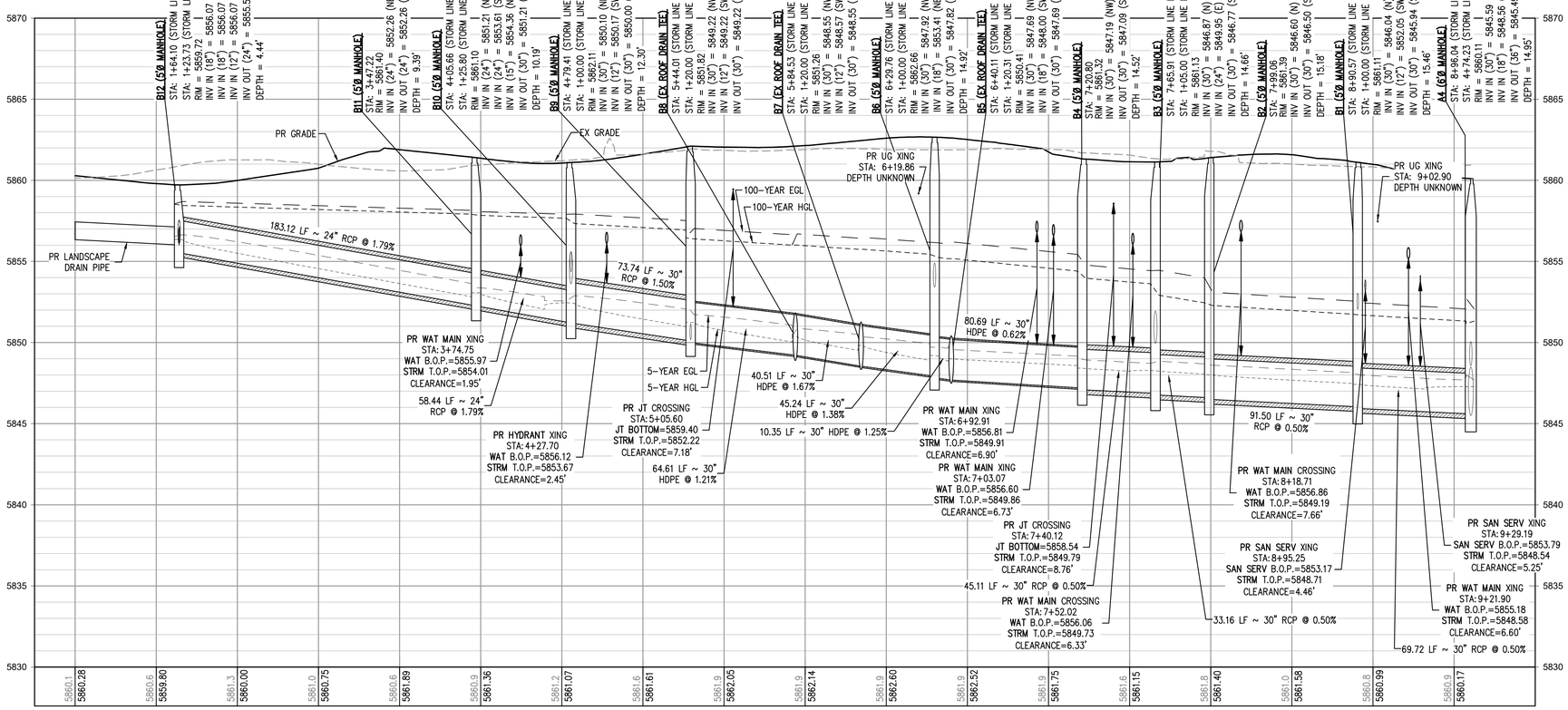


STORM LINE B PLAN

SCALE: 1" = 40'



STORM LINE B PROFILE

HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 4'

LEGEND

	EX
MANHOLE	
HYDRANT	
STREET LIGHT	
UNDERGROUND ELECTRIC	UE
WATER	W
IRRIGATION WATER	IR
GAS	G
STORM SEWER	ST
SANITARY SEWER	SS
UNDERGROUND TELECOMM	UT
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	PR
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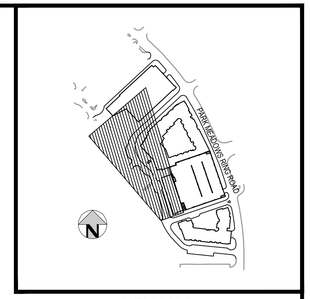
GAS	G
WATER	8W
STORM SEWER	
SANITARY SEWER	SS
SANITARY SERVICE	



KEY MAP

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CITY OF LONE TREE ACCEPTANCE BLOCK

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DEVELOPMENT SERVICES DEPARTMENT DATE

Know what's below. Call before you dig.

40 0 40 80
SCALE: 1" = 40'

DESIGNED BY: LME
CHECKED BY: JDO
DRAWN BY: LME

ISSUE DATE: 11-11-2022	
DATE	REVISION COMMENTS
01-27-2023	PER CITY COMMENTS
03-17-2023	ISSUED FOR CONSTRUCTION

HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
Denver, Colorado 80203
P: 303.623.6300 F: 303.623.6311
HarrisKocherSmith.com

PARK MEADOWS MALL, LLC /
PARK MEADOWS ANCHOR ACQUISITION, LLC

PARK MEADOWS - MIXED USE DEVELOPMENT
STORM LINE B P&P

COLORADO LICENSED
MARK A. WEST
38561
03/20/2023
PROFESSIONAL ENGINEER

PROJECT #: 220407
SHEET NUMBER
ST5
5 OF 15

FILEPATH: K:\220407\ENGINEERING\UTILITIES\STORMSW - PLAN & PROFILES.DWG LAYOUT: STORM LINE B P&P
7. XREFs: e-base, e-full, keymap, p-base, p-storm, p-util, stamp-park meadows
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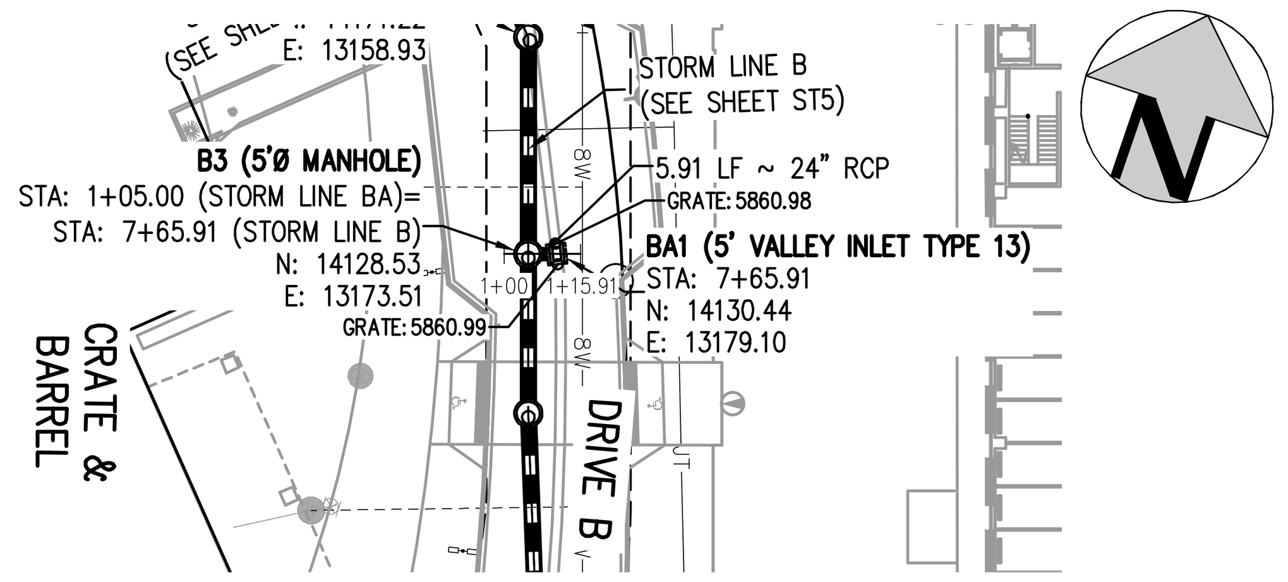
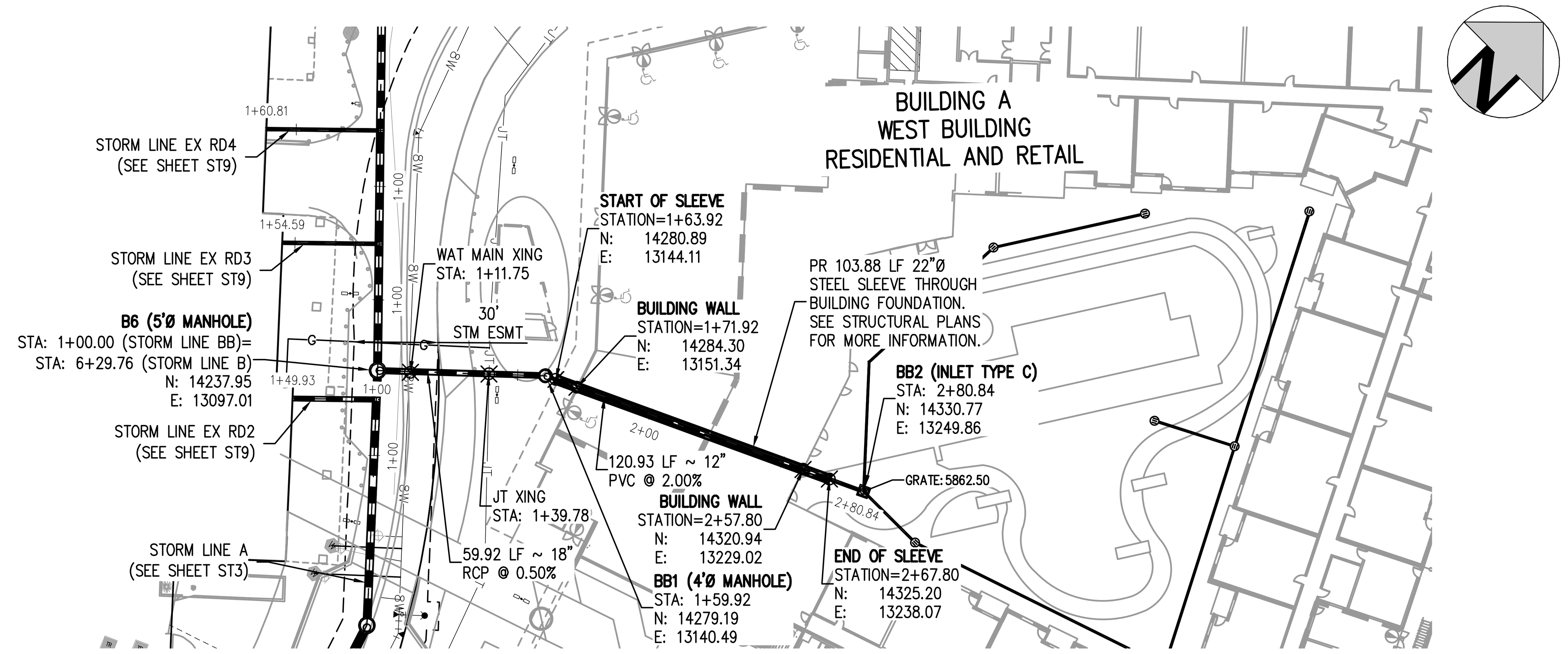


STORM LINE BA PLAN

SCALE: 1" = 40'



STORM LINE BB PLAN

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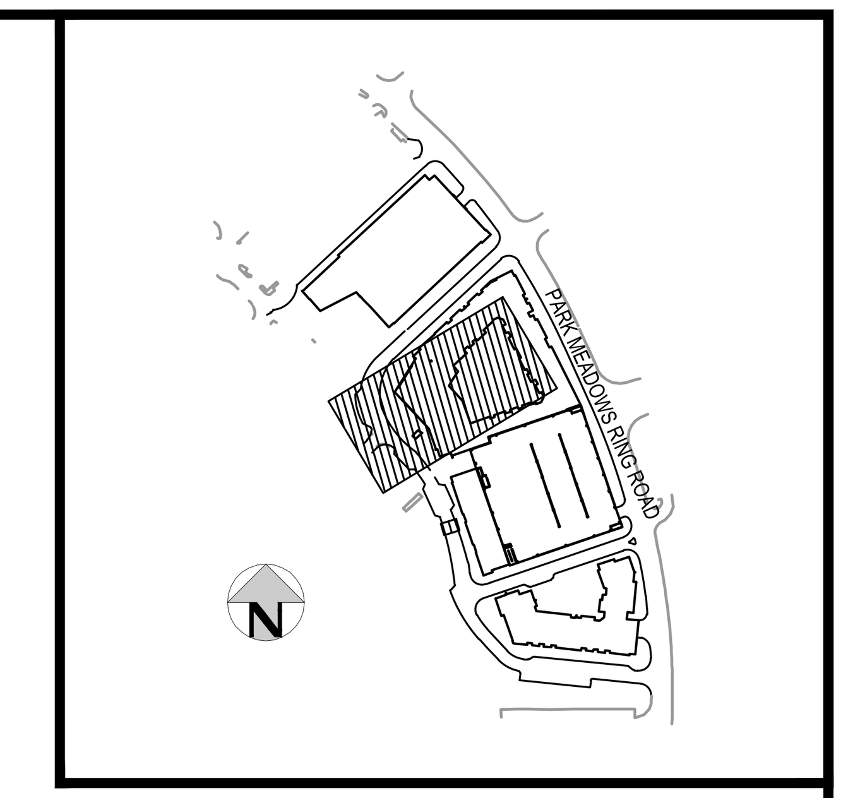
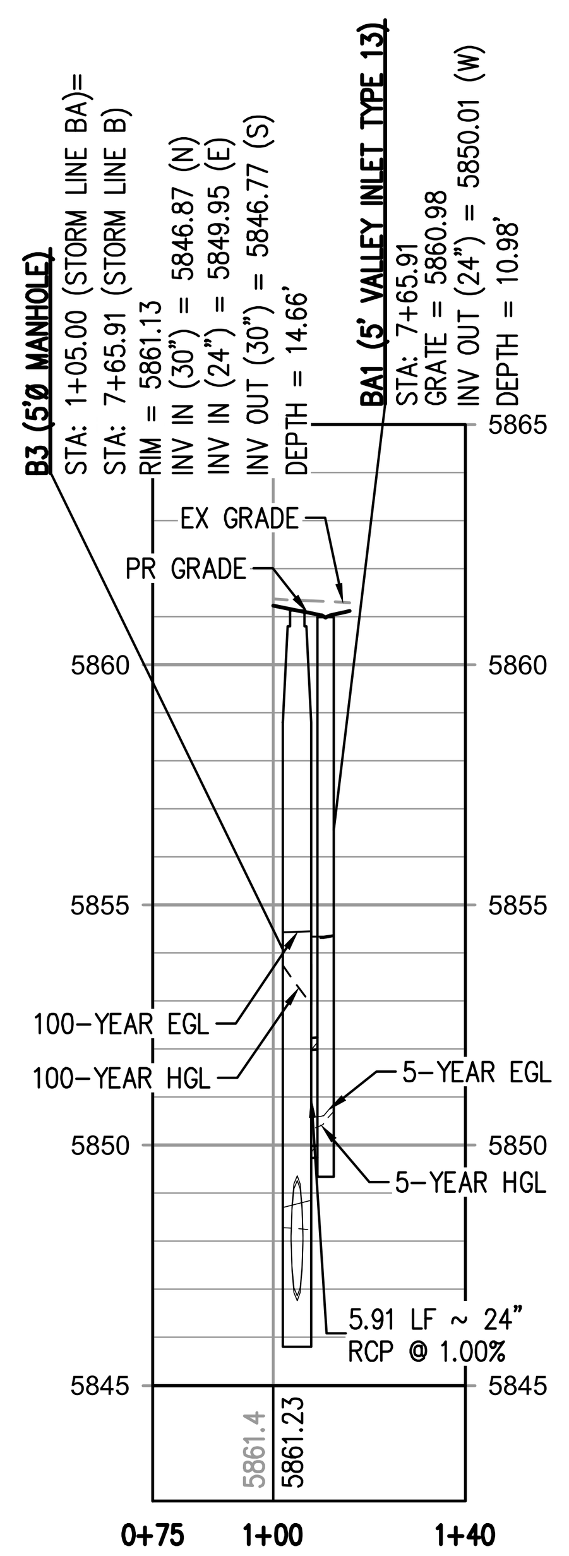


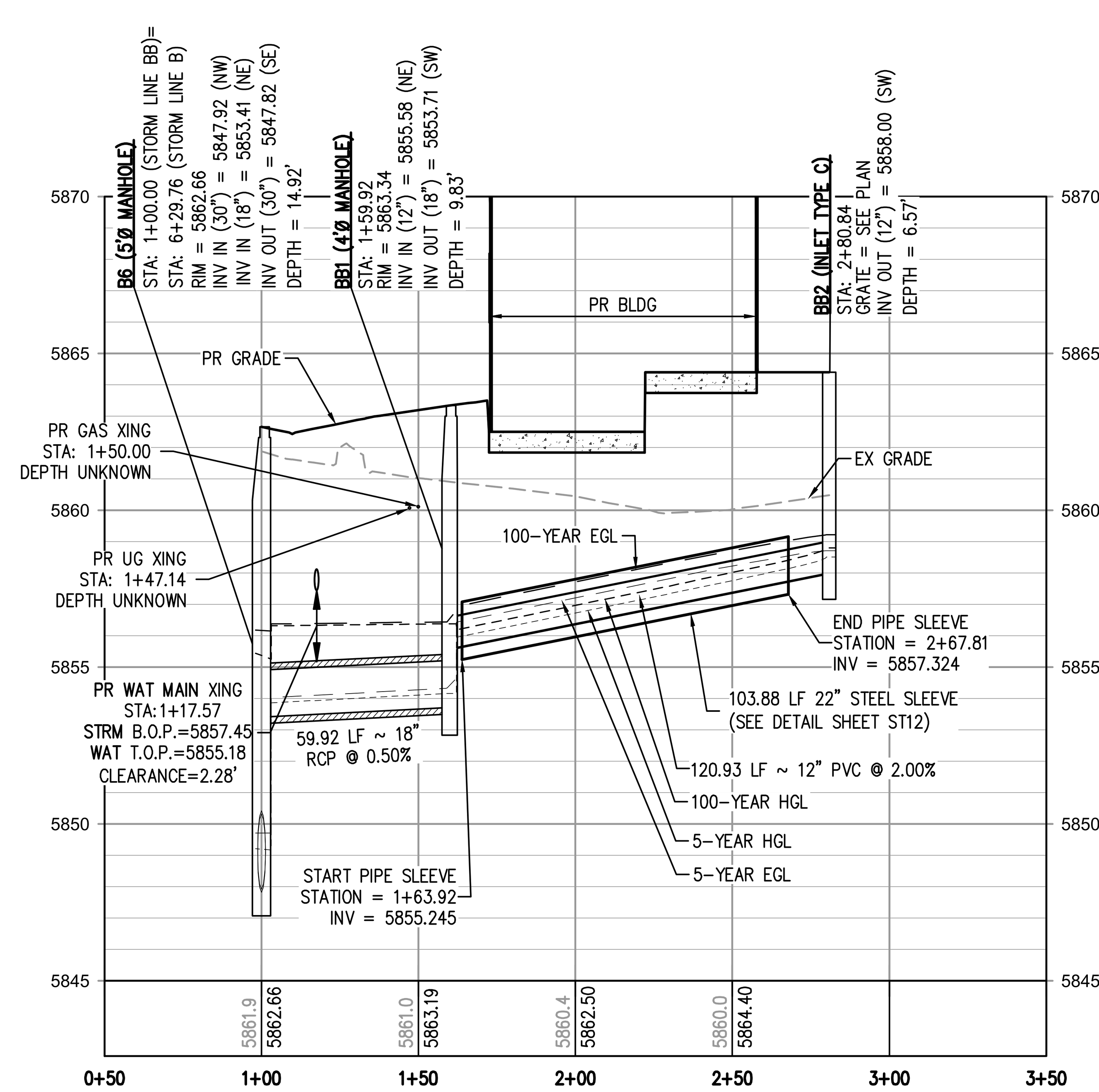
KEY MAP

SCALE: 1"=400'



STORM LINE BA PROFILE

HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 4'



STORM LINE BB PROFILE

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NOTE: SEE STRUCTURAL PLANS FOR SUBSURFACE FOUNDATION AND BUILDING INFORMATION

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LEGEND

EX

MANHOLE
HYDRANT
STREET LIGHT
UNDERGROUND ELECTRIC — UE —
WATER — W —
IRRIGATION WATER — IR —
GAS — G —
STORM SEWER — ST —
SANITARY SEWER — SS —
UNDERGROUND TELECOMM — UT —
TO BE DEMOLISHED

PR

MANHOLE
HYDRANT
DOMESTIC WATER SERVICE
FIRE WATER SERVICE
INLET
STREET LIGHT
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WATER — 8W —
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SANITARY SERVICE

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Know what's below. Call before you dig. 811

40 0 40 80
SCALE: 1" = 40'

DESIGNED BY: LME
CHECKED BY: JDO
DRAWN BY: LME

ISSUE DATE: 11-11-2022

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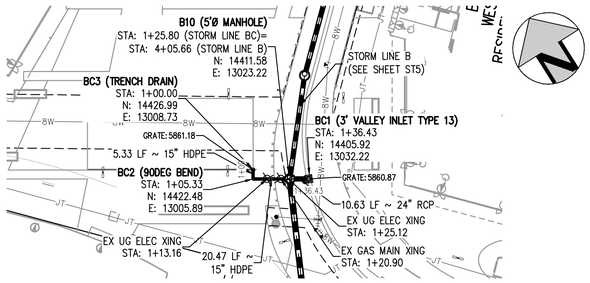
PARK MEADOWS MALL, LLC /
PARK MEADOWS ANCHOR ACQUISITION, LLC

PARK MEADOWS - MIXED USE DEVELOPMENT
STORM LINE BA-BB P&P

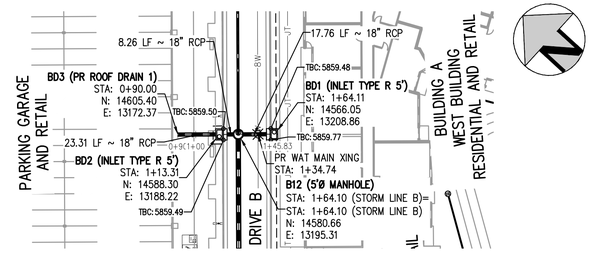
COLORADO LICENSED PROFESSIONAL ENGINEER MARK A. WEST 38561 03/20/2023

PROJECT #: 220407
SHEET NUMBER
ST6



STORM LINE BC PLAN

SCALE: 1" = 40'



STORM LINE BD PLAN

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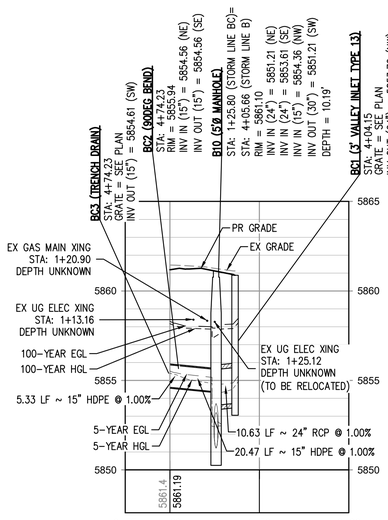

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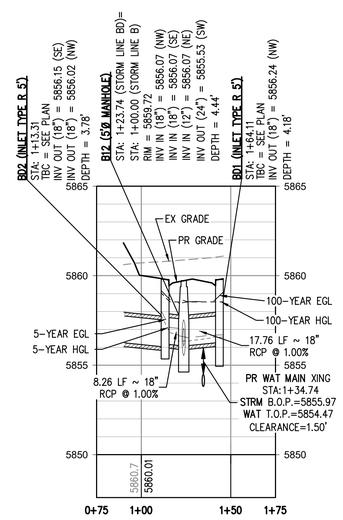

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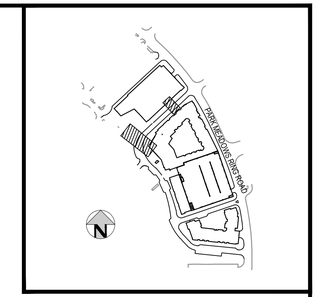

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LEGEND

	EX	PR
MANHOLE	●	◎
HYDRANT	●	●
STREET LIGHT	●—	
UNDERGROUND ELECTRIC	UE	
WATER	W	
IRRIGATION WATER	IR	
GAS	G	
STORM SEWER	ST	
SANITARY SEWER	SS	
UNDERGROUND TELECOMM	UT	
TO BE DEMOLISHED		
DOMESTIC WATER SERVICE		
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INLET		
GAS		G
WATER		8W
SANITARY SERVICE		SS

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PARK MEADOWS - MIXED USE DEVELOPMENT
STORM LINE BC-BD P&P

COLORADO LICENSED
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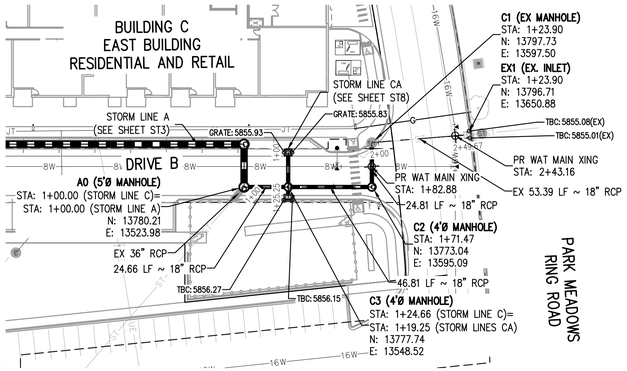
PROFESSIONAL ENGINEER
03/20/2023

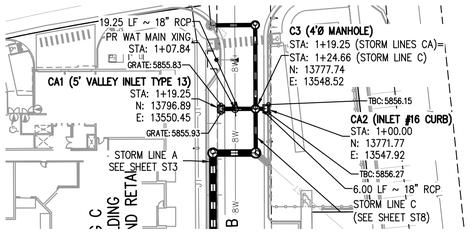
PROJECT #: 220407
SHEET NUMBER
ST7
7 OF 15

FILEPATH: K:\220407\ENGINEERING\UTILITIES\STORMSW - PLAN & PROFILES-2.DWG LAYOUT: STORM LINE BC-BD
& XREFs: e-base, e-util, keymap, p-base, p-legal, p-storm, p-util, stamp-park meadows
PLOTTED: MON 03/20/23 2:51:02P BY: AIDAN LOWE



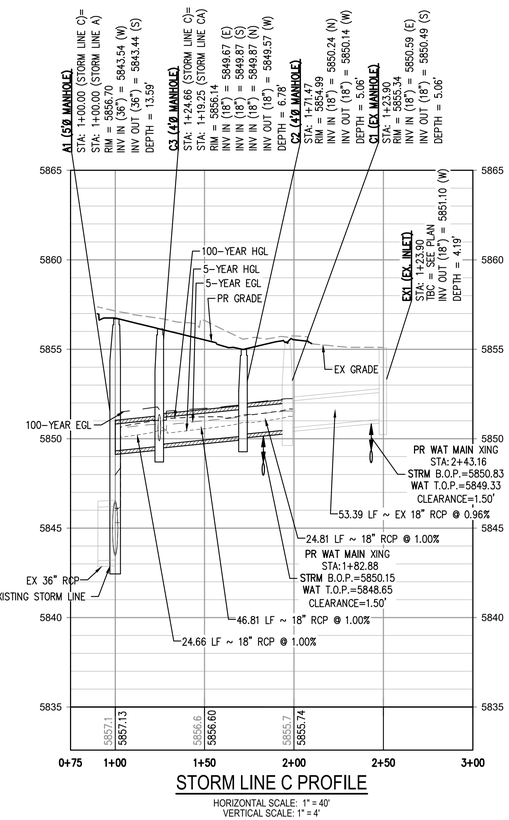
STORM LINE C PLAN

SCALE: 1" = 40'



STORM LINE CA PLAN

SCALE: 1" = 40'



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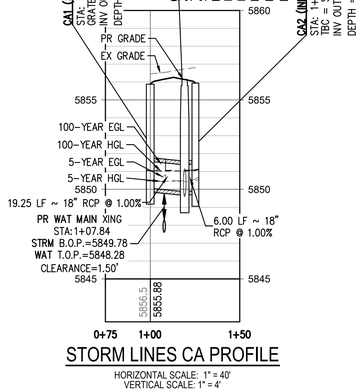

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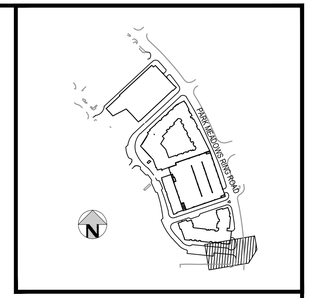

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13. ANY SUBSURFACE DETENTION AND/OR WATER QUALITY SYSTEM DESIGNS SHOWN ON THESE PLANS (IF APPLICABLE) ARE SPECIFICALLY LIMITED TO ELEVATIONS, GRADES AND STORMWATER DETENTION AND/OR WATER QUALITY DESIGN VOLUMES AND RELEASE RATES. THE DESIGN AND PROFESSIONAL ENGINEER'S SEAL SPECIFICALLY EXCLUDES STRUCTURAL DESIGN (INCLUDING, BUT NOT LIMITED TO, BUOYANCY CALCULATIONS AND CONSTRUCTION, TRAFFIC, OR OTHER LOADING), DEWATERING, EXCAVATION, SHORING, AND MATERIALS AND BACKFILL SPECIFICATIONS. IF THE PROPOSED SYSTEM UTILIZES A PROPRIETARY AND/OR PRE-MANUFACTURED DETENTION AND/OR WATER QUALITY SYSTEM, THE OWNER OR CONTRACTOR IS RESPONSIBLE FOR COORDINATING ALL REQUIRED SYSTEM DESIGN, CALCULATIONS, MATERIALS AND BACKFILL SPECIFICATIONS WITH THE UNDERGROUND DETENTION AND/OR WATER QUALITY SYSTEM MANUFACTURER AND/OR SUPPLIER. CONSTRUCTION OBSERVATION BY THE MANUFACTURER'S REPRESENTATIVE IS ESSENTIAL FOR PROPER INSTALLATION OF UNDERGROUND DETENTION AND/OR WATER QUALITY SYSTEMS. AT A MINIMUM, THE INSTALLATION SHOULD BE INSPECTED BY THE MANUFACTURER'S REPRESENTATIVE DURING CONSTRUCTION AND ANY DEFICIENCIES OF THE INSTALLATION IDENTIFIED BY THE MANUFACTURER'S INSPECTION SHOULD BE CORRECTED IMMEDIATELY.
14. EXISTING MANHOLES MAY NEED TO BE REMOVED AND REPLACED PER DIRECTION FROM THE CITY OF LONE TREE INNSPECTOR DEPENDING ON THE CONDITION.

LEGEND

	EX
MANHOLE	
HYDRANT	
STREET LIGHT	
UNDERGROUND ELECTRIC	UE
WATER	W
IRRIGATION WATER	IR
GAS	G
STORM SEWER	ST
SANITARY SEWER	SS
UNDERGROUND TELECOMM	UT
TO BE DEMOLISHED	

	PR
MANHOLE	
HYDRANT	
DOMESTIC WATER SERVICE	
FIRE WATER SERVICE	
INLET	
STREET LIGHT	
UNDERGROUND ELECTRIC	UE
GAS	G
WATER	8W
STORM SEWER	
SANITARY SEWER	SS
SANITARY SERVICE	

CITY OF LONE TREE ACCEPTANCE BLOCK

THESE DRAWINGS HAVE BEEN REVIEWED BY THE CITY OF LONE TREE FOR TEMPORARY EROSION AND SEDIMENT CONTROL IMPROVEMENTS ONLY.

DEVELOPMENT SERVICES DEPARTMENT DATE

Know what's below. Call before you dig.

40 0 40 80
SCALE: 1" = 40'

DESIGNED BY: LME
CHECKED BY: JDO
DRAWN BY: LME

ISSUE DATE: 11-11-2022

DATE	REVISION COMMENTS
01-27-2023	PER CITY COMMENTS
03-17-2023	ISSUED FOR CONSTRUCTION

HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
Denver, Colorado 80203
P: 303.623.6300 F: 303.623.6311
HarrisKocherSmith.com

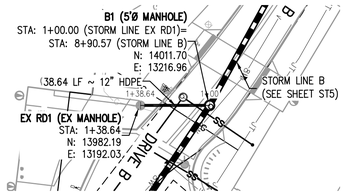
PARK MEADOWS MALL, LLC /
PARK MEADOWS ANCHOR ACQUISITION, LLC

PARK MEADOWS - MIXED USE DEVELOPMENT
STORM LINE C P&P

COLORADO LICENSED
MARK A. WEST
38561
03/20/2023
PROFESSIONAL ENGINEER

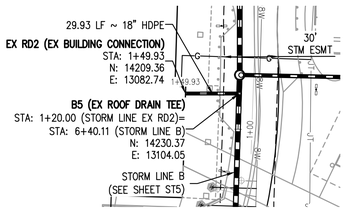
PROJECT #: 220407
SHEET NUMBER
ST8
8 OF 15

FILEPATH: K:\220407\ENGINEERING\UTILITIES\STORM\SW - PLAN & PROFILES 2.DWG LAYOUT: STORM LINE C P&P
8 XREFs: e-base, e-ult, keymap, p-base, p-dept, p-storm, p-ult, stamp-park meadows
PLOTTED: MON 03/20/23 2:51:11P BY: AIDAN LOWE



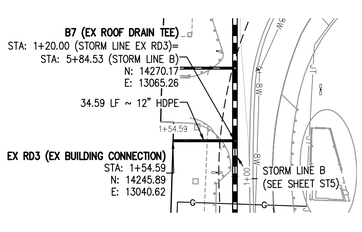
STORM LINE EX RD1 PLAN

SCALE: 1" = 40'



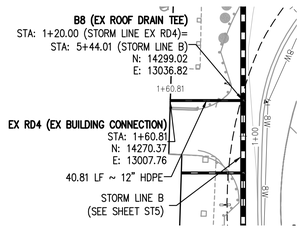
STORM LINE EX RD2 PLAN

SCALE: 1" = 40'



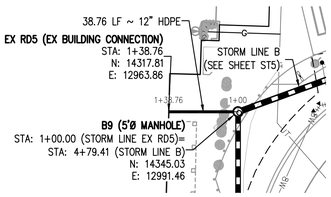
STORM LINE EX RD3 PLAN

SCALE: 1" = 40'



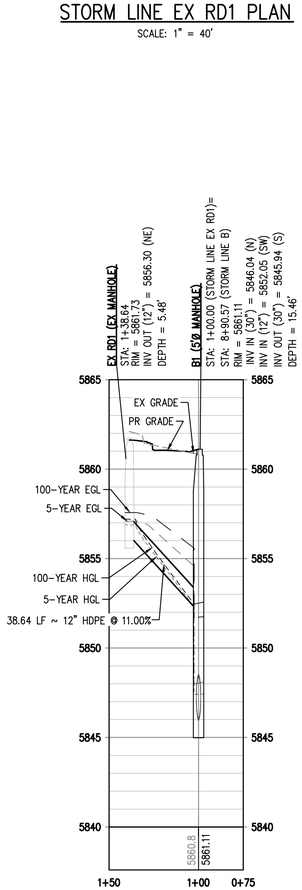
STORM LINE EX RD4 PLAN

SCALE: 1" = 40'



STORM LINE EX RD5 PLAN

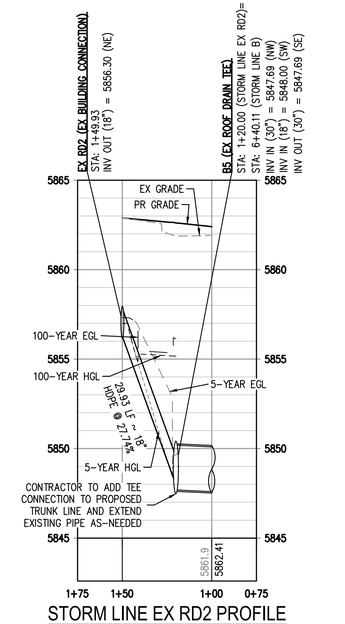
SCALE: 1" = 40'



STORM LINE EX RD1 PROFILE

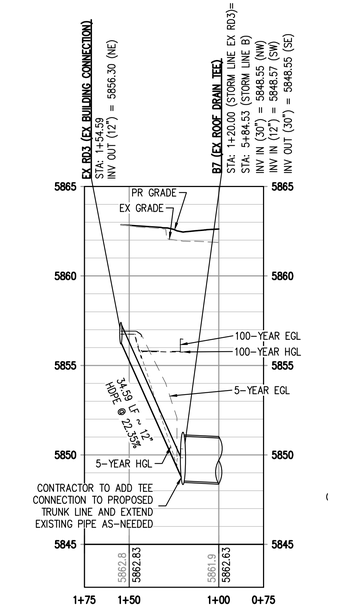
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 4'

NOTE: CONTRACTOR TO POTHOLE AND VERIFY LOCATION AND ELEVATION OF EXISTING STORM PIPES.



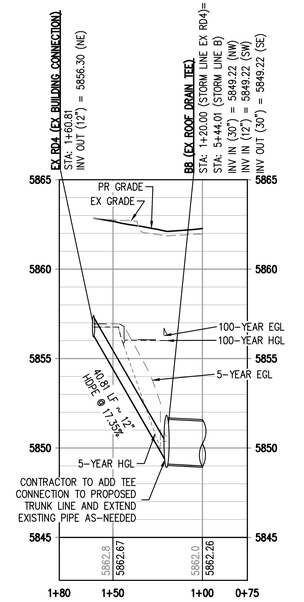
STORM LINE EX RD2 PROFILE

HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 4'



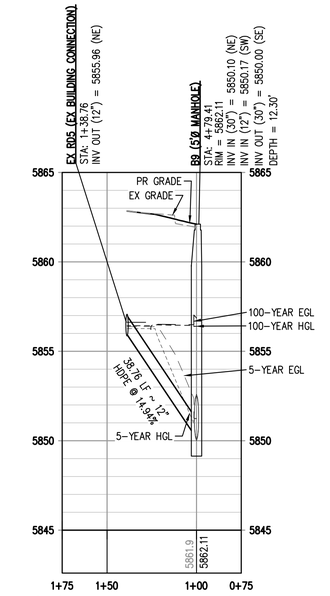
STORM LINE EX RD3 PROFILE

HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 4'



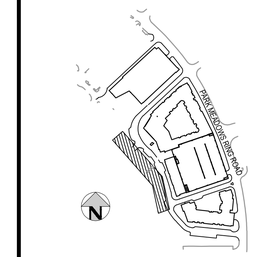
STORM LINE EX RD4 PROFILE

HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 4'



STORM LINE EX RD5 PROFILE

HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 4'



KEY MAP

SCALE: 1"=400'

GENERAL STORM NOTES:

1. THE CONTRACTOR SHALL NOTIFY COLORADO 811 PRIOR TO EXCAVATION, IN ACCORDANCE WITH COLORADO STATE STATUTES.
2. THE LOCATION OF EXISTING UNDERGROUND UTILITIES IS APPROXIMATE AND SHOWN ACCORDING TO THE BEST INFORMATION AVAILABLE, AS SUPPLIED BY THE UTILITY OWNERS. PRIOR TO EXCAVATION, THE CONTRACTOR SHALL VERIFY EXISTENCE, SIZE, AND LOCATION OF EXISTING UTILITIES AND IMMEDIATELY NOTIFY HARRIS KOCHER SMITH OF ANY DISCREPANCIES. THE CONTRACTOR IS RESPONSIBLE FOR ANY AND ALL DAMAGES TO EXISTING UNDERGROUND FACILITIES.
3. PIPE LENGTHS ARE MEASURED FROM CENTER OF STRUCTURE TO CENTER OF STRUCTURE FOR CYLINDRICAL MANHOLES AND TO THE INSIDE FACE OF INLETS AND OTHER BOX STRUCTURES. PIPE LENGTHS ARE MEASURED TO THE END OF THE STRUCTURE FOR ALL FLARED END SECTIONS.
4. STATIONING OF INLETS SHOWN IN STORM SEWER PROFILES IS AT CENTER OF STRUCTURE.
5. ALL COORDINATES ARE AT THE CENTER OF THE STRUCTURE UNLESS OTHERWISE INDICATED.
6. CONTRACTOR SHALL USE RCP, PVC, PP, OR HDPE PIPES FOR THE MAIN LINES, BUT SHALL NOTIFY THE JURISDICTIONAL UTILITY PROVIDER AND THE ENGINEER, PRIOR TO INSTALLATION, FOR APPROVAL. REGARDLESS OF PIPE MATERIAL, ALL STORM SEWER SHALL UTILIZE WATER-TIGHT JOINTS.
7. FOR ALL NON-CONCENTRIC MANHOLES, MANHOLE RINGS/COVERS AND STEPS LIDS SHALL BE ROTATED AS SHOWN IN PLAN VIEW.
8. ALL TYPE C & D INLETS SHALL HAVE CLOSE MESH GRATES.
9. ALL LATERAL PIPE-TO-PIPE CONNECTIONS SHALL BE MADE USING KOR-N-TEE CONNECTORS OR ENGINEER APPROVED EQUIVALENT.
10. CONTRACTOR SHALL ADJUST ALL EXISTING RIM ELEVATIONS TO MATCH THE PROPOSED GRADE.
11. CONTRACTOR SHALL MODIFY INLET BASES AS NEEDED IN ORDER TO ENSURE ALL STORM PIPES CONNECT PROPERLY TO THE INLET. CONTRACTOR SHALL PROVIDE SHOP DRAWINGS FOR REVIEW AND APPROVAL BY ENGINEER, OWNER, AND CITY/COUNTY PRIOR TO INSTALLATION.
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LEGEND

EX	
MANHOLE	
HYDRANT	
STREET LIGHT	
UNDERGROUND ELECTRIC	UE
WATER	W
IRRIGATION WATER	IR
GAS	G
STORM SEWER	ST
SANITARY SEWER	SS
UNDERGROUND TELECOMM	UT
TO BE DEMOLISHED	

PR	
MANHOLE	
HYDRANT	
DOMESTIC WATER SERVICE	
FIRE WATER SERVICE	
INLET	
STREET LIGHT	
UNDERGROUND ELECTRIC	UE
GAS	G
WATER	W
STORM SEWER	
SANITARY SEWER	SS
SANITARY SERVICE	

CITY OF LONE TREE ACCEPTANCE BLOCK

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DEVELOPMENT SERVICES DEPARTMENT DATE

Know what's below. Call before you dig.

SCALE: 1" = 40'

DESIGNED BY: LME
CHECKED BY: JDO
DRAWN BY: LME

ISSUE DATE: 12-23-2022

DATE	REVISION COMMENTS
01-27-2023	PER CITY COMMENTS
03-17-2023	ISSUED FOR CONSTRUCTION
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HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
Denver, Colorado 80203
P: 303.623.6300 F: 303.623.6311
HarrisKocherSmith.com

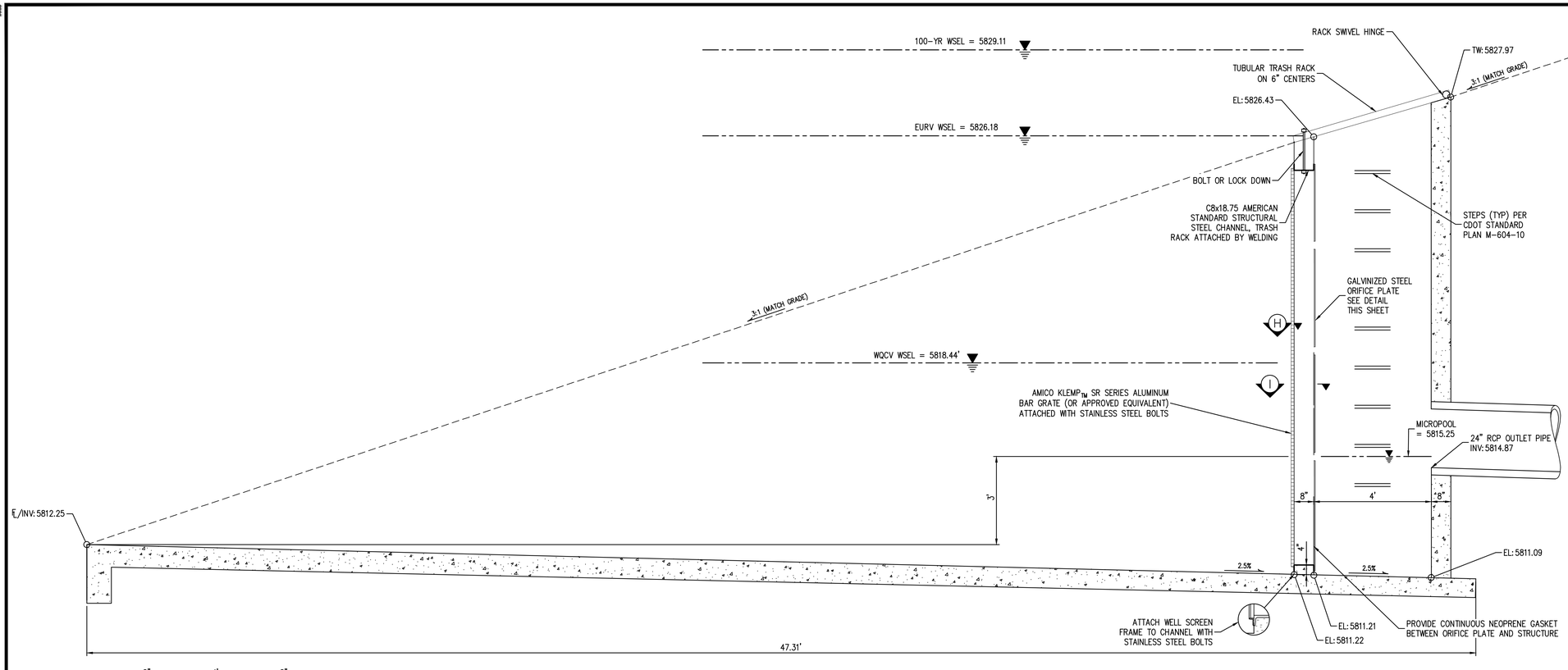
PARK MEADOWS MALL, LLC /
PARK MEADOWS ANCHOR ACQUISITION, LLC

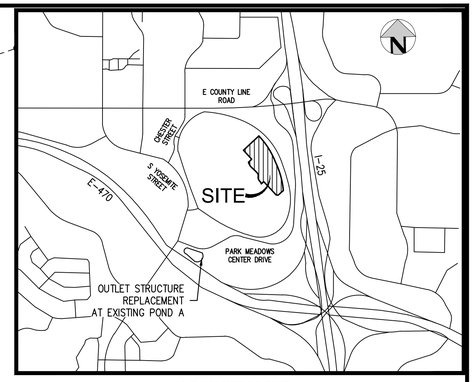
PARK MEADOWS - MIXED USE DEVELOPMENT
STORM LINE RD P&P

COLORADO LICENSED
MARK A. WEST
38561
PROFESSIONAL ENGINEER
03/20/2023

PROJECT #: 220407
SHEET NUMBER
ST9
9 OF 15

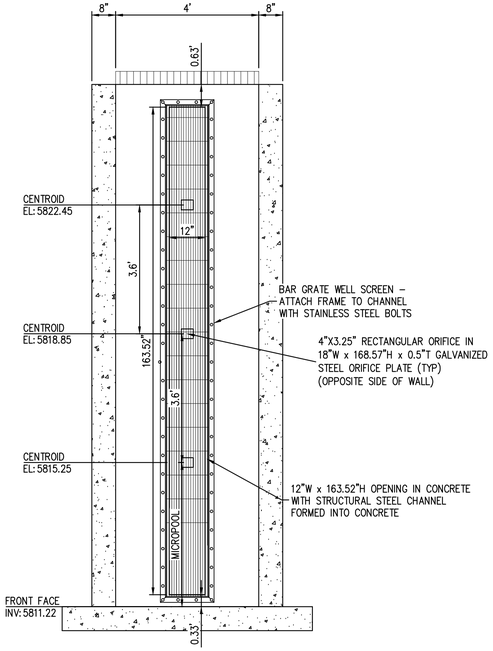
FILEPATH: K:\220407\ENGINEERING\UTILITIES\STORMSW\ - PLAN & PROFILES-2.DWG LAYOUT: STORM LINE RD
8 XREFs: e-base, e-util, keymap, p-base, p-legal, p-storm, p-util, stamp-pelt, meadows
PLOTTED: MON 03/20/22 2:51:35P BY: AIDAN LOWE



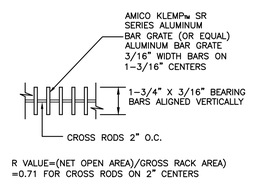


VICINITY MAP
SCALE: 1"=1000'

OUTLET STRUCTURE
SCALE: N.T.S.

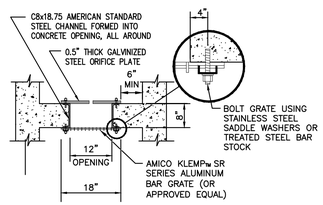


WQCV & EURV ORIFICE PLATE
SCALE: N.T.S.



R VALUE=(NET OPEN AREA)/GROSS RACK AREA)
=0.71 FOR CROSS RODS ON 2" CENTERS

SECTION H
SCALE: N.T.S.



SECTION I
SCALE: N.T.S.

ORIFICE PLATE NOTES:

1. PROVIDE CONTINUOUS NEOPRENE GASKET MATERIAL BETWEEN THE ORIFICE PLATE AND CONCRETE.
2. BOLT PLATE TO CONCRETE 12" MAX. ON CENTER. SEE SECTION I ABOVE FOR PLATE THICKNESS.

EURV AND WQCV TRASH RACKS:

1. BAR GATE TRASH RACKS SHALL BE ALUMINUM AND SHALL BE BOLTED USING STAINLESS STEEL HARDWARE.
2. STRUCTURAL DESIGN OF TRASH RACKS SHALL BE BASED ON FULL HYDROSTATIC HEAD WITH ZERO HEAD DOWNSTREAM OF THE RACK.

CITY OF LONE TREE ACCEPTANCE BLOCK

THESE DRAWINGS HAVE BEEN REVIEWED BY THE CITY OF LONE TREE FOR TEMPORARY EROSION AND SEDIMENT CONTROL IMPROVEMENTS ONLY.

DEVELOPMENT SERVICES DEPARTMENT DATE

Know what's below. Call before you dig.

DESIGNED BY: LME
CHECKED BY: JDO
DRAWN BY: LME

ISSUE DATE: 11-11-2022

DATE	REVISION COMMENTS
01-27-2023	PER CITY COMMENTS
03-17-2023	ISSUED FOR CONSTRUCTION

HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
Denver, Colorado 80203
P: 303.623.6300 F: 303.623.6311
HarrisKocherSmith.com

PARK MEADOWS MALL, LLC /
PARK MEADOWS ANCHOR ACQUISITION, LLC

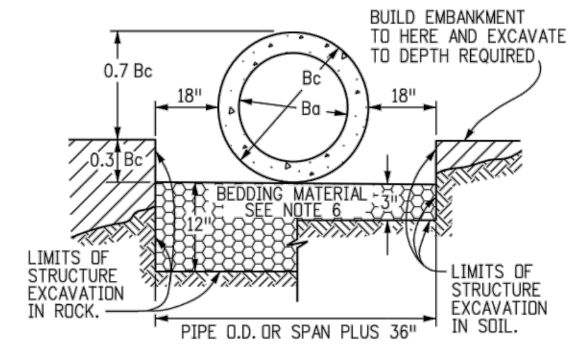
PARK MEADOWS - MIXED USE DEVELOPMENT
WATER QUALITY DETENTION POND DETAILS

COLORADO LICENSED MARK A. WEST 38561 PROFESSIONAL ENGINEER
03/20/2023

PROJECT #: 220407
SHEET NUMBER
ST10
10 OF 15

FILEPATH: K:\220407\ENGINEERING\UTILITIES\STORM\CD - POND OUTLET STRUCTURE.DWG LAYOUT: DRAINAGE DETAILS
NO XREFS
PLOTTED: MON 03/20/23 2:51:36P BY: AIDAN LOWE

REINFORCED CONCRETE PIPE — STANDARD PLAN NO. M-603-2 (July 4, 2012)



NOTE: Bc IS THE OUTSIDE DIMENSION FOR DIAMETER, SPAN OR RISE.

PIPE INSTALLATION
(WITH 0.7 PROJECTION RATIO)

CIRCULAR (CIR)			VERTICAL ELLIPTICAL (VE)				HORIZONTAL ELLIPTICAL (HE)			
△ PIPE SIZE= Ba (INSIDE DIA)	WALL THICKNESS	0.3 Bc (OUTSIDE DIA)	SPAN	RISE	WALL THICKNESS	0.3 OUTSIDE RISE	SPAN	RISE	WALL THICKNESS	0.3 OUTSIDE RISE
IN.	IN.	FT.	IN.	IN.	IN.	FT.	IN.	IN.	IN.	FT.
12	2	0.40								
15	2-1/4	0.49								
18	2-1/2	0.58					23	14	2-3/4	0.49
21	2-3/4	0.66								
24	3	0.75					30	19	3-1/4	0.66
27	3-1/4	0.84					34	22	3-1/2	0.73
30	3-1/2	0.92					38	24	3-3/4	0.79
33	3-3/4	1.01								
36	4	1.10	29	45	4-1/2	1.35	45	29	4-1/2	0.95
42	4-1/2	1.28	34	53	5	1.58	53	34	5	1.10
48	5	1.45	38	60	5-1/2	1.78	60	38	5-1/2	1.23
54	5-1/2	1.62	43	68	6	2.00	68	43	6	1.38
60	6	1.80	48	76	6-1/2	2.23	76	48	6-1/2	1.53
66	6-1/2	1.97	53	83	7	2.43	83	53	7	1.68
72	7	2.15	58	91	7-1/2	2.65	91	58	7-1/2	1.83
78	7-1/2	2.32	63	98	8	2.85	98	63	8	1.98
84	8	2.50	68	106	8-1/2	3.08	106	68	8-1/2	2.13
90	8-1/2	2.68	72	113	9	3.28	113	72	9	2.25
96	9	2.85	77	121	9-1/2	3.50	121	77	9-1/2	2.40
102	9-1/2	3.02	82	128	9-3/4	3.69	128	82	9-3/4	2.54
108	10	3.20	87	136	10	3.90	136	87	10	2.68

△ ALSO EQUIVALENT ROUND DIMENSION FOR ELLIPTICAL PIPE.

DIMENSIONS FOR REINFORCED CONCRETE PIPE
(FOR INFORMATION ONLY)

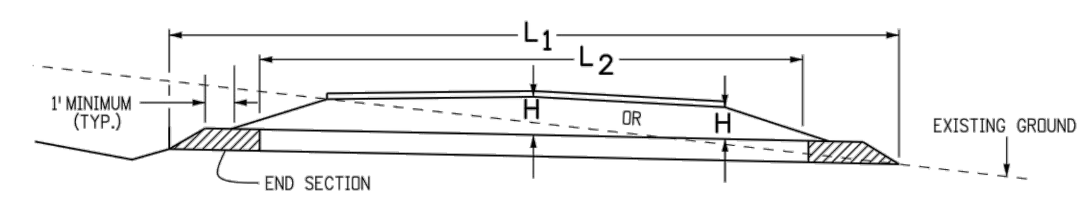
GENERAL NOTES

REINFORCED CONCRETE PIPE

1. ADEQUATE COVER SHALL BE PROVIDED DURING CONSTRUCTION TO PROTECT THE PIPE FROM DAMAGE. THE MINIMUM COVER SHALL BE AS SHOWN ON THESE TABLES OR CONFORM TO AASHTO REQUIREMENTS, WHICHEVER IS GREATER. THE MINIMUM COVER FOR REINFORCED CONCRETE PIPE IS MEASURED FROM THE TOP OF THE PIPE TO THE BOTTOM OF THE PAVEMENT: HMA OR PCCP.
2. FILL HEIGHTS GREATER THAN MAXIMUM ALLOWED IN THE HEIGHTS OF FILL TABLE ON THIS SHEET REQUIRE SPECIAL DESIGN OF STRUCTURE.
3. PIPE DESIGN IS BASED ON SAFETY FACTOR OF 1.33 ON ULTIMATE STRENGTH.
4. THE HEIGHTS OF FILL OVER TOP OF PIPE ARE BASED ON UNIT WEIGHT OF SOIL AT 135 LBS. PER CUBIC FT.
5. PIPE CLASS IS DETERMINED FROM 0.01 IN. CRACK D-LOAD.
6. BEDDING IS CLASS B (MODIFIED) (FROM CONCRETE PIPE DESIGN MANUAL-AMERICAN CONCRETE PIPE ASSOCIATION) WITH SETTLEMENT RATIO R = 0.0 sd (YIELDING BED). BEDDING MATERIAL FOR RIGID PIPE IN SOIL SHALL BE 3 IN. LOOSE THICKNESS STRUCTURE BACKFILL CLASS 2. BEDDING MATERIAL FOR RIGID PIPE IN ROCK SHALL BE 12 IN. LOOSE THICKNESS STRUCTURE BACKFILL CLASS 1.
7. CHANGES IN DESIGN FACTORS REQUIRE COMPENSATING CHANGES IN PIPE DESIGN.
8. MINIMUM WALL THICKNESS DIMENSIONS ARE BASED ON AASHTO M 170 (WALL B) FOR CIRCULAR PIPE, AND AASHTO M 207 FOR ELLIPTICAL PIPE.
9. SPACING FOR MULTIPLE PIPE INSTALLATIONS SHALL CONFORM TO THE DETAILS SHOWN ON STANDARD PLAN M-206-1.
10. WHEN A PIPE IS TO BE EXTENDED, THE SAME PIPE MATERIAL AND SIZE AS IN THE ORIGINAL PIPE INSTALLATION SHALL BE USED.

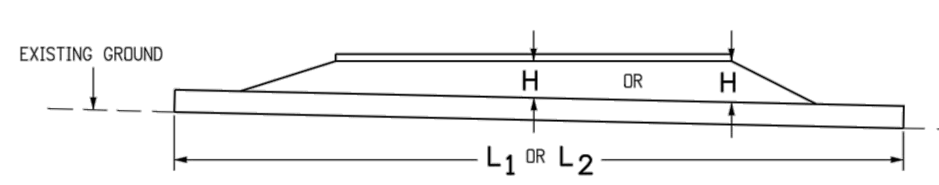
NONREINFORCED CONCRETE PIPE

1. AT THE OPTION OF THE CONTRACTOR, NONREINFORCED CONCRETE PIPE CONFORMING TO AASHTO M 86 MAY BE USED IN LIEU OF REINFORCED CONCRETE PIPE FOR ALL SIZES 36 INCHES IN DIAMETER AND SMALLER. THE NONREINFORCED CONCRETE PIPE SHALL MEET THE SAME D-LOAD TO PRODUCE THE ULTIMATE LOAD UNDER THE THREE-EDGE BEARING METHOD AS SPECIFIED FOR REINFORCED CONCRETE PIPE IN CONFORMANCE WITH AASHTO M 170. THE CONTRACTOR SHALL PROVIDE WRITTEN CERTIFICATION OF CONFORMACE. THE WALL THICKNESS OF THE NONREINFORCED PIPE MAY BE INCREASED AS REQUIRED TO MEET D-LOAD REQUIREMENT.
2. ALL REQUIREMENTS FOR REINFORCED CONCRETE PIPE, EXCEPT THOSE REFERRING TO REINFORCEMENT, SHALL APPLY TO NONREINFORCED CONCRETE PIPE.

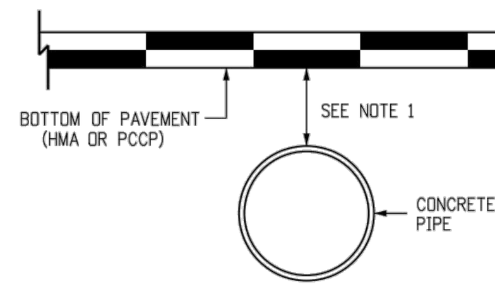


CONCRETE PIPE WITH END SECTIONS
NOTE: USE THE H THAT IS GREATER FOR MAXIMUM ALLOWABLE FILL HEIGHT.

H = MAXIMUM HEIGHT OF FILL OVER TOP OF PIPE, EXCLUDING PAVEMENT THICKNESS.
L_1 = LENGTH OF PIPE TO BE MEASURED WHEN PLACED IN ACCORDANCE WITH SECTION 617 OR 624.
L_2 = LENGTH OF PIPE TO BE MEASURED WHEN PLACED IN ACCORDANCE WITH SECTION 603.



CONCRETE PIPE WITHOUT END SECTIONS
NOTE: USE THE H THAT IS GREATER FOR MAXIMUM ALLOWABLE FILL HEIGHT.



MINIMUM COVER FOR RIGID PIPE

TYPE OF PIPE	HEIGHT OF FILL OVER TOP OF PIPE, H (FEET)				
	CLASS OF PIPE (0.01 IN. CRACK D-LOAD)				
	CLASS CIR II / CLASS VE II / CLASS HE II / 1000 D	CLASS CIR III / CLASS VE III / CLASS HE III / 1350 D	CLASS CIR IV / CLASS VE IV / CLASS HE IV / 2000 D	CLASS CIR V / CLASS VE V / —— / 3000 D	—— / CLASS VE VI / —— / 4000 D
CIRCULAR (CIR)	MIN. TO 18	MIN. TO 25	± 25 TO 37	± 37 TO 45	
VERTICAL ELLIPTICAL (VE)	MIN. TO 18	MIN. TO 25	± 25 TO 37	± 37 TO 45	± 45 TO 62
HORIZONTAL ELLIPTICAL (HE)	MIN. TO 18	MIN. TO 25	± 25 TO 37		

ALLOWABLE RANGE OF HEIGHTS FOR FILL OVER REINFORCED CONCRETE PIPE
(ALL SIZES)

Computer File Information			Sheet Revisions	
Creation Date: 07/04/12	Initials: DD		Date:	Comments
Last Modification Date: 07/04/12	Initials: LTA	(R-X)		
Full Path: www.coloradodot.info/business/designsupport		(R-X)		
Drawing File Name: 603020101.dgn		(R-X)		
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English		(R-X)		

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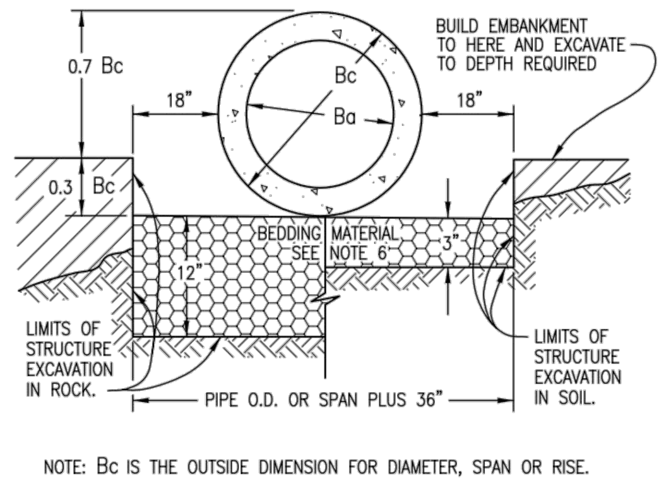
REINFORCED CONCRETE PIPE
Issued By: Project Development Branch on July 4, 2012

STANDARD PLAN NO. M-603-2
Sheet No. 1 of 1

REINFORCED CONCRETE PIPE — STANDARD PLAN NO. M-603-2 (July 04, 2006)



NOTE: Bc IS THE OUTSIDE DIMENSION FOR DIAMETER, SPAN OR RISE.

PIPE INSTALLATION
(WITH 0.7 PROJECTION RATIO)

CIRCULAR (CIR)			VERTICAL ELLIPTICAL (VE)				HORIZONTAL ELLIPTICAL (HE)			
△ PIPE SIZE= Ba (INSIDE DIA)	WALL THICKNESS	0.3 Bc (OUTSIDE DIA)	SPAN	RISE	WALL THICKNESS	0.3 OUTSIDE RISE	SPAN	RISE	WALL THICKNESS	0.3 OUTSIDE RISE
IN.	IN.	FT.	IN.	IN.	IN.	FT.	IN.	IN.	IN.	FT.
12	2	0.40								
15	2-1/4	0.49								
18	2-1/2	0.58					23	14	2-3/4	0.49
21	2-3/4	0.66								
24	3	0.75					30	19	3-1/4	0.66
27	3-1/4	0.84					34	22	3-1/2	0.73
30	3-1/2	0.92					38	24	3-3/4	0.79
33	3-3/4	1.01								
36	4	1.10	29	45	4-1/2	1.35	45	29	4-1/2	0.95
42	4-1/2	1.28	34	53	5	1.58	53	34	5	1.10
48	5	1.45	38	60	5-1/2	1.78	60	38	5-1/2	1.23
54	5-1/2	1.62	43	68	6	2.00	68	43	6	1.38
60	6	1.80	48	76	6-1/2	2.23	76	48	6-1/2	1.53
66	6-1/2	1.97	53	83	7	2.43	83	53	7	1.68
72	7	2.15	58	91	7-1/2	2.65	91	58	7-1/2	1.83
78	7-1/2	2.32	63	98	8	2.85	98	63	8	1.98
84	8	2.50	68	106	8-1/2	3.08	106	68	8-1/2	2.13
90	8-1/2	2.68	72	113	9	3.28	113	72	9	2.25
96	9	2.85	77	121	9-1/2	3.50	121	77	9-1/2	2.40
102	9-1/2	3.02	82	128	9-3/4	3.69	128	82	9-3/4	2.54
108	10	3.20	87	136	10	3.90	136	87	10	2.68

△ ALSO EQUIVALENT ROUND DIMENSION FOR ELLIPTICAL PIPE.

DIMENSIONS FOR REINFORCED CONCRETE PIPE
(FOR INFORMATION ONLY)

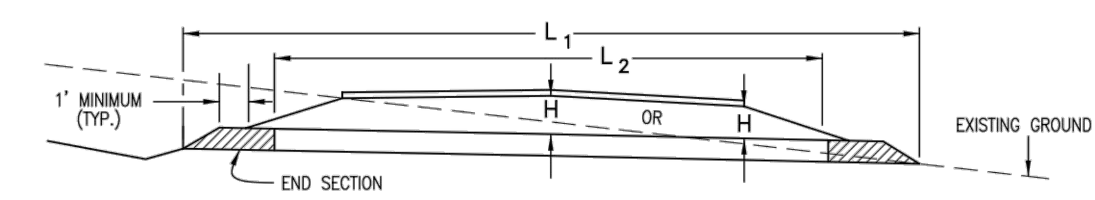
GENERAL NOTES

REINFORCED CONCRETE PIPE

1. ADEQUATE COVER SHALL BE PROVIDED DURING CONSTRUCTION TO PROTECT THE PIPE FROM DAMAGE. THE MINIMUM COVER SHALL BE AS SHOWN ON THESE TABLES OR CONFORM TO AASHTO REQUIREMENTS, WHICHEVER IS GREATER. THE MINIMUM COVER FOR REINFORCED CONCRETE PIPE IS MEASURED FROM THE TOP OF THE PIPE TO THE BOTTOM OF THE PAVEMENTS (HMA OR PCCP).
2. FILL HEIGHTS GREATER THAN MAXIMUM ALLOWED IN THE HEIGHTS OF FILL TABLE ON THIS SHEET REQUIRE SPECIAL DESIGN OF STRUCTURE.
3. PIPE DESIGN IS BASED ON SAFETY FACTOR OF 1.33 ON ULTIMATE STRENGTH.
4. THE HEIGHTS OF FILL OVER TOP OF PIPE ARE BASED ON UNIT WEIGHT OF SOIL AT 135 LBS. PER CUBIC FT.
5. PIPE CLASS IS DETERMINED FROM 0.01 IN. CRACK D-LOAD.
6. BEDDING IS CLASS B (MODIFIED) (FROM CONCRETE PIPE DESIGN MANUAL-AMERICAN CONCRETE PIPE ASSOCIATION) WITH SETTLEMENT RATIO R = 0.0 sd (YIELDING BED). BEDDING MATERIAL FOR RIGID PIPE IN SOIL SHALL BE 3 IN. LOOSE THICKNESS STRUCTURE BACKFILL CLASS 2. BEDDING MATERIAL FOR RIGID PIPE IN ROCK SHALL BE 12 IN. LOOSE THICKNESS STRUCTURE BACKFILL CLASS 1.
7. CHANGES IN DESIGN FACTORS REQUIRE COMPENSATING CHANGES IN PIPE DESIGN.
8. MINIMUM WALL THICKNESS DIMENSIONS ARE BASED ON AASHTO M 170 (WALL B) FOR CIRCULAR PIPE, AND AASHTO M 207 FOR ELLIPTICAL PIPE.
9. SPACING FOR MULTIPLE PIPE INSTALLATIONS SHALL CONFORM TO THE DETAILS SHOWN ON STANDARD PLAN M-206-1.
10. WHEN A PIPE IS TO BE EXTENDED, THE SAME PIPE MATERIAL AND SIZE AS IN THE ORIGINAL PIPE INSTALLATION SHALL BE USED.

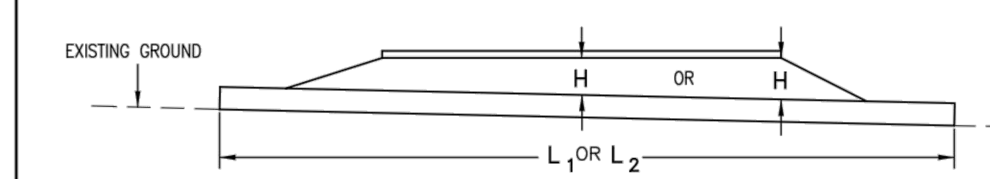
NONREINFORCED CONCRETE PIPE

1. AT THE OPTION OF THE CONTRACTOR, NONREINFORCED CONCRETE PIPE CONFORMING TO AASHTO M 86 MAY BE USED IN LIEU OF REINFORCED CONCRETE PIPE FOR ALL SIZES 36 INCHES IN DIAMETER AND SMALLER. THE NONREINFORCED CONCRETE PIPE SHALL MEET THE SAME D-LOAD TO PRODUCE THE ULTIMATE LOAD UNDER THE THREE-EDGE BEARING METHOD AS SPECIFIED FOR REINFORCED CONCRETE PIPE IN CONFORMANCE WITH AASHTO M 170. THE CONTRACTOR SHALL PROVIDE WRITTEN CERTIFICATION OF CONFORMANCE. THE WALL THICKNESS OF THE NONREINFORCED PIPE MAY BE INCREASED AS REQUIRED TO MEET D-LOAD REQUIREMENT.
2. ALL REQUIREMENTS FOR REINFORCED CONCRETE PIPE, EXCEPT THOSE REFERRING TO REINFORCEMENT, SHALL APPLY TO NONREINFORCED CONCRETE PIPE.

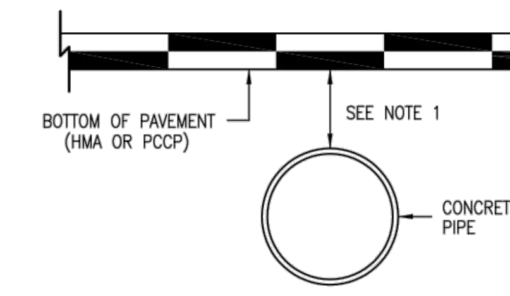


CONCRETE PIPE WITH END SECTIONS
NOTE: USE THE H THAT IS GREATER FOR MAXIMUM ALLOWABLE FILL HEIGHT.

H = MAXIMUM HEIGHT OF FILL OVER TOP OF PIPE, EXCLUDING PAVEMENT THICKNESS.
L_1 = LENGTH OF PIPE TO BE MEASURED WHEN PLACED IN ACCORDANCE WITH SECTION 617 OR 624.
L_2 = LENGTH OF PIPE TO BE MEASURED WHEN PLACED IN ACCORDANCE WITH SECTION 603.



CONCRETE PIPE WITHOUT END SECTIONS
NOTE: USE THE H THAT IS GREATER FOR MAXIMUM ALLOWABLE FILL HEIGHT.



MINIMUM COVER FOR RIGID PIPE

TYPE OF PIPE	HEIGHT OF FILL OVER TOP OF PIPE, H (FEET)				
	CLASS OF PIPE (0.01 IN. CRACK D-LOAD)				
	CLASS CIR II / CLASS VE II / CLASS HE II / 1000 D	CLASS CIR III / CLASS VE III / CLASS HE III / 1350 D	CLASS CIR IV / CLASS VE IV / CLASS HE IV / 2000 D	CLASS CIR V / CLASS VE V / —— / 3000 D	—— / CLASS VE VI / —— / 4000 D
CIRCULAR (CIR)	MIN. TO 18	MIN. TO 25	± 25 TO 37	± 37 TO 45	
VERTICAL ELLIPTICAL (VE)	MIN. TO 18	MIN. TO 25	± 25 TO 37	± 37 TO 45	± 45 TO 62
HORIZONTAL ELLIPTICAL (HE)	MIN. TO 18	MIN. TO 25	± 25 TO 37		

ALLOWABLE RANGE OF HEIGHTS FOR FILL OVER REINFORCED CONCRETE PIPE
(ALL SIZES)

Computer File Information			Sheet Revisions	
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Last Modification Date: 07/04/06	Initials: LTA	(R-X)		
Full Path: www.dot.state.co.us/DesignSupport/		(R-X)		
Drawing File Name: 603020101.dwg		(R-X)		
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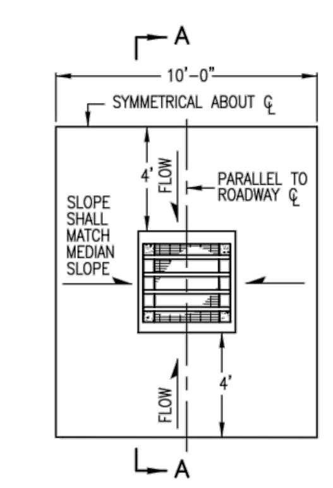
Project Development Branch SRJ/LTA

REINFORCED CONCRETE PIPE
Issued By: Project Development Branch on July 04, 2006

STANDARD PLAN NO. M-603-2
Sheet No. 1 of 1

INLET, TYPE C — STANDARD PLAN NO. M-604-10

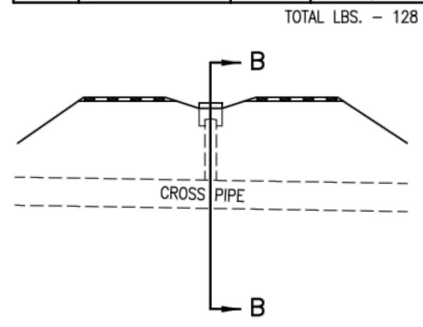


INLET WITH DITCH PAVING

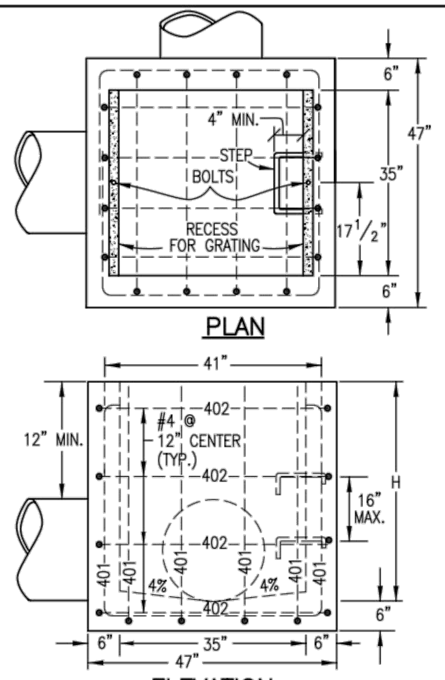
STEEL GRATE QUANTITIES

NO. PIECES	DESCRIPTION	LENGTH	LBS PER FT.	WEIGHT (LBS.)
4	S4 x 7.7 BEAM	40"	7.70	103
2	3-1/2" x 1/4" FLAT	26-5/8"	2.98	13
2	3" x 1/4" FLAT	26-5/8"	2.55	12

TOTAL LBS. – 128

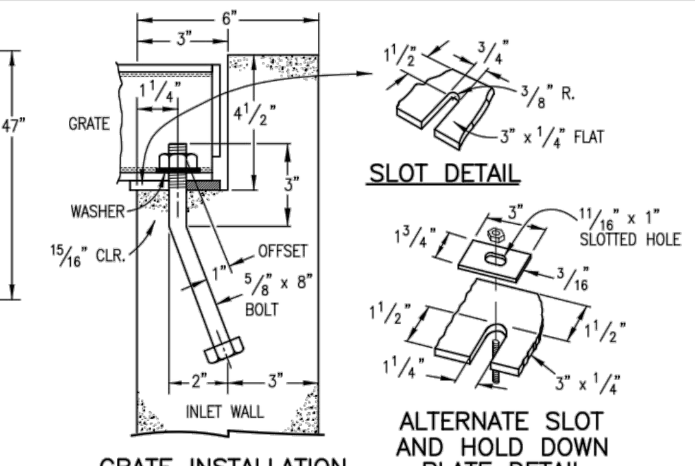


SECTION VIEW



PLAN

ELEVATION CONCRETE INLET



GRATE INSTALLATION DETAIL

SLOT DETAIL

ALTERNATE SLOT AND HOLD DOWN PLATE DETAIL

GENERAL NOTES

1. CONCRETE SHALL BE CLASS B. INLET MAY BE CAST-IN-PLACE OR PRECAST.
2. REINFORCING BARS SHALL BE EPOXY COATED AND DEFORMED #4, AND SHALL HAVE A MINIMUM 2 IN. CLEARANCE. CUT OR BEND AROUND PIPES AS REQUIRED.
3. CONCRETE SLOPE AND DITCH PAVING SHALL BE IN ACCORDANCE WITH SECTION 507. REINFORCEMENT FOR CONCRETE SLOPE PAVING SHALL BE 6 X 6 – W1.4 X W1.4 OR 6 X 6 – W2.1 X W2.1.
4. STRUCTURAL STEEL FOR GRATES AND GRATE INSTALLATION HARDWARE SHALL BE GALVANIZED, AND SHALL BE IN ACCORDANCE WITH SUBSECTION 712.06.
5. THE STANDARD INLET GRATES SHALL BE USED ON ALL TYPE C INLETS UNLESS CLOSE MESH GRATES ARE SPECIFIED ON THE PLANS.
6. STEPS SHALL BE PROVIDED WHEN INLET DIMENSION "H" IS EQUAL TO OR GREATER THAN 3 FT. – 6 IN., AND SHALL CONFORM TO AASHTO M 199.
7. SEE STANDARD PLAN M-604-11, FOR REINFORCEMENT AROUND THE PIPE OPENING.

* CONCRETE SLOPE AND DITCH PAVING WILL BE REQUIRED WHEN SHOWN ON THE PLANS.

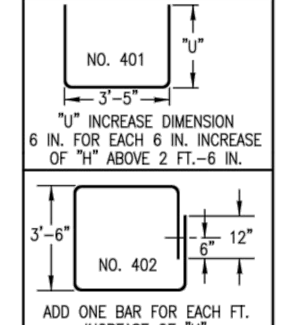
QUANTITIES FOR ONE INLET

H	CONCRETE ▼ (CU. YDS.)	STEEL ▼ (LBS.)	NO. STEPS REQ'D.
2'-6"	0.9	75	0
3'-0"	1.0	80	0
3'-6"	1.2	96	0
4'-0"	1.3	101	1
4'-6"	1.4	116	2
5'-0"	1.5	122	2
5'-6"	1.7	137	2
6'-0"	1.8	142	3
6'-6"	1.9	158	3
7'-0"	2.0	163	3
7'-6"	2.2	179	4
8'-0"	2.3	184	4
8'-6"	2.4	199	4
9'-0"	2.5	205	5
9'-6"	2.7	220	5
10'-0"	3.0	235	6
11'-6"	3.4	251	6

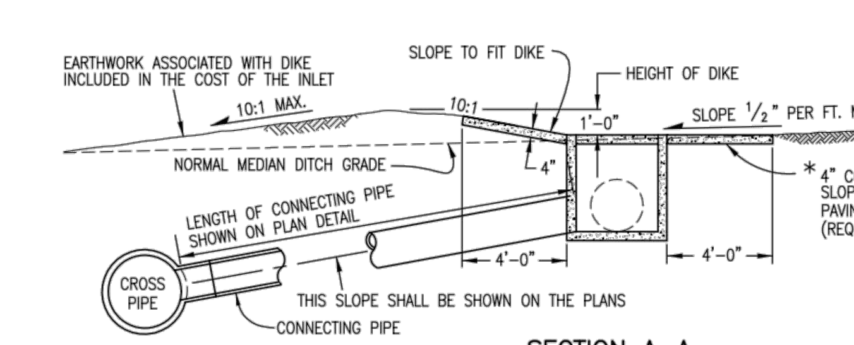
▼ PIPE INSIDE DIAMETER SHALL BE 30 IN. OR LESS. CONCRETE AND STEEL QUANTITIES ARE FOR ONE ENTIRE INLET BEFORE DEDUCTION FOR VOLUME OCCUPIED BY PIPE. WEIGHT OF STEEL INCLUDES A RING FOR THE MAXIMUM PIPE DIAMETER.

BAR LIST FOR H=2 FT–6 IN. AND BENDING DIAGRAM

MARK	NO. REQ'D.	HEIGHT	LENGTH
401	2	2'-3"	7'-11"
401	6	2'-7"	8'-7"
402	3	"U"	15'-0"

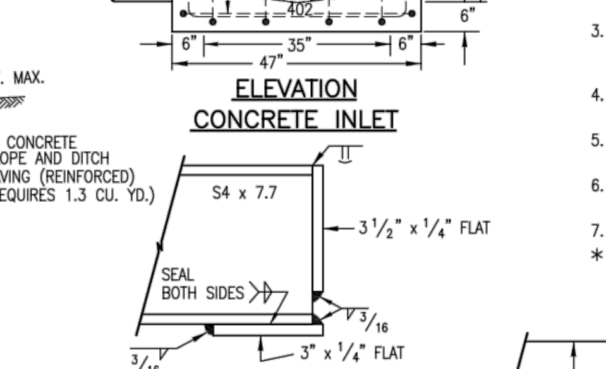


402 BARS SHALL BE EQUALLY SPACED FROM EACH OTHER.

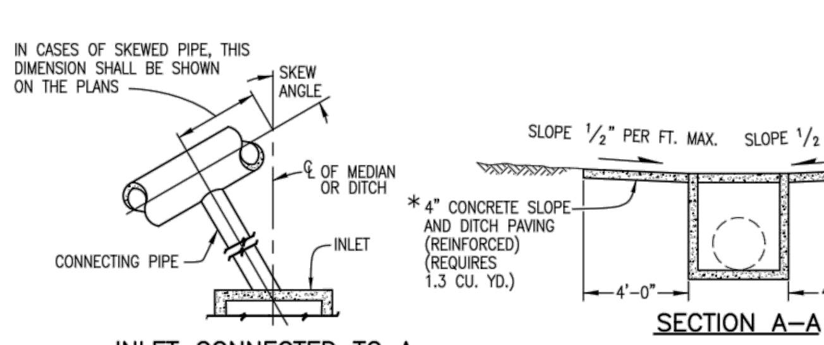


SECTION B-B
INLET CONNECTED TO A CROSS PIPE

SECTION A-A
INLET ON GRADE (FLOW FROM ONE DIRECTION)

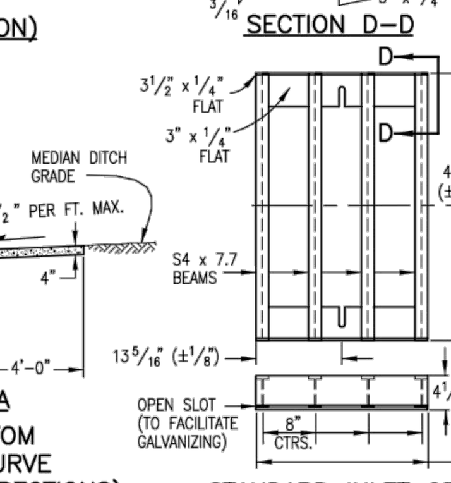


SECTION D-D

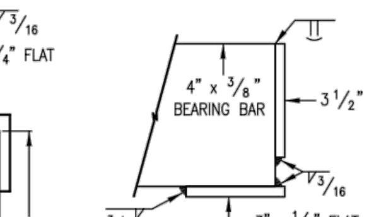


INLET CONNECTED TO A SKEWED CROSS PIPE

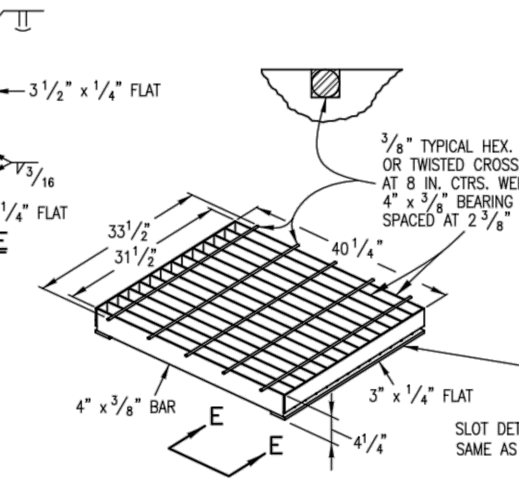
SECTION A-A
INLET AT BOTTOM OF VERTICAL CURVE (FLOW FROM TWO DIRECTIONS)



STANDARD INLET GRATE



SECTION E-E



CLOSE MESH GRATE
USE FOR PEDESTRIAN AND BICYCLE AREAS ONLY.

Computer File Information			Sheet Revisions	
Creation Date: 07/04/06	Initials: SJR		Date:	Comments
Last Modification Date: 07/04/06	Initials: LTA	(R-X)		
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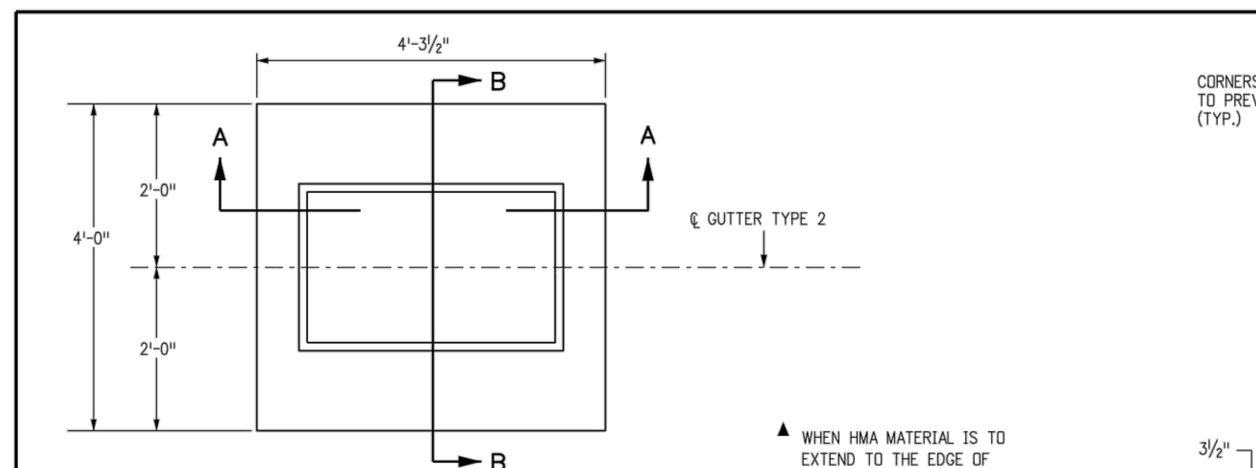
Project Development Branch SRJ/LTA

INLET, TYPE C
Issued By: Project Development Branch on July 04, 2006

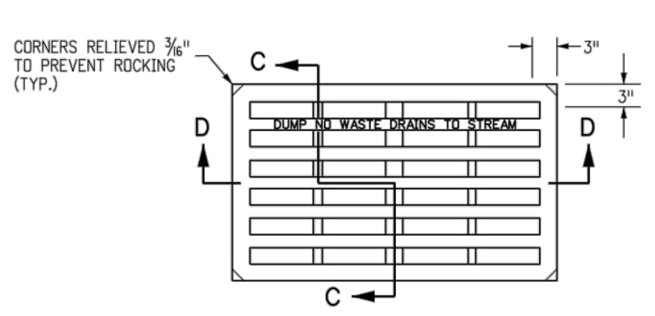
STANDARD PLAN NO. M-604-10
Sheet No. 1 of 1

CONCRETE INLET TYPE 13 — STANDARD PLAN NO. M-604-13

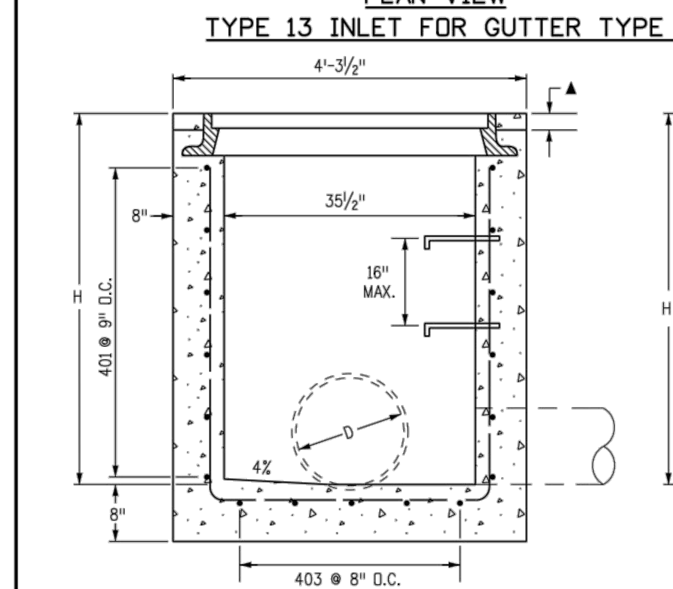


PLAN VIEW
TYPE 13 INLET FOR GUTTER TYPE 2

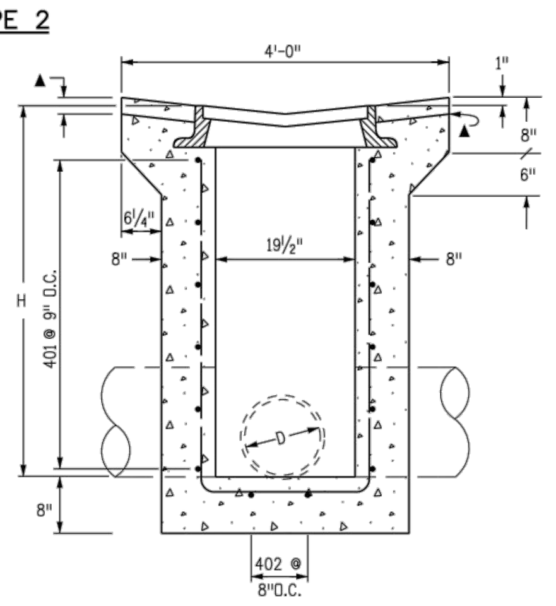
▲ WHEN HMA MATERIAL IS TO EXTEND TO THE EDGE OF THE GRATING FRAME, CONCRETE MAY BE DEPRESSED.



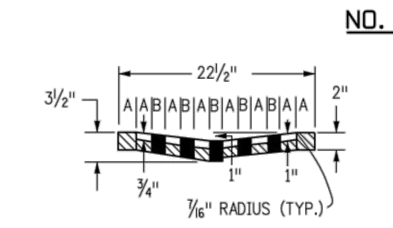
NO. 13 GRATE



SECTION A-A
D MAX = 30 IN. FOR H > 4 FT.

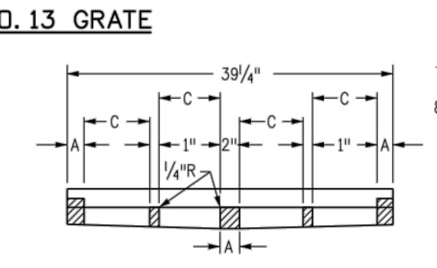


SECTION B-B
D MAX = 18 IN. FOR ALL H

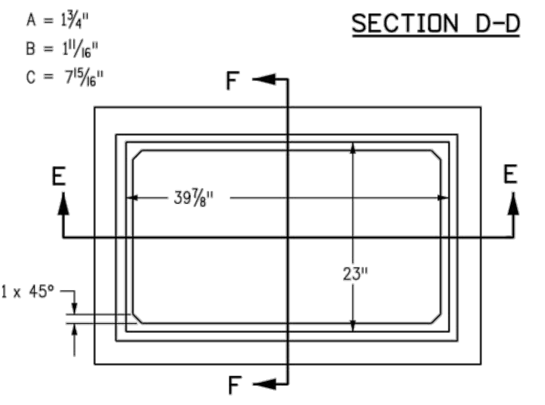


SECTION C-C

A = 1-3/4"
B = 1-11/16"
C = 7-15/16"



SECTION D-D



NO. 13 GRATING & FRAMES

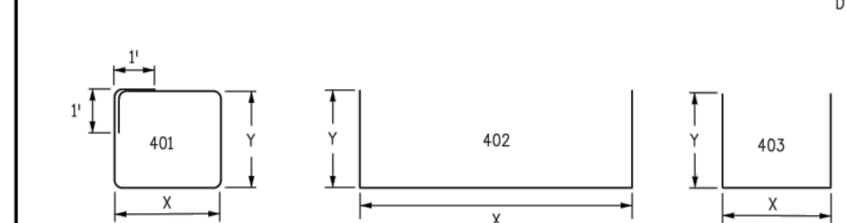
GENERAL NOTES

1. CONCRETE SHALL BE CLASS B. INLET MAY BE CAST-IN-PLACE OR PRECAST.
2. CAST-IN-PLACE CONCRETE WALLS SHALL BE FORMED ON BOTH SIDES.
3. EXPOSED CONCRETE CORNERS SHALL BE CHAMFERED 3/4 OF A INCH.
4. REINFORCING BARS SHALL BE DEFORMED #4 AND SHALL HAVE A 2 INCH MINIMUM CLEARANCE. ALL REINFORCING BARS SHALL BE GRADE 60 AND EPOXY COATED.
5. STEPS SHALL BE PROVIDED WHEN INLET DIMENSION "H" IS EQUAL TO OR GREATER THAN 3 FEET-6 INCHES AND SHALL CONFORM TO AASHTO M 199.
6. ALL GRATES AND FRAMES SHALL BE GRAY OR DUCTILE CAST IRON IN ACCORDANCE WITH SUBSECTION 712.06. GRATES AND FRAMES SHALL BE DESIGNED TO WITHSTAND HS 20 LOADING.
7. STATION POINT IS AT THE CENTER OF THE INLET.
8. GRATE SHALL HAVE "DUMP NO WASTE DRAINS TO STREAM" MESSAGE CAST ON SURFACE.

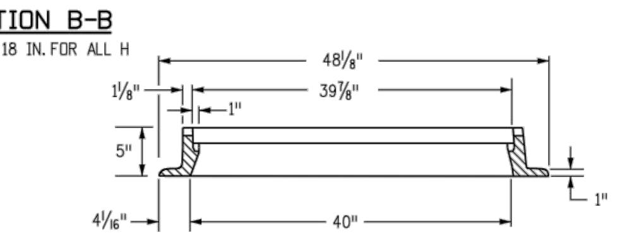
H	CONCRETE	REINFORCING STEEL	NO. OF 401 BARS REQ'D.	MAXIMUM PIPE I.D.	
	CU. YDS.	θ LB.		SEC. A-A IN.	SEC. B-B IN.
3'-0"	1.3	72	4	18	18
3'-6"	1.5	76	4	24	18
4'-0"	1.6	90	5	30	18
4'-6"	1.8	104	6	30	18
5'-0"	1.9	109	6	30	18
5'-6"	2.1	122	7	30	18
6'-0"	2.2	136	8	30	18
6'-6"	2.4	141	8	30	18
7'-0"	2.5	154	9	30	18
7'-6"	2.7	168	10	30	18
8'-0"	2.8	173	10	30	18
8'-6"	3.0	187	11	30	18
9'-0"	3.1	200	12	30	18
9'-6"	3.3	205	12	30	18
10'-0"	3.4	219	13	30	18

θ INCLUDES 1% FOR OVERRUN.
NOTE: CONCRETE QUANTITIES INCLUDE VOLUME OCCUPIED BY PIPE.

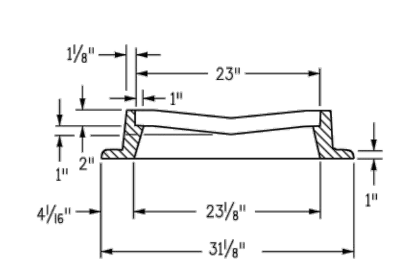
QUANTITIES FOR ONE INLET



BENDING DIAGRAMS
ALL DIMENSIONS ARE OUT-TO-OUT OF BAR.



SECTION E-E
APPROXIMATE WEIGHT = 590 LBS.



SECTION F-F

MARK	NO. REQ'D.	DIMENSIONS X	DIMENSIONS Y	LENGTH
401	4	3'-6"	2'-2"	13'-4"
402	2	3'-4-1/2"	* 2'-6-1/2"	8'-5-1/2"
403	5	2'-1/2"	* 2'-7"	7'-2-1/2"

* ADD 6 IN. TO THIS DIMENSION FOR EACH 6 IN. INCREASE OF "H" OVER 3 FT.-0 IN.

BAR LIST FOR H = 3 FT.-0 IN.

Computer File Information		Sheet Revisions	
Creation Date: 07/31/19		Date:	Comments
Designer Initials: JBK	(R-X)		
Last Modification Date: 07/31/19	(R-X)		
Detailer Initials: LTA	(R-X)		
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	(R-X)		

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Project Development Branch JBK

CONCRETE INLET TYPE 13
Issued by the Project Development Branch: July 31, 2019

STANDARD PLAN NO. M-604-13
Standard Sheet No. 1 of 1
Project Sheet Number:

CITY OF LONE TREE ACCEPTANCE BLOCK

THESE DRAWINGS HAVE BEEN REVIEWED BY THE CITY OF LONE TREE FOR TEMPORARY EROSION AND SEDIMENT CONTROL IMPROVEMENTS ONLY.

DEVELOPMENT SERVICES DEPARTMENT DATE

FILEPATH: K:\220407\ENGINEERING\UTILITIES\STORM\ST - DETAILS.DWG LAYOUT: LAYOUT1
NO XREFs
PLOTTED: MON 03/20/23 2:51:43P BY: AIDAN LOWE

Know what's below. Call before you dig.

DESIGNED BY: LME
CHECKED BY: JDO
DRAWN BY: LME

ISSUE DATE: 11-11-2022

DATE	REVISION COMMENTS
01-27-2023	PER CITY COMMENTS
03-17-2023	ISSUED FOR CONSTRUCTION

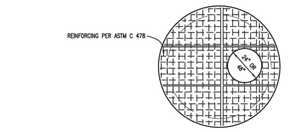
HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
Denver, Colorado 80203
P: 303.623.6300 F: 303.623.6311
HarrisKocherSmith.com

PARK MEADOWS MALL, LLC /
PARK MEADOWS ANCHOR ACQUISITION, LLC

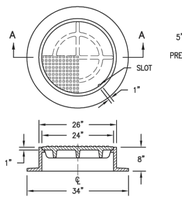
PARK MEADOWS - MIXED USE DEVELOPMENT
STORM SEWER DETAILS

COLORADO LICENSED PROFESSIONAL ENGINEER MARK A. WEST 38561 03/20/2023

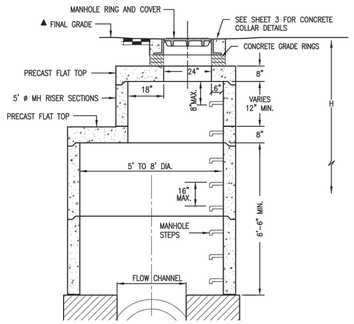
PROJECT #: 220407
SHEET NUMBER
ST11
11 OF 15

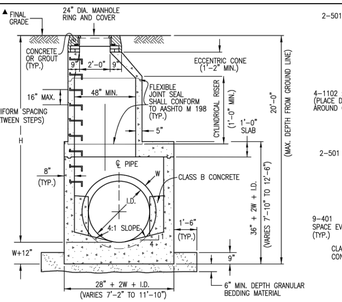


FLAT TOP SECTION DETAIL

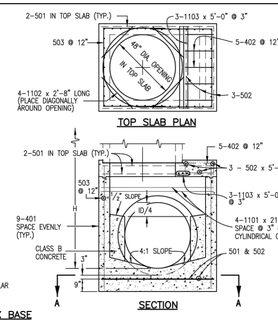


SECTION A–A
MANHOLE RING AND COVER





SECTION



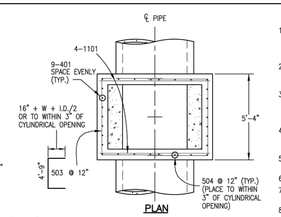
SECTION

MANHOLE BOX BASE

MARK	SIZE	TYPE	WT. #/FT.	BARS	I.D. 54"	I.D. 60"	I.D. 66"	I.D. 72"	I.D. 84"	I.D. 96"	FORMULAS
401	4	I	0.668	NO. REQ'D. / LENGTH / WEIGHT #	18 8'–1" 97.2	18 8'–8" 104.2	18 9'–3" 111.2	18 9'–10" 118.2	18 11'–0" 132.3	18 12'–2" 146.3	401 BAR LENGTH = 32"+2W+I.D.
402	4	III	0.668	NO. REQ'D. / LENGTH / WEIGHT #	5 5'–5" 18.1	5 6'–0" 20.0	5 6'–7" 22.0	5 7'–2" 23.9	5 8'–4" 27.8	5 9'–6" 31.7	402 BAR LENGTH = I.D. + 2W
501	5	I	1.043	NO. REQ'D. / LENGTH / WEIGHT #	17 7'–5" 131.5	17 8'–0" 141.8	17 8'–7" 152.2	17 9'–2" 162.5	17 10'–4" 183.2	17 11'–6" 203.9	501 BAR LENGTH = 24" + I.D. + 2W
502	5	I	1.043	NO. REQ'D. / LENGTH / WEIGHT #	23 5'–0" 114.7	25 5'–0" 119.9	26 5'–0" 130.4	28 5'–0" 135.6	29 5'–0" 151.2	32 5'–0" 166.9	502 NUMBER BARS REQ'D. = 3 + ((24+I.D.+2W)/@ 5" +1)
503	5	II	1.043	NO. REQ'D. / LENGTH / WEIGHT #	16 12'–10" 214.2	16 13'–5" 223.9	18 14'–0" 262.8	18 14'–7" 273.8	20 15'–9" 328.5	24 16'–11" 423.5	503 NUMBER BARS REQ'D. = 2 ((134+I.D.+2W)/@ 12" +1) BAR LENGTH = 4'–9"+2(16+W+I.D./2)
504	5	I	1.043	NO. REQ'D. / LENGTH / WEIGHT #	12 8'–1" 101.2	14 8'–8" 126.6	14 9'–4" 135.1	16 9'–10" 164.1	18 11'–0" 206.5	20 12'–2" 253.8	504 NUMBER BARS REQ'D. = 2 ((2W+I.D.–4)/@ 12" +1) BAR LENGTH = 32"+2W+I.D.
1101	11	I	5.313	NO. REQ'D. / LENGTH / WEIGHT #	6 7'–2" 152.3	6 7'–9" 164.7	6 8'–4" 177.1	3 +11 8'–11" 189.5	4 10'–1" 214.3	4 11'–3" 239.1	1101 BAR LENGTH = 21" + I.D. + 2W
1102	11	I	5.313	NO. REQ'D. / LENGTH / WEIGHT #	6 2'–8" 56.7	6 2'–8" 56.7	6 2'–8" 56.7	5 2'–8" 56.7	6 2'–8" 56.7	6 2'–8" 56.7	BENDING TYPE I STRAIGHT; TYPE II 4'–9", 16"+W+I.D./2; TYPE III 12", 12", 7", I.D.+2W–38"
1103	11	I	5.313	NO. REQ'D. / LENGTH / WEIGHT #	3 5'–0" 79.7	3 5'–0" 79.7	3 5'–0" 79.7	3 5'–0" 79.7	3 5'–0" 79.7	3 5'–0" 79.7	
REINFORCING STEEL TOTAL #					965.6	1,037.5	1,127.2	1,204.0	1,380.2	1,601.6	
CONCRETE – CUBIC YARDS – TOTAL					6.0	6.6	7.3	8.0	9.5	11.1	

NOTE: QUANTITIES ARE BASED ON SAME SIZE PIPE ENTRANCE TO AND EXIT FROM, BASE AND A 4 FT. MANHOLE ENTRANCE INTO TOP SLAB OF BASE.

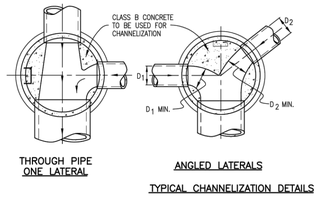
QUANTITIES FOR CONCRETE MANHOLE BOX BASE



GENERAL NOTES

1. SINCE ALL PIPE ENTRIES INTO THE BASE ARE VARIABLE, THE DIMENSIONS SHOWN ARE TYPICAL. ACTUAL DIMENSIONS AND QUANTITIES FOR CONCRETE AND REINFORCEMENT SHALL BE AS REQUIRED IN THE WORK.
2. THE PRECAST FLAT TOP MAY BE USED ON ANY MANHOLE. THE ECCENTRIC CONE MAY BE USED WHEN THE MANHOLE "H" HEIGHT IS AT LEAST 8 FT.
3. THE MANHOLE RING FRAME SHALL BE SET IN A BED OF GROUT. THE FRAME SHALL BE SURROUNDED WITH A CEMENT GROUT IN UNPAVED AREA, OR A CONCRETE COLLAR IN PAVED AREA. SEE DETAILS ON SHEETS 2 AND 3.
4. DESIGN OF BOX BASE IS BASED ON STRAIGHT RUNS OF PIPE OR CHANGE IN DIRECTION OF LESS THAN 45°. SPECIAL DESIGN IS REQUIRED FOR 45° OR GREATER.
5. PRECAST MANHOLES AND REINFORCEMENT SHALL CONFORM TO AASHTO M 199 (ASTM C 478).
6. CAST–IN–PLACE MANHOLES SHALL BE CLASS B CONCRETE.
7. STEPS ARE REQUIRED WHEN THE MANHOLE DEPTH EXCEEDS 3 FT.–6 IN. AND SHALL CONFORM TO AASHTO M 199.
8. ALL REINFORCING STEEL SHALL BE GRADE 60 AND EPOXY COATED. VERTICAL STEEL SHALL BE PLACED AT CENTERLINE OF WALL. ALL BARS SHALL HAVE A 2 IN. MINIMUM CLEARANCE.
9. ALL PIPE ENTRIES INTO THE BASE OF MANHOLE SHALL BE CONNECTED BY OPEN CHANNELIZATION ADJUSTED FOR PIPE SIZE, SHAPE, SLOPE, AND DIRECTION OF FLOW. DETAILS SHOWN ARE TYPICAL FOR INSTALLATIONS WITH ALL INVERTS OF SAME RELATIVE ELEVATION. FOR EXCESSIVE ELEVATION DIFFERENCE BETWEEN INVERTS, SPECIAL BASE/CHANNEL DETAILS WILL BE SHOWN ON THE PLANS.
10. FLOW CHANNELS AND INVERTS SHALL BE FORMED BY SHAPING WITH CLASS B CONCRETE OR APPROVED GROUT.
11. STUB–OUTS SHALL EXTEND 2 FT. MINIMUM BEYOND OUTSIDE WALL SURFACE OF MANHOLE AND BE SATISFACTORILY PLUGGED.
12. THE SLOPE OF THE MANHOLE COVER SHALL MATCH THE ROADWAY PROFILE AND CROSS SLOPE.

▲ WHEN FINAL GRADE IS PAVEMENT SURFACE, RECESS MANHOLE RING AND COVER 1/4" MIN. TO 1/2" MAX.



TYPICAL CHANNELIZATION DETAILS

Computer File Information		Sheet Revisions	
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Last Modification Date: 07/04/06 Initials: LTA			
Full Path: www.dot.state.co.us/DesignSupport/			
Drawing File Name: 604020102.dwg			
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English			

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MANHOLES

Issued By: Project Development Branch on July 04, 2006

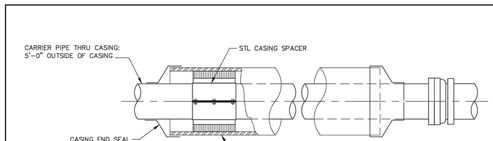
STANDARD PLAN NO.
M-604-20
Sheet No. 1 of 3

REFERENCE:
CDOT M & S STANDARDS
M-604-20

MANHOLES

DOUGLAS COUNTY COLORADO

Issued: 05/2013
Revised:
Drawing No. SP.43e



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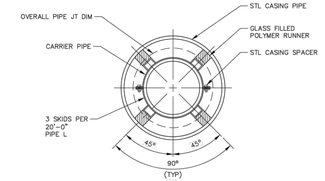
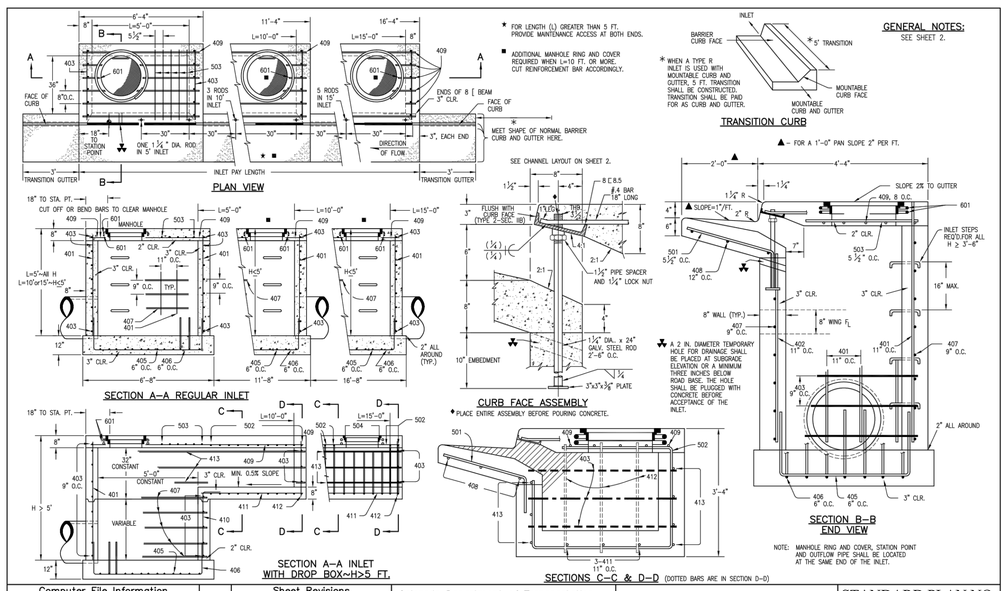


PIPE CASING

CARRIER PIPE NOMINAL ø	CASING PIPE MIN OD	CASING PIPE MIN WALL THICKNESS
4"	12"	0.25"
6"	16"	0.3125"
8"	18"	0.3125"
12"	22"	0.375"
16"	28"	0.500"
20"	32"	0.500"

NOTE:
CASING LENGTH CALCULATED ACCORDING TO (33217).

DRAWN BY: BAIRES	33218 BORE CASING DETAIL	DENVER WATER
CHKD BY: K ROSS/ KLR		1600 West 12th Ave Denver, Colorado 80204–3412 T: 303.628.6000 F: 303.628.6199 denverwater.org
APPD BY:		
ORIGINATION DATE: JULY 2021		
REVISION DATE:		



GENERAL NOTES:
SEE SHEET 2.

MARK	BAR # OR SIZE	O.C. SPACING	TYPE	ALL INLETS L = 5 FT. NO. REQ'D.	ALL INLETS L = 5 FT. LENGTH	INLETS: H ≤ 5 FT. L = 10 FT. NO. REQ'D.	INLETS: H ≤ 5 FT. L = 10 FT. LENGTH	INLETS: H ≤ 5 FT. L = 15 FT. NO. REQ'D.	INLETS: H ≤ 5 FT. L = 15 FT. LENGTH	INLETS: H > 5 FT. L = 10 FT. NO. REQ'D.	INLETS: H > 5 FT. L = 10 FT. LENGTH	INLETS: H > 5 FT. L = 15 FT. NO. REQ'D.	INLETS: H > 5 FT. L = 15 FT. LENGTH
401	4	11"	II	15	*	21	*	26	*	11	*	11	*
402	4	11"	II	7	*	13	*	18	*	7	*	7	*
403	4	9"	II	*	4'–0"	*	4'–0"	*	4'–0"	*	4'–0"	*	4'–0"
405	4	6"	VI	11	6'–10"	21	6'–10"	31	6'–10"	11	6'–10"	11	6'–10"
406	4	6"	VIII	7	8'–10"	7	13'–10"	7	18'–10"	7	8'–10"	7	8'–10"
407	4	9"	II	*	5'–10"	*	10'–10"	*	15'–10"	*	5'–10"	*	5'–10"
408	4	12"	II	3	6'–10"	3	11'–10"	3	16'–10"	3	11'–10"	3	16'–10"
409	4	8"	II	6	5'–10"	6	10'–10"	6	15'–10"	6	10'–10"	6	15'–10"
410	4	11"	VII							3	*	3	*
411	4	11"	II							3	5'–2"	3	10'–2"
412	4	11"	II							3	7'–9"	3	2'–9"
413	4	9"	II							7	10'–10"	7	15'–10"
501	5	5½"	IV	11	3'–4"	22	3'–4"	33	3'–4"	22	3'–4"	33	3'–4"
502	5	5½"	III							11	11'–5"	17	11'–5"
503	5	5½"	II	5	3'–6"	16	3'–6"	27	3'–6"	6	3'–6"	6	3'–6"
504	5	5½"	IX									5	8'–4"
601	6	2½"	V	2	8'–10"	2	8'–10"	2	8'–10"	2	8'–10"	4	8'–10"
■BC8.5				1 2 BARS, 1 RODS	5'–10"	1 4 BARS, 2 RODS	10'–10"	1 8 BARS, 5 RODS	15'–10"	1 4 BARS, 2 RODS	10'–10"	1 8 BARS, 5 RODS	15'–10"

REGULAR INLETS | DROP BOX INLETS

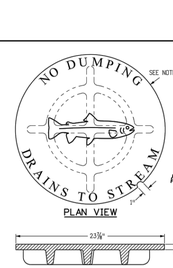
♦ VARIABLE REFER TO TABLE TWO.
■ INCLUDE #4, 18 IN. BARS (SEE CHANNEL LAYOUT).

TABLE ONE ~ BAR LIST FOR CURB INLETS, TYPE "R"

"H"	LENGTH 401	LENGTH 402	LENGTH 410	NO. REQ'D. REGULAR 403	NO. REQ'D. REGULAR 407	NO. REQ'D. DROP BOX 403	NO. REQ'D. DROP BOX 407	L = 5 FT. CONC. CU. YDS.	L = 5 FT. STEEL LBS.	L = 10 FT. CONC. CU. YDS.	L = 10 FT. STEEL LBS.	L = 15 FT. CONC. CU. YDS.	L = 15 FT. STEEL LBS.
3'–0"	2'–8"	1'–8"		10	7			3.2	285	5.3	497	7.4	706
3'–6"	3'–2"	2'–2"		10	7			3.4	305	5.7	528	7.9	747
4'–0"	3'–8"	2'–8"		12	9			3.7	326	6.0	559	8.4	786
4'–6"	4'–2"	3'–2"		12	9			3.9	334	6.4	571	8.8	803
5'–0"	4'–8"	3'–8"		14	11			4.1	354	6.7	602	9.3	844
5'–6"	5'–2"	4'–2"	3'–5"	16	13	15	6	4.4	375	6.9	607	7.4	850
6'–0"	5'–8"	4'–8"	3'–11"	16	13	16	6	4.6	382	6.2	616	7.6	860
6'–6"	6'–2"	5'–2"	4'–5"	18	15	18	8	4.8	402	6.4	637	7.8	880
7'–0"	6'–8"	5'–8"	4'–11"	20	17	18	10	5.0	423	6.6	654	8.0	897
7'–6"	7'–2"	6'–2"	5'–5"	20	17	20	10	5.3	430	6.9	664	8.3	907
8'–0"	7'–8"	6'–8"	5'–11"	22	19	22	12	5.5	451	7.1	684	8.5	927
8'–6"	8'–2"	7'–2"	6'–5"	24	21	23	14	5.7	471	7.3	702	8.7	944
9'–0"	8'–8"	7'–8"	6'–11"	24	21	24	14	6.0	479	7.6	711	9.0	954
9'–6"	9'–2"	8'–2"	7'–5"	26	23	26	16	6.2	499	7.8	732	9.2	974
10'–0"	9'–8"	8'–8"	7'–11"	28	25	27	18	6.4	520	8.0	749	9.4	992
10'–6"	10'–2"	9'–2"	8'–5"	28	25	28	18	6.7	527	8.3	759	9.7	1000
11'–0"	10'–8"	9'–8"	8'–11"	30	27	30	20	6.9	547	8.5	779	9.9	1022

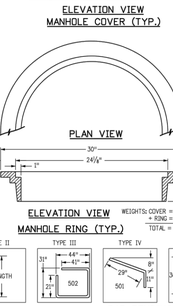
NOTES: FOR L= 5 FT., L=10 FT., AND L=15 FT.
REGULAR INLETS: TOTAL QUANTITIES NEEDED ARE OUTSIDE THE HEAVY BLACK LINE.
DROP BOX INLETS: TOTAL QUANTITIES NEEDED ARE INSIDE THE HEAVY BLACK LINE.
STEEL WEIGHTS DO NOT INCLUDE STRUCTURAL STEEL CHANNEL.

TABLE TWO ~ BARS AND QUANTITIES VARIABLE WITH "H"

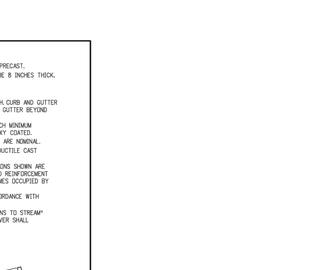


GENERAL NOTES

1. CONCRETE SHALL BE CLASS B. INLET MAY BE CAST–IN–PLACE OR PRECAST.
2. CONCRETE WALLS SHALL BE FORMED ON BOTH SIDES AND SHALL BE 8 INCHES THICK.
3. INLET STEPS SHALL BE IN CONFORMANCE WITH AASHTO M 199.
4. CURB FACE ASSEMBLY SHALL BE GALVANIZED AFTER WELDING.
5. EXPOSED CONCRETE CORNERS SHALL BE CHAMFERED 3/4" OF A INCH. CURB AND GUTTER CORNERS SHALL BE FINISHED TO MATCH THE EXISTING CURB AND GUTTER BEYOND THE TRANSITION GUTTER.
6. REINFORCING BARS SHALL BE DEFORMED AND SHALL HAVE A 2 INCH MINIMUM CLEARANCE. ALL REINFORCING BARS SHALL BE GRADE 60 AND EPOXY COATED.
7. DIMENSIONING AND WEIGHTS OF TYPICAL MANHOLE RING AND COVER ARE NOMINAL.
8. MATERIAL FOR MANHOLE RINGS AND COVERS SHALL BE GRAY OR DUCTILE CAST IRON IN ACCORDANCE WITH SUBSECTION 712.06.
9. SINCE PIPE ENTRIES INTO THE INLET ARE VARIABLE, THE DIMENSIONS SHOWN ARE TYPICAL. ACTUAL DIMENSIONS AND QUANTITIES FOR CONCRETE AND REINFORCEMENT SHALL BE AS REQUIRED IN THE WORK. QUANTITIES INCLUDE VOLUMES OCCUPIED BY PIPES.
10. STRUCTURAL STEEL SHALL BE GALVANIZED AND SHALL BE IN ACCORDANCE WITH SUBSECTION 712.06.
11. ALL MANHOLE COVERS SHALL BE CAST WITH A "NO DUMPING DRAINS TO STREAM" MESSAGE AND A FISH SYMBOL. THE SURFACE OF THE MANHOLE COVER SHALL HAVE A NON–SLIP PATTERN.



BAR BENDING DIAGRAMS ~ (DIMENSIONS ARE OUT–TO–OUT OF BAR)



CHANNEL LAYOUT DETAILS
SEE CURB FACE ASSEMBLY ON SHEET 1.

Computer File Information		Sheet Revisions	
Creation Date: 07/31/19		Date:	Comments
Designer Initials: JBK			
Last Modification Date: 07/31/19			
Detailer Initials: LTA			
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English			

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Project Development Branch JBK

CURB INLET TYPE R

Issued by the Project Development Branch on July 31, 2019

STANDARD PLAN NO.
M-604-12
Standard Sheet No. 2 of 2
Project Sheet Number:

CITY OF LONE TREE ACCEPTANCE BLOCK

THESE DRAWINGS HAVE BEEN REVIEWED BY THE CITY OF LONE TREE FOR TEMPORARY EROSION AND SEDIMENT CONTROL IMPROVEMENTS ONLY.

DEVELOPMENT SERVICES DEPARTMENT DATE

811 Know what's below. Call before you dig.

DESIGNED BY: LME
CHECKED BY: JDO
DRAWN BY: LME

ISSUE DATE: 12-23-2022	
DATE	REVISION COMMENTS
01-27-2023	PER CITY COMMENTS
03-17-2023	ISSUED FOR CONSTRUCTION
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HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
Denver, Colorado 80203
P: 303.623.6300 F: 303.623.6311
HarrisKocherSmith.com

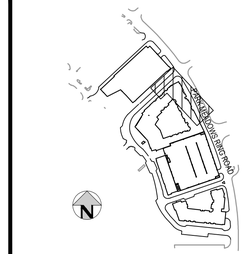
PARK MEADOWS MALL, LLC /
PARK MEADOWS ANCHOR ACQUISITION, LLC

PARK MEADOWS - MIXED USE DEVELOPMENT
STORM SEWER DETAILS

COLORADO LICENSED MARK A. WEST 38561 03/20/2023 PROFESSIONAL ENGINEER

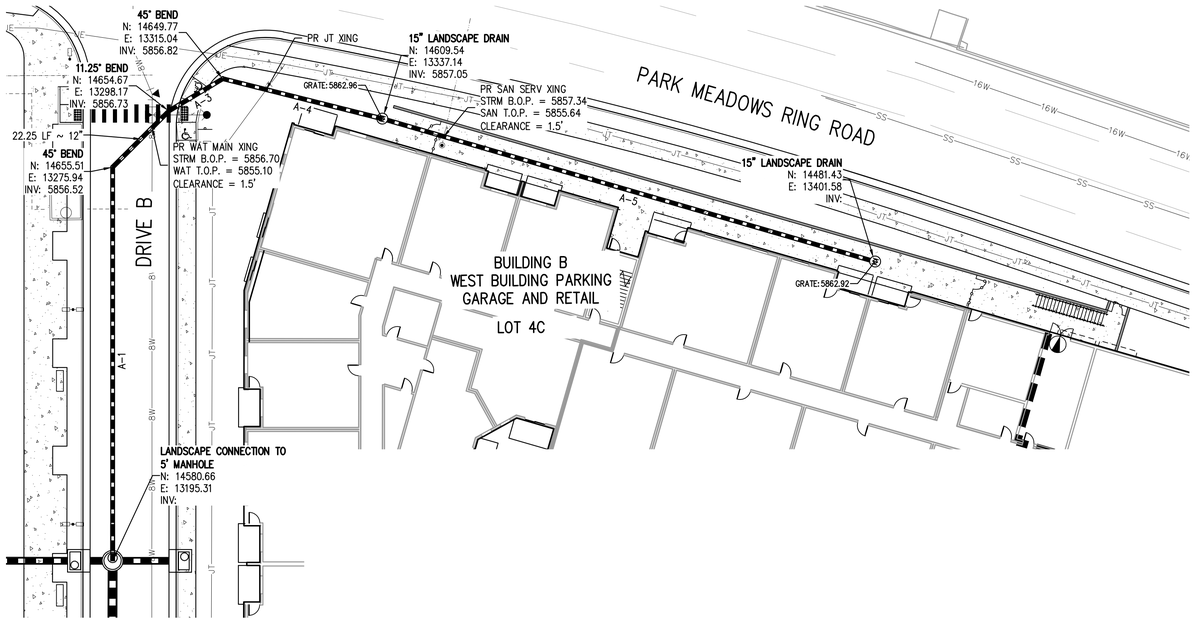
PROJECT #: 220407
SHEET NUMBER
ST12
12 OF 15

FILEPATH: K:\220407\ENGINEERING\UTILITIES\STORMST - DETAILS.DWG LAYOUT: LAYOUT1 (2)
NO XREFS
PLOTTED: MON 03/20/23 2:51:44P BY: AIDAN LOWE



KEY MAP

SCALE: 1"=400'



GENERAL LANDSCAPE DRAIN NOTES:

1. CONTRACTOR SHALL USE 90-DEGREE WYES AT PERPENDICULAR JOINTS WHERE POSSIBLE.
2. CONTRACTOR SHALL USE CONCENTRIC REDUCERS UNLESS OTHERWISE NOTED. WHERE ECCENTRIC REDUCERS ARE USED THE INVERTS MUST MATCH.
3. CONTRACTOR SHALL USE STANDARD PVC FITTINGS WHEN POSSIBLE UNLESS OTHERWISE NOTED ON THE PLAN.
4. ALL LANDSCAPE DRAINS PIPES SHALL BE WATERTIGHT PVC, RIGID HDPE WITH SMOOTH INNER WALL, OR ENGINEER APPROVED EQUIVALENT.
5. ALL LANDSCAPE DRAIN PIPES SHALL BE A MINIMUM OF 2-FT DEEP (UNLESS OTHERWISE NOTED) AND SHALL HAVE A 0.50% MINIMUM SLOPE.
6. LANDSCAPE DRAIN GRATES IN LANDSCAPED AREAS SHALL BE NYLOPLAST 12-INCH DOME STYLE GRATES\COVERS, OR ENGINEER-APPROVED EQUIVALENT.
7. LANDSCAPE DRAIN GRATES IN PAVEMENT SHALL BE PEDESTRIAN-FRIENDLY, 4-INCH ROUND BRASS GRATES OR ENGINEER-APPROVED EQUIVALENT UNLESS OTHERWISE NOTED ON THE PLAN.
8. TRENCH DRAINS SHALL BE ACO KLASSIC KS100S WITH TYPE 461O DUCTILE IRON SLOTTED GRATE OR ENGINEER-APPROVED EQUIVALENT. TRENCH DRAINS SHALL HAVE AN INVERT SLOPE OF AT LEAST 0.50%. TRENCH DRAIN INVERT SHALL MATCH THE CONNECTING LANDSCAPE DRAIN PIPE INVERT. FOR GRATE ELEVATIONS SEE SHEET(S) ? & ?.
9. LANDSCAPE DRAINS LOCATED AT THE END OF A LINE SHALL BE INSTALLED WITH A RISER AND 90 DEGREE BEND MATCHING THE SIZE OF THE PIPE CONNECTING TO THE DRAIN AS CALLED OUT IN THE LANDSCAPE DRAIN TABLE.
10. LANDSCAPE DRAINS CONNECTING TO ROOF DOWNSPOUTS SHALL BE INSTALLED WITH A RISER AND 90 DEGREE BEND MATCHING THE SIZE OF THE PIPE CONNECTING TO THE ROOF DRAIN AS CALLED OUT IN THE LANDSCAPE DRAIN TABLE.
11. INLINE LANDSCAPE DRAINS SHALL BE INSTALLED WITH A RISER AND TEE FITTING MATCHING THE SIZE OF THE MAIN LINE CONNECTION AS CALLED OUT IN THE LANDSCAPE DRAIN TABLE. IF TWO OR MORE PIPE SIZES INTERSECT AT THE INLINE DRAIN CONNECTION THEN THE LARGER PIPE SIZE SHALL DICTATE THE SIZE OF THE RISER.
12. AT ANY LOCATION WHERE MORE THAN TWO LANDSCAPE DRAIN PIPES INTERSECT AND CANNOT BE CONNECTED WITH STANDARD FITTINGS, A DRAIN BASIN SHALL BE INSTALLED. THE DRAIN BASIN SHALL BE SIZED ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS.
13. FOR GRATE ELEVATIONS SEE DETAILED GRADING PLAN SHEET(S).

PIPE TABLE

NAME	SIZE	LENGTH	SLOPE	UPSTREAM INVERT	DOWNSTREAM INVERT
A-1	12"	110.01'	0.50%	5856.62	5856.07
A-2	12"	22.25'	0.50%	5856.73	5856.62
A-3	12"	17.57'	0.50%	5856.82	5856.73
A-4	12"	45.90'	0.50%	5857.05	5856.82
A-5	12"	143.41'	0.50%	5857.97	5857.25

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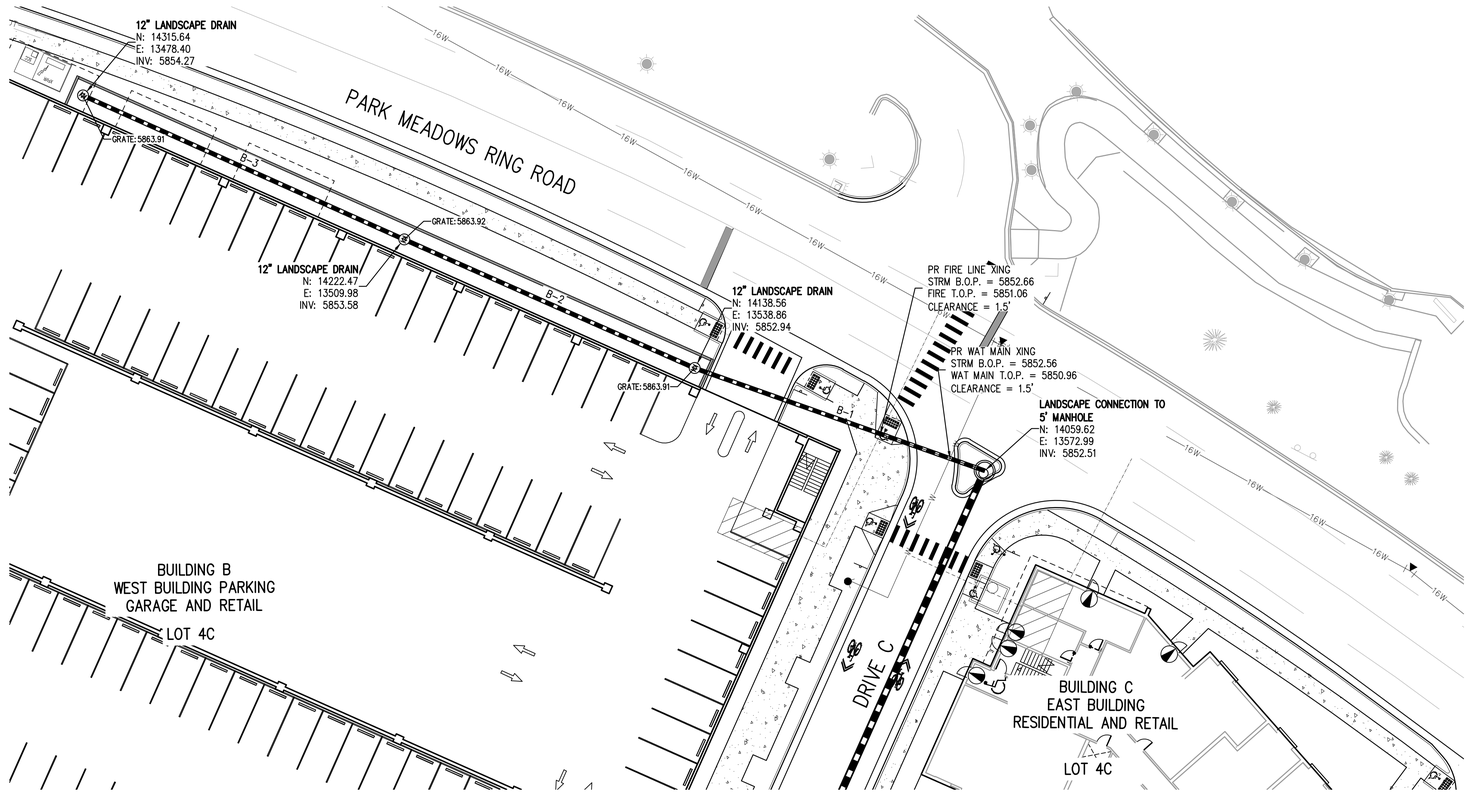
PARK MEADOWS - MIXED USE DEVELOPMENT
LANDSCAPE DRAIN PLAN

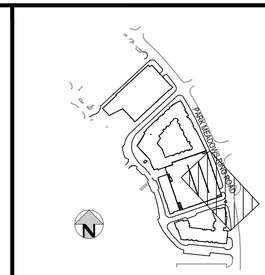
COLORADO LICENSED
MARK A. WEST
38561
03/20/2023
PROFESSIONAL ENGINEER

PROJECT #: 220407

SHEET NUMBER
ST13
13 OF 15

FILEPATH: K:\220407\ENGINEERING\UTILITIES\STORMSW - LANDSCAPE DRAIN PLAN.DWG LAYOUT: LAYOUT1
6 XREFs: n-base, e-util, keymap, p-base, p-util, stamp-park meadows
PLOTTED: MON 03/20/23 2:51:56P BY: AIDAN LOWE





KEY MAP

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13. FOR GRATE ELEVATIONS SEE DETAILED GRADING PLAN SHEET(S).

PIPE TABLE					
NAME	SIZE	LENGTH	SLOPE	UPSTREAM INVERT	DOWNSTREAM INVERT
B-1	12"	86.00'	0.50%	5852.94	5852.51
B-2	12"	88.74'	0.50%	5853.58	5853.14
B-3	12"	98.38'	0.50%	5854.27	5853.78

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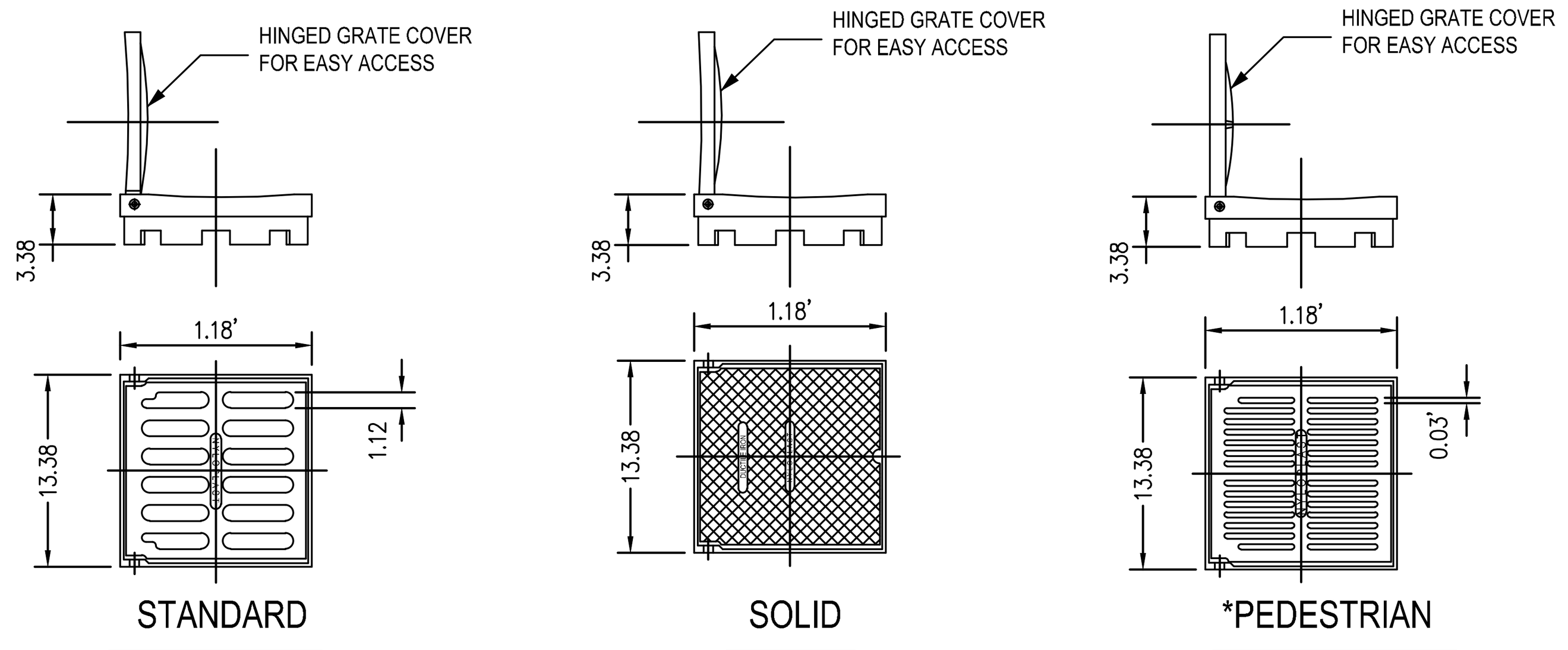
LANDSCAPE DRAIN PLAN

COLORADO LICENSED
MARK A. WEST
38561
PROFESSIONAL ENGINEER
03/20/2023

PROJECT #: 220407

SHEET NUMBER
ST14
14 OF 15

FILEPATH: K:\220407\ENGINEERING\UTILITIES\STORM\SW - LANDSCAPE DRAIN PLAN.DWG LAYOUT: LAYOUT1 (3)
6 XREFs: e-base, e-util, keymap, p-base, p-util, stamp-park meadows
PLOTTED: MON 03/20/23 2:52:01P BY: AIDAN LOWE



STANDARD

APPROX. DRAIN AREA = 60.62 SQ. IN.
APPROX. WEIGHT WITH FRAME = 40.68 LBS.

SOLID

APPROX. WEIGHT WITH FRAME = 39.90 LBS.

*PEDESTRIAN

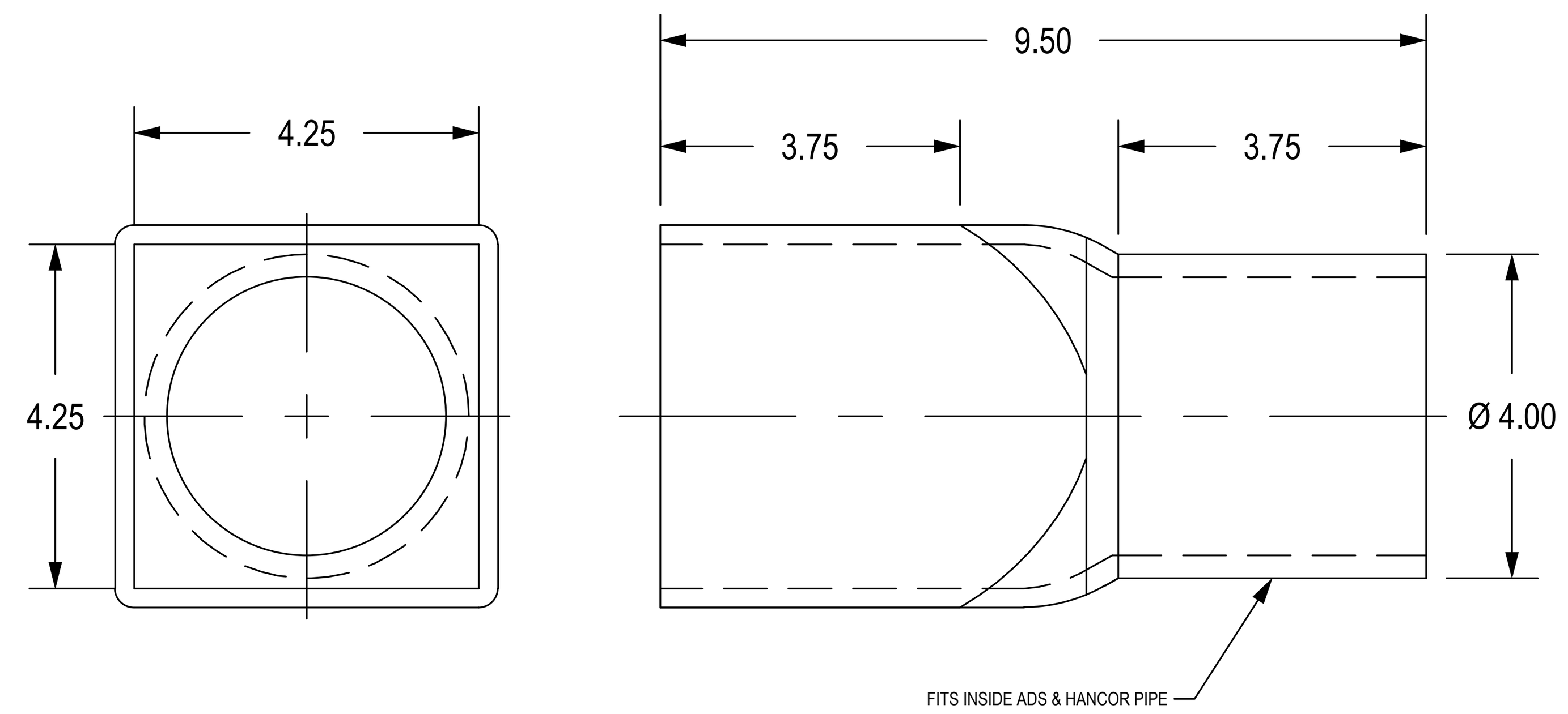
APPROX. DRAIN AREA = 50.6 SQ. IN.
APPROX. WEIGHT WITH FRAME = 35.04 LBS.

NYLOPLAST 12" GRATES/COVERS

STANDARD GRATE HAS H-25 HEAVY DUTY RATING
SOLID COVER HAS H-25 HEAVY DUTY RATING
PEDESTRIAN GRATE HAS H-10 MEDIUM DUTY RATING
QUALITY: MATERIALS SHALL CONFORM TO ASTM A536 GRADE 70-50-05 & A48-CLASS 30B
MATERIAL: DUCTILE IRON GRATE W/CAST IRON FRAME
PAINT: CASTINGS ARE FURNISHED WITH A BLACK PAINT
LOCKING DEVICE AVAILABLE UPON REQUEST
PRICE INCLUDES FRAME & GRATE/COVER

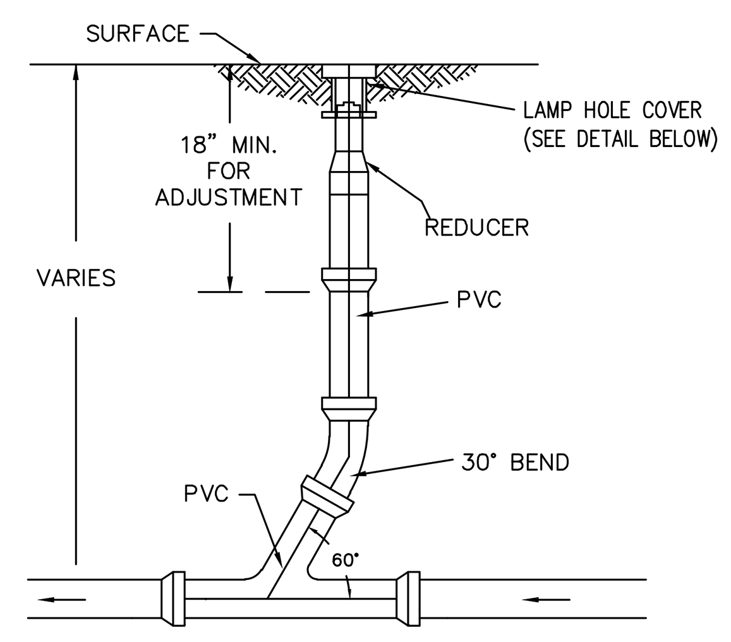
* SIZE OF OPENING MEETS REQUIREMENTS OF AMERICAN DISABILITY ACT AS STATED IN FEDERAL REGISTER PART III, DEPARTMENT OF JUSTICE, 28 CFR PART 36. NONDISCRIMINATION ON THE BASIS OF DISABILITY BY PUBLIC ACCOMMODATIONS AND IN COMMERCIAL FACILITIES; FINAL RULE.

DRAWN BY AWA | DATE 15AUG00 | APPD BY CJA | DATE 15AUG00 | DWG SIZE A | SCALE 1:12 | SHEET 1 OF 1
MATERIAL: DUCTILE IRON
PROJECT NO./NAME: GRATE / COVER
Nyloplast
3130 VERONA AVE
BUFORD, GA 30518
PHN (770) 932-2443
FAX (770) 932-2490
www.nyloplast-us.com
TITLE: 12" STANDARD, SOLID & PEDESTRIAN
DWG NO. 7001-110-049 REV C

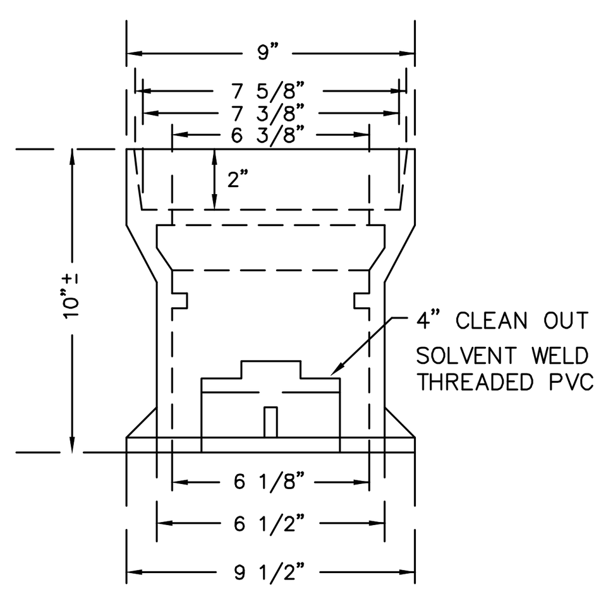


1 - DIMENSIONS ARE FOR REFERENCE ONLY
ACTUAL DIMENSIONS MAY VARY
2 - DIMENSIONS ARE IN INCHES

DRAWN BY EBC | DATE 6-6-06 | APPD BY CJA | DATE 6-6-06 | DWG SIZE A | SCALE 1:2 | SHEET 1 OF 1
MATERIAL: PVC
PROJECT NO./NAME
TITLE: 4 X 4 X 4 DOWNSPOUT ADAPTER
DWG NO. 0444TH REV A



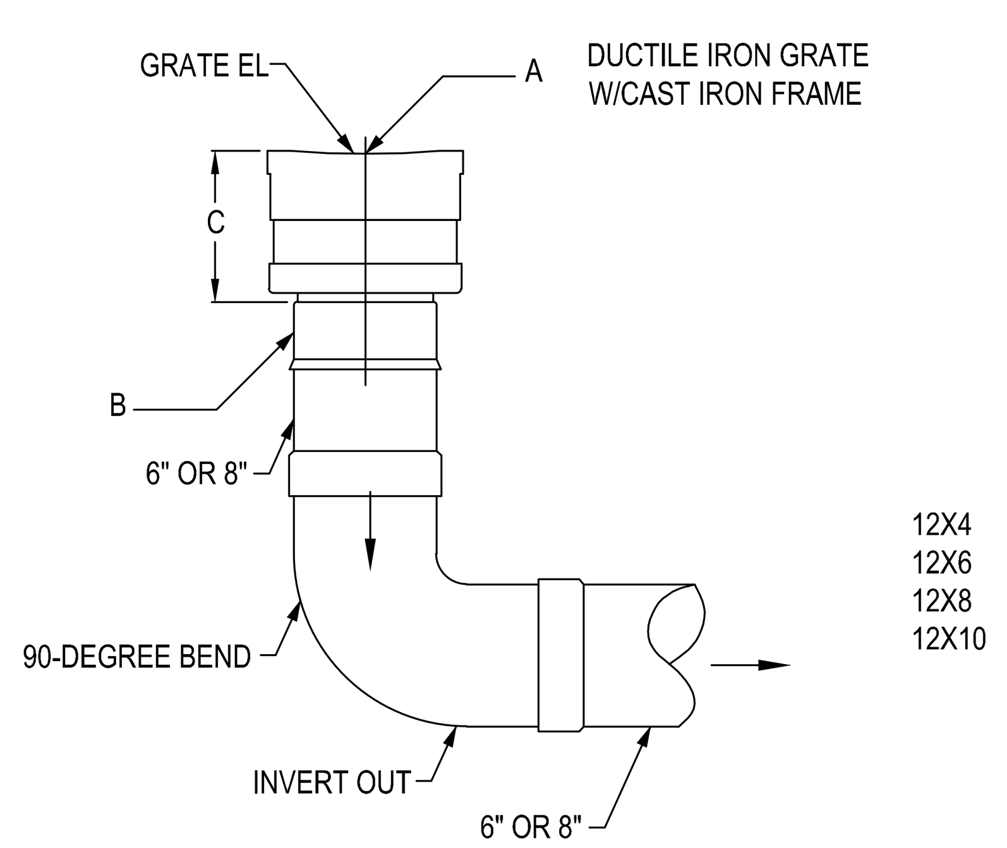
PLAN VIEW



COVER DETAIL

CLEANOUT DETAIL
N.T.S.

NOTES:
1. COVER SHALL HAVE A LOCKING LID MARKED "SEWER".
2. TYLER SERIES 6855 SLIP TYPE TOP SECTION, D & L SUPPLY SERIES M8056 OR EQUAL.
3. I.D. = 6 1/8".



12X4
12X6
12X8
12X10

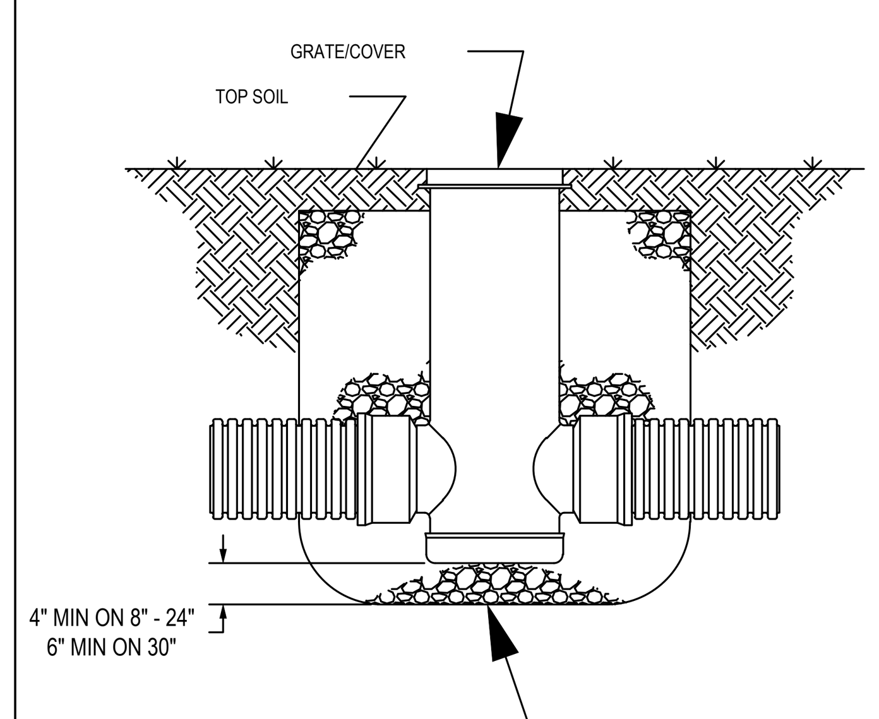
VARIOUS TYPES OF OUTLETS WITH WATERTIGHT ADAPTERS FOR:
ADS N-12
SDR-35 SEWER
SCHEDULE 40 DWV
CORRUGATED PVC
RIBBED PVC

A	B	C
12"	4"	10.50
12"	6"	11.50
12"	8"	11.50
12"	10"	11.25
12"	12"	6.00

DRAWN BY CJA | DATE 6-25-99 | APPD BY CJA | DATE 6-25-99 | DWG SIZE A | SCALE NTS | SHEET 1 OF 1
MATERIAL
PROJECT NO./NAME: INLINE DRAIN
TITLE: 12" DESIGN DETAILS
DWG NO. 7003-110-002 REV B

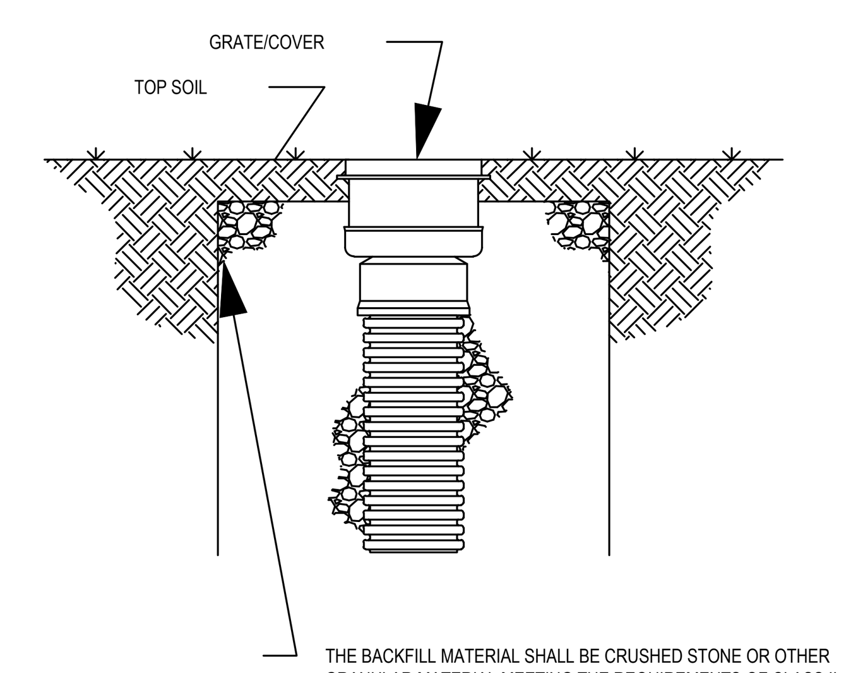
NON TRAFFIC INSTALLATION

DRAIN BASIN



THE BACKFILL MATERIAL SHALL BE CRUSHED STONE OR OTHER GRANULAR MATERIAL MEETING THE REQUIREMENTS OF CLASS II MATERIAL AS DEFINED IN ASTM D2321, OR AS DETERMINED BY LOCAL STANDARDS & SITE ENGINEER. BEDDING & BACKFILL FOR SURFACE DRAINAGE INLETS SHALL BE PLACED & COMPACTED UNIFORMLY IN ACCORDANCE WITH ASTM D2321.

INLINE DRAIN



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DRAWN BY CJA | DATE 9-30-99 | REVISED BY EBC | DATE 2-24-10 | DWG SIZE A | SCALE 1:25 | SHEET 1 OF 1
MATERIAL
PROJECT NO./NAME
TITLE: DRAIN BASIN & INLINE DRAIN NON TRAFFIC INSTALLATION
DWG NO. 7001-110-111 REV D

Section 2722

Engineered Surface Drainage Products

GENERAL
PVC surface drainage inlets shall be of the inline drain type as indicated on the contract drawing and referenced within the contract specifications. The ductile iron grates for each of these fittings are to be considered an integral part of the surface drainage inlet and shall be furnished by the same manufacturer. The surface drainage inlets shall be as manufactured by Nyloplast a division of Advanced Drainage Systems, Inc., or prior approved equal.

MATERIALS
The inline drain required for this contract shall be manufactured from PVC pipe stock, utilizing a thermo-molding process to reform the pipe stock to the furnished configuration. The drainage pipe connection stubs shall be manufactured from PVC pipe stock and formed to provide a watertight connection with the specified pipe system. This joint tightness shall conform to ASTM D3212 for joints for drain and sewer plastic pipe using flexible elastomeric seals. The flexible elastomeric seals shall conform to ASTM F477. The pipe bell spigot shall be joined to the inline drain body by use of a **swage mechanical joint**. The raw material used to manufacture the pipe stock that is used to manufacture the inline drain body and pipe stubs of the surface drainage inlets shall conform to ASTM D1784 cell class 12454.

The grates furnished for all surface drainage inlets shall be ductile iron grates for sizes 8", 10", 12", 15", 18", 24" and 30" shall be made specifically for each fitting so as to provide a round bottom flange that closely matches the diameter of the surface drainage inlet. Grates for inline drains shall be capable of supporting H-20 wheel loading for traffic areas or H-10 loading for pedestrian areas. 12" and 15" square grates will be hinged to the frame using pins. Metal used in the manufacture of the castings shall conform to ASTM A536 grade 70-50-05 for ductile iron. Grates shall be provided painted black.

INSTALLATION
The specified PVC surface drainage inlet shall be installed using conventional flexible pipe backfill materials and procedures. The backfill material shall be crushed stone or other granular material meeting the requirements of class 2 material as defined in ASTM D2321. Bedding and backfill for surface drainage inlets shall be placed and compacted uniformly in accordance with ASTM D2321. The drain basin body will be cut at the time of the final grade. No brick, stone or concrete block will be required to set the grate to the final grade height. For H-20 load rated installations, a concrete ring will be poured under and around the grate and frame. The concrete slab must be designed taking into consideration local soil conditions, traffic loading, and other applicable design factors. For other installation considerations such as migration of fines, ground water, and soft foundations refer to ASTM D2321 guidelines.

DRAWN BY CJA | DATE 3-10-00 | REVISED BY EBC | DATE 3-19-10 | DWG SIZE A | SCALE 1:1 | SHEET 1 OF 1
MATERIAL
PROJECT NO./NAME
TITLE: 8 IN - 30 IN INLINE DRAIN SPECIFICATIONS
DWG NO. 7003-110-999 REV F

DESIGNED BY: LME
CHECKED BY: JDO
DRAWN BY: LME

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LANDSCAPE DRAIN DETAIL

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