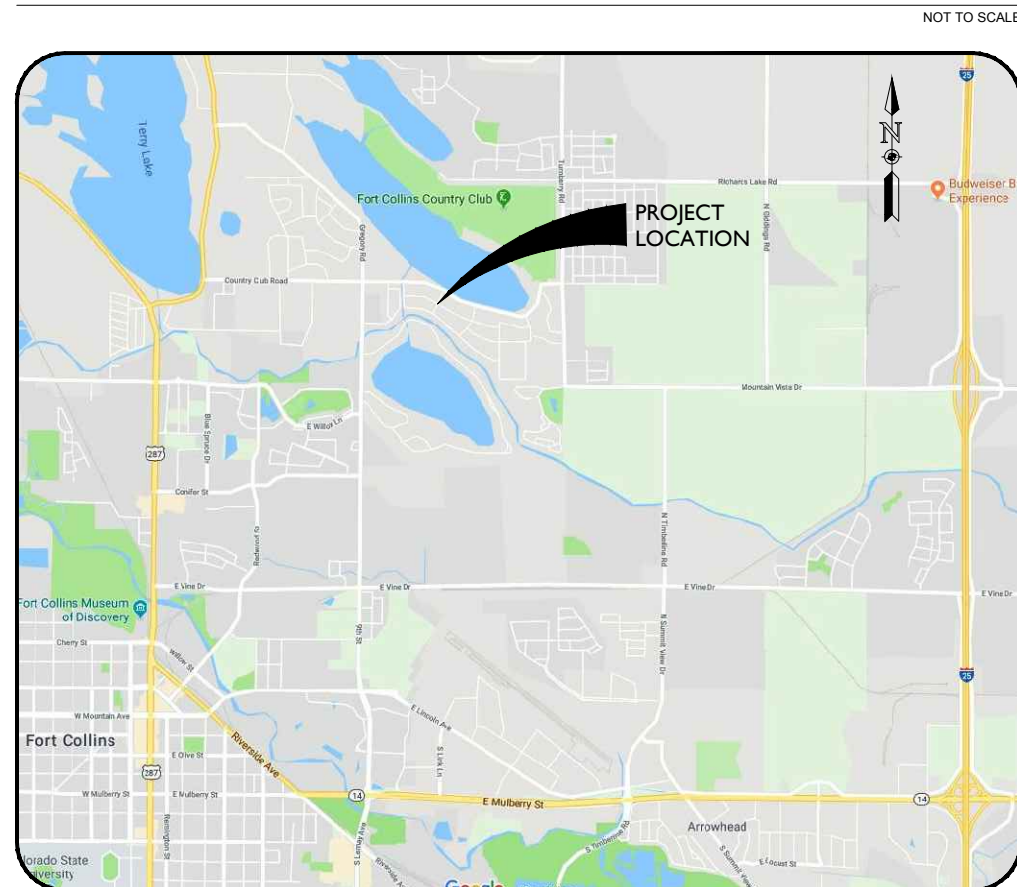


CONSTRUCTION DRAWINGS FOR LONGVIEW DRIVE DRAINAGE IMPROVEMENTS IN COUNTRY CLUB ESTATES

PREPARED FOR
LARIMER COUNTY, COLORADO
AUGUST 5, 2019

VICINITY MAP



CONTACT INFORMATION



OWNER
Larimer County
Matt Johnson
200 W. Oak Street, Suite 3000
Fort Collins, CO 80521
(970) 498-5700



CIVIL ENGINEER
Ayres Associates
Dale Mathison, P.E.
3665 JFK Parkway, Building 2, Suite 100
Fort Collins, Colorado 80525
(970) 223-5556

SHEET INDEX

SHEET	DRAWING	DESCRIPTION
1	G01	COVER SHEET
2	C01	PLAN AND PROFILE 1 OF 3
3	C02	PLAN AND PROFILE 2 OF 3
4	C03	PLAN AND PROFILE 3 OF 3
5	D01	MISCELLANEOUS DETAILS
6	D02	TRENCH, CURB & GUTTER, AND SIDEWALK DETAILS
7	D03	CONCRETE TYPE 13 INLET DETAIL CDOT STANDARD PLAN M-604-13
8	D04	CONCRETE DOUBLE TYPE 13 INLET DETAILS - 1 OF 2
9	D05	CONCRETE DOUBLE TYPE 13 INLET DETAILS - 2 OF 2
10	D06	CONCRETE NO. 16 INLET DETAIL - 1 OF 2
11	D07	CONCRETE NO. 16 INLET DETAIL - 2 OF 2
12	D08	PVC PIPE BEDDING DETAIL CDOT STANDARD PLAN M-603-5
13	D09	CONCRETE PIPE BEDDING DETAIL CDOT STANDARD PLAN M-603-2
14	D10	EXCAVATION AND BACKFILL DETAIL CDOT STANDARD PLAN M-206-1

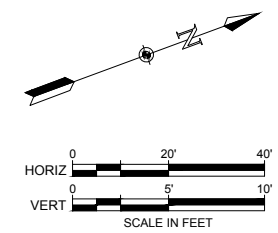
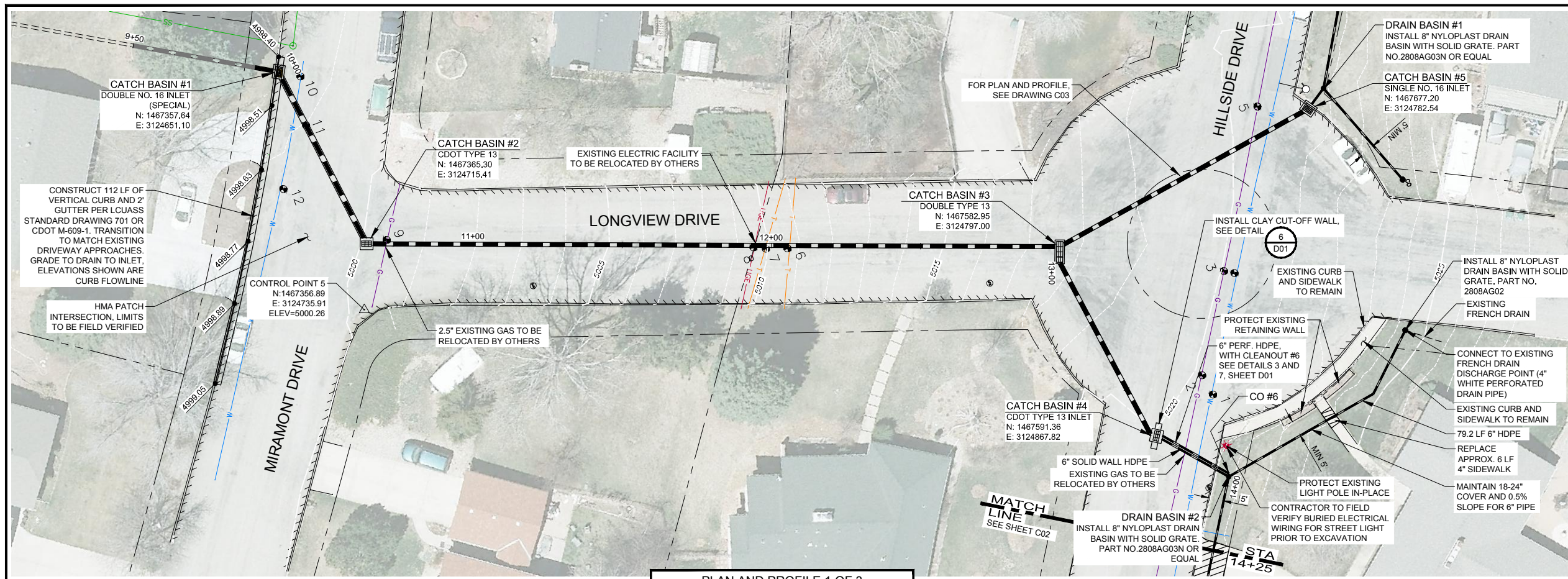
BENCHMARK

VERTICAL DATUM:
SEE DRAWINGS C01 AND C02 FOR SURVEY CONTROL POINTS.



COMPUTER INFORMATION	REVISIONS	LARIMER COUNTY ENGINEERING DEPARTMENT	AS CONSTRUCTED	PROJECT NO. 32-1918.00
CREATION DATE: 04/05/2019	(R-1)	200 WEST OAK, SUITE 3000	NO REVISIONS:	COUNTRY CLUB ESTATES
MODIFICATION DATE: 08/05/2019	(R-2)	POST OFFICE BOX 1190	REVISED:	SHEET NO. G01
I:\32\32-1918.00 COUNTRY CLUB ESTATES\MAIN\DWGS 2018\SHEETS	(R-3)	FORT COLLINS, COLORADO 80522-1190	VOID:	
FILE NAME: 32-1918.00 COVER SHEET.DWG	(R-4)	(970)498-5700		
	(R-5)	(970)498-7986 FAX		

COVER SHEET

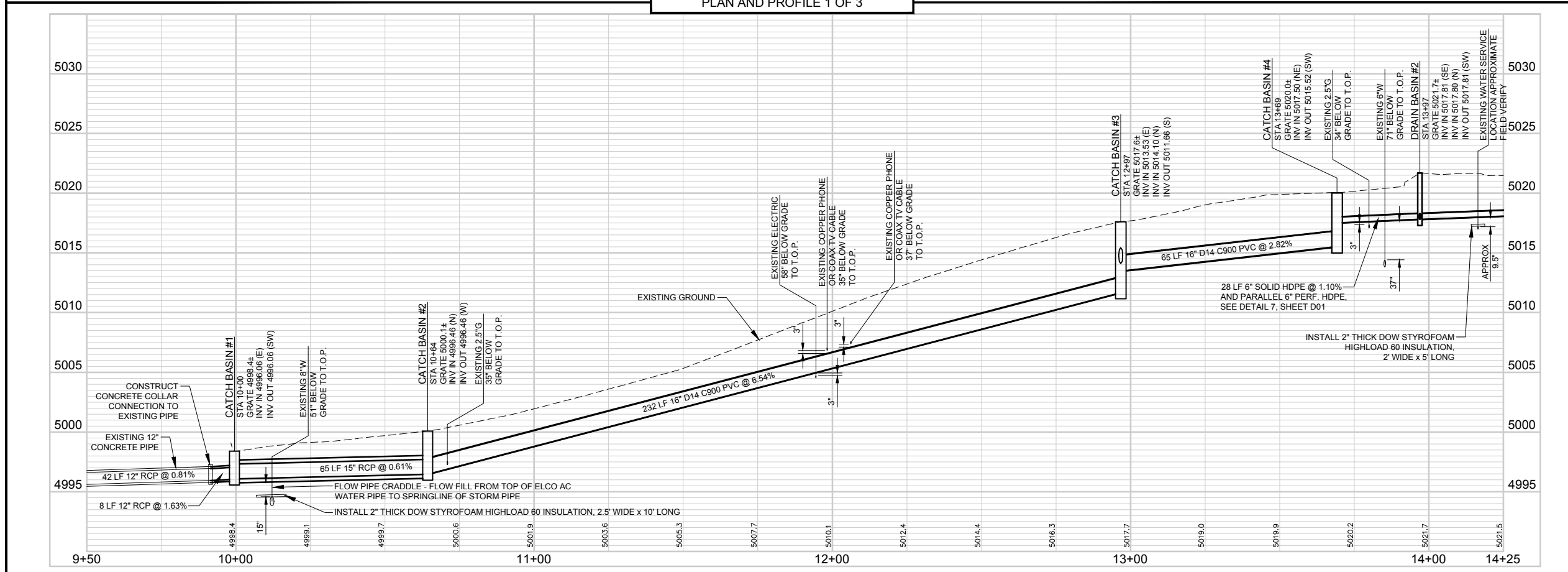


- NOTES:**
- DEPTH TO EXISTING UTILITIES SHOWN ON PLANS IS APPROXIMATE. CONTRACTOR TO FIELD VERIFY PRIOR TO OPEN TRENCHING.
 - HOT MIX ASPHALT PATCHING SHALL BE AS FIELD MARKED AND SHALL BE PAVED IN 2'-3" LIFTS USING HMA (GRADE SX) (75) (PG 64-22).
 - C900 PVC PIPE TO BE PURPLE IN COLOR. COLOR SHALL NOT BE BLUE.
 - ALL NEW DRAINAGE PIPES TO INCLUDE TRACER WIRE INSTALLATION CONSISTING OF 12 GAUGE, INSULATED COPPER WIRE BURIED DIRECTLY WITH PIPE. GROUND SURFACE TEST STATIONS FOR TRACER WIRE TO BE FIELD LOCATED OUTSIDE OF PAVEMENT LIMITS.

- LEGEND:**
- RIGHT OF WAY AND PROPERTY LINE
 - SS SANITARY SEWER
 - W WATER
 - G GAS
 - T TELEPHONE
 - UGE UNDERGROUND ELECTRICAL
 - EDGE OF PAVEMENT
 - 5020 MAJOR CONTOUR
 - 5021 MINOR CONTOUR
 - Water Meter Symbol WATER METER
 - Fire Hydrant Symbol FIRE HYDRANT
 - Light Pole Symbol LIGHT POLE
 - Mail Box Symbol MAIL BOX
 - Monitoring Well Symbol MONITORING WELL
 - Pothole Location Symbol POT HOLE LOCATION
 - Survey Control Point Symbol SURVEY CONTROL POINT
 - Private Perimeter Drain Tie-in Location Symbol PRIVATE PERIMETER DRAIN TIE-IN LOCATION
 - Cleanout Symbol CLEANOUT
 - Nyloplast Drain Basin Symbol NYLOPLAST DRAIN BASIN

- ABBREVIATIONS:**
- CDOT COLORADO DEPARTMENT OF TRANSPORTATION
 - ELEV ELEVATION
 - G GAS
 - INV INVERT
 - LCUASS LARIMER COUNTY URBAN AREA STREET STANDARDS
 - LF LINEAR FEET, LINEAR FOOT
 - PERF PERFORATED
 - PVC POLYVINYL CHLORIDE
 - RCP REINFORCED CONCRETE PIPE
 - SS SANITARY SEWER
 - STA STATION
 - T.O.P. TOP OF PIPE
 - TYP TYPICAL
 - W WATER, WATT, WEST, WIDTH

PLAN AND PROFILE 1 OF 3



COMPUTER INFORMATION

CREATION DATE:	04/05/2019
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FILE NAME: 32-1918.00 PLAN AND PROFILE 1.DWG	

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 (970)498-7986 FAX

AS CONSTRUCTED

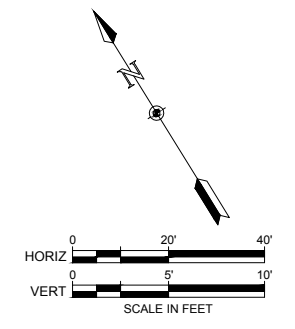
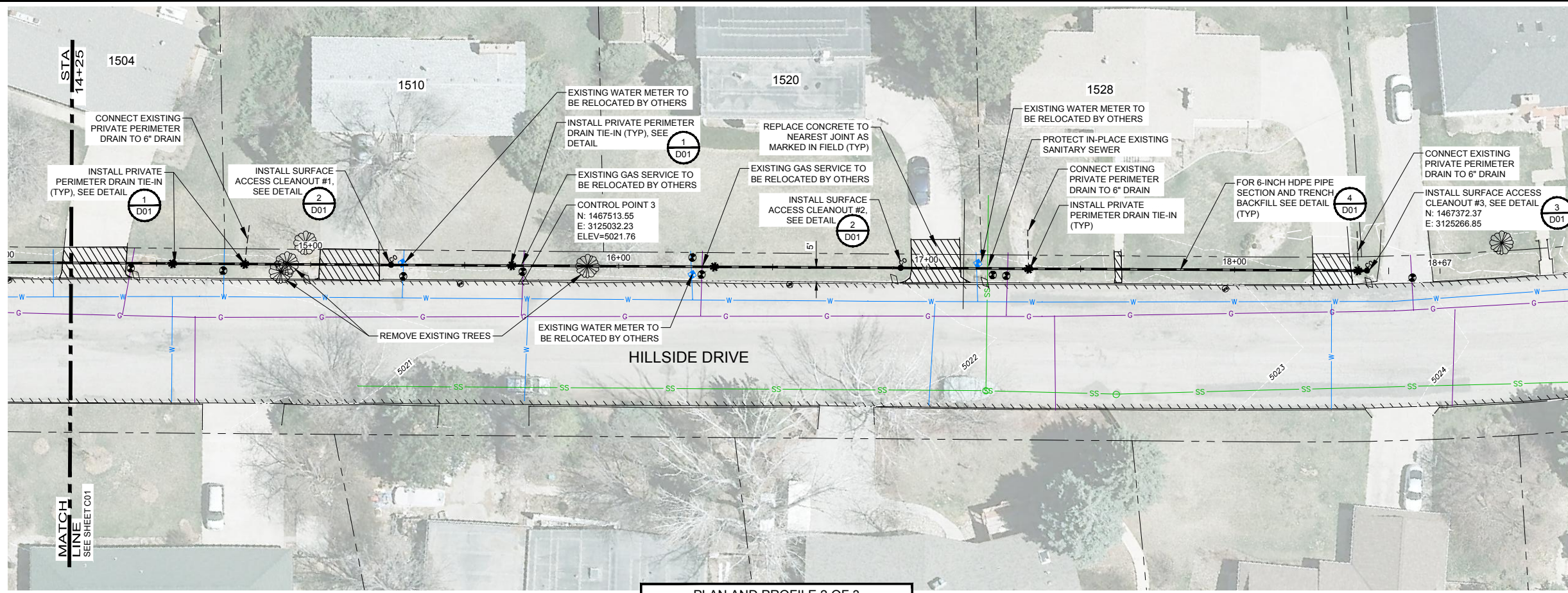
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PLAN AND PROFILE 1 OF 3

PROJECT NO. 32-1918.00

COUNTRY CLUB ESTATES

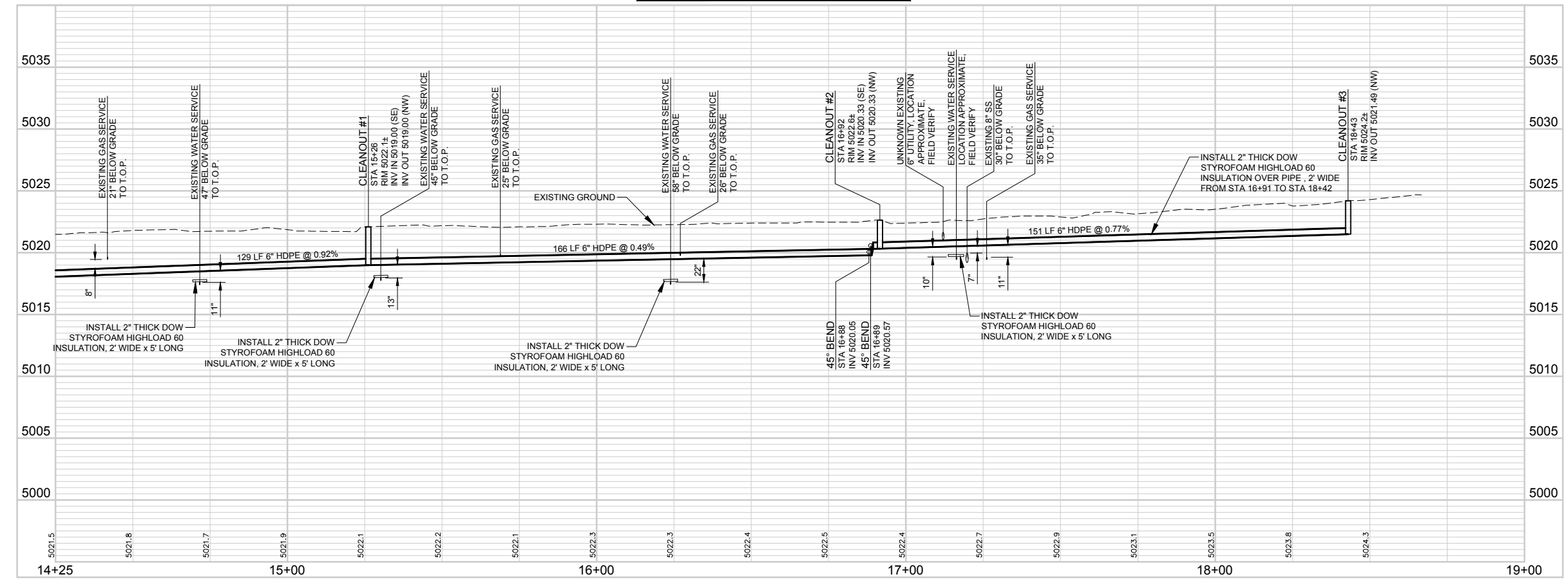
SHEET NO. C01



- NOTES:**
- DEPTH TO EXISTING UTILITIES SHOWN ON PLANS IS APPROXIMATE. CONTRACTOR TO FIELD VERIFY PRIOR TO OPEN TRENCHING.
 - PRIVATE IRRIGATION SYSTEM DAMAGED DURING CONSTRUCTION TO BE REPAIRED AT HOMEOWNER'S EXPENSE.
 - ALL NEW DRAINAGE PIPES TO INCLUDE TRACER WIRE INSTALLATION CONSISTING OF 12 GAUGE, INSULATED COPPER WIRE BURIED DIRECTLY WITH PIPE. GROUND SURFACE TEST STATIONS FOR TRACER WIRE TO BE FIELD LOCATED OUTSIDE OF PAVEMENT LIMITS.

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PLAN AND PROFILE 2 OF 3



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FILE NAME: 32-1918.00 PLAN AND PROFILE 2.DWG	

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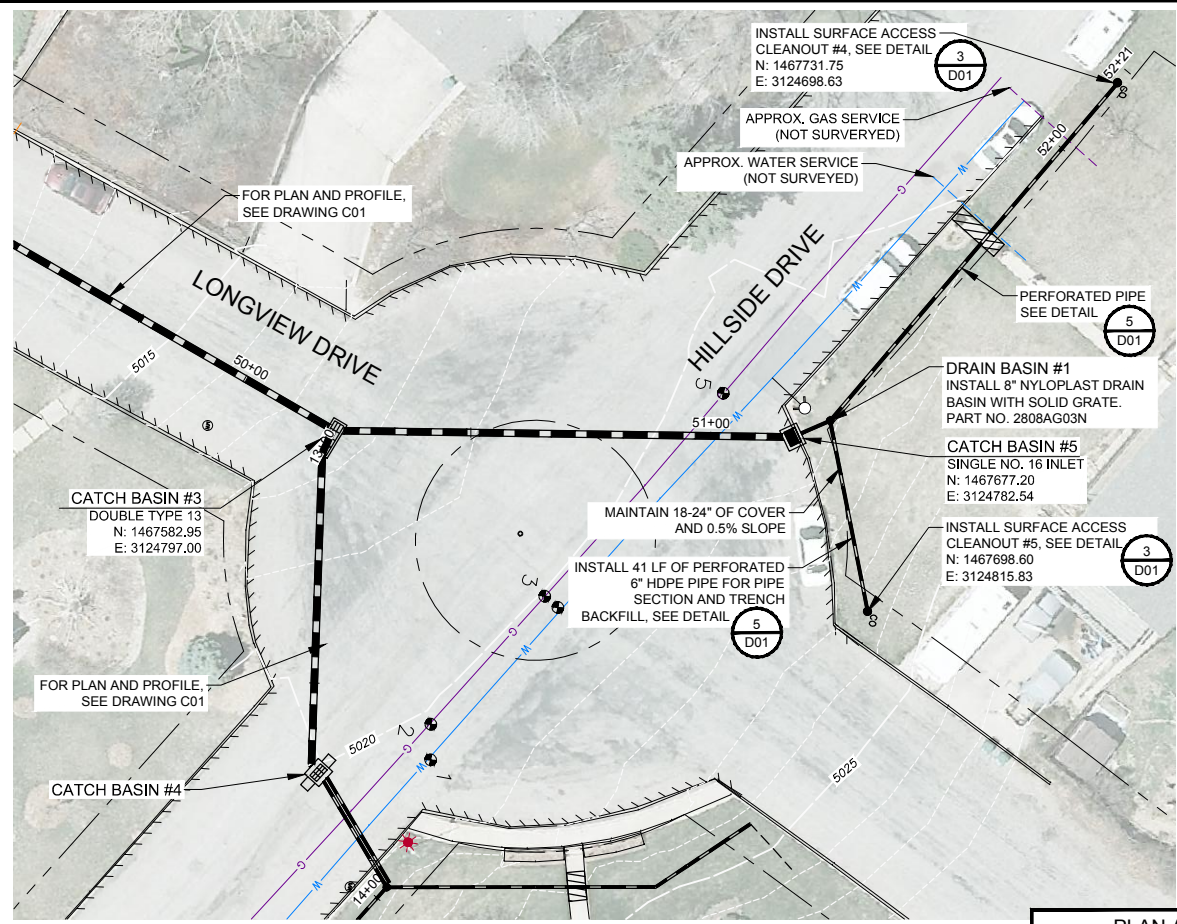
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R-3	
R-4	
R-5	

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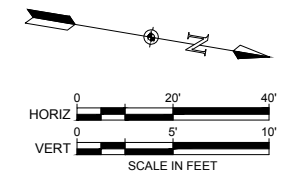
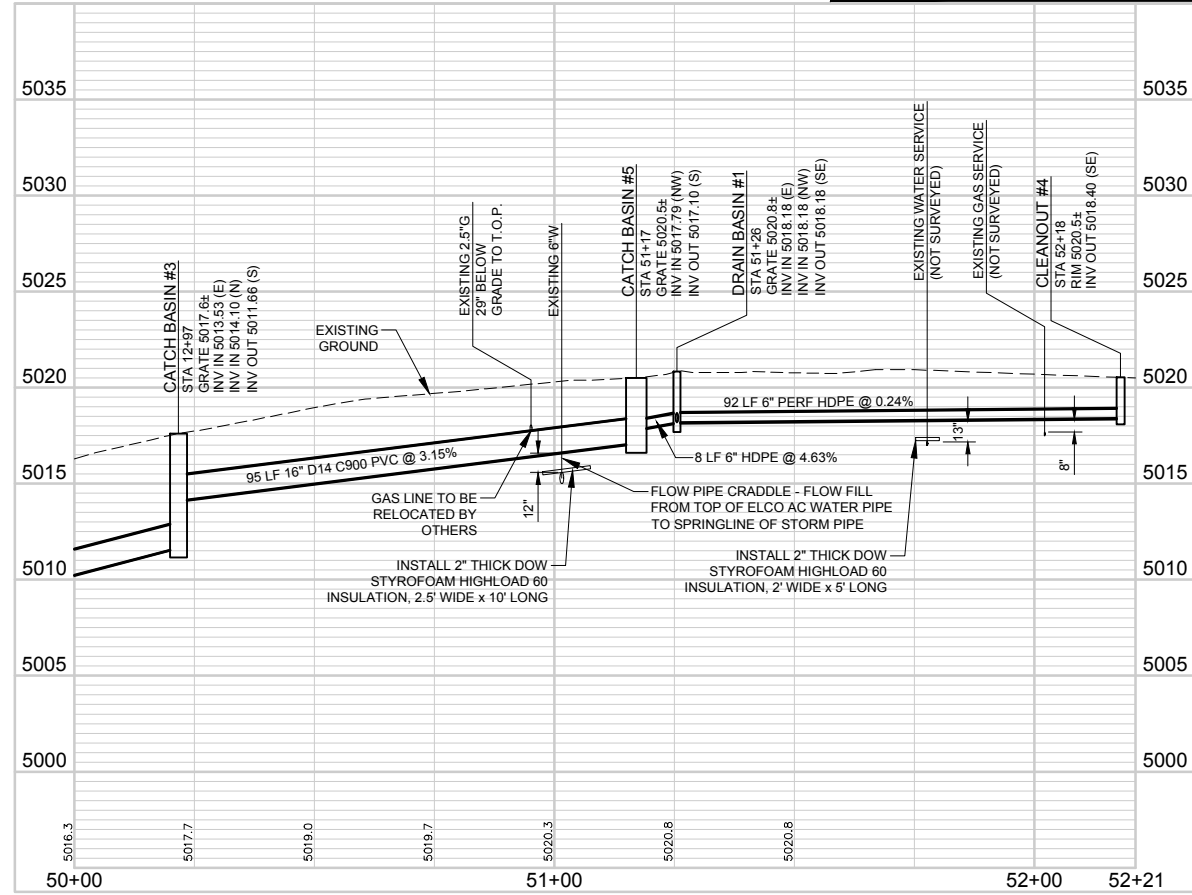
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PLAN AND PROFILE 2 OF 3

PROJECT NO. 32-1918.00
COUNTRY CLUB ESTATES
SHEET NO. C02



PLAN AND PROFILE 3 OF 3



- NOTES:**
- DEPTH TO EXISTING UTILITIES SHOWN ON PLANS IS APPROXIMATE. CONTRACTOR TO FIELD VERIFY PRIOR TO OPEN TRENCHING.
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 - UGE UNDERGROUND ELECTRICAL
 - EDGE OF PAVEMENT
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 - 5021 MINOR CONTOUR
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 - Fire Hydrant
 - Light Pole
 - Mail Box
 - Monitoring Well
 - Pothole Location
 - Survey Control Point
 - Private Perimeter Drain Tie-in Location
 - Cleanout
 - Nyloplast Drain Basin

- ABBREVIATIONS:**
- | | |
|--------|--------------------------------------------|
| CDOT | COLORADO DEPARTMENT OF TRANSPORTATION |
| ELEV | ELEVATION |
| G | GAS |
| INV | INVERT |
| LCUASS | LARIMER COUNTY URBAN AREA STREET STANDARDS |
| LF | LINEAR FEET, LINEAR FOOT |
| PERF | PERFORATED |
| PVC | POLYVINYL CHLORIDE |
| RCP | REINFORCED CONCRETE PIPE |
| SS | SANITARY SEWER |
| STA | STATION |
| T.O.P. | TOP OF PIPE |
| TYP | TYPICAL |
| W | WATER, WATT, WEST, WIDTH |

COMPUTER INFORMATION

CREATION DATE:	04/05/2019
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FILE NAME: 32-1918.00 PLAN AND PROFILE 3.DWG	

REVISIONS

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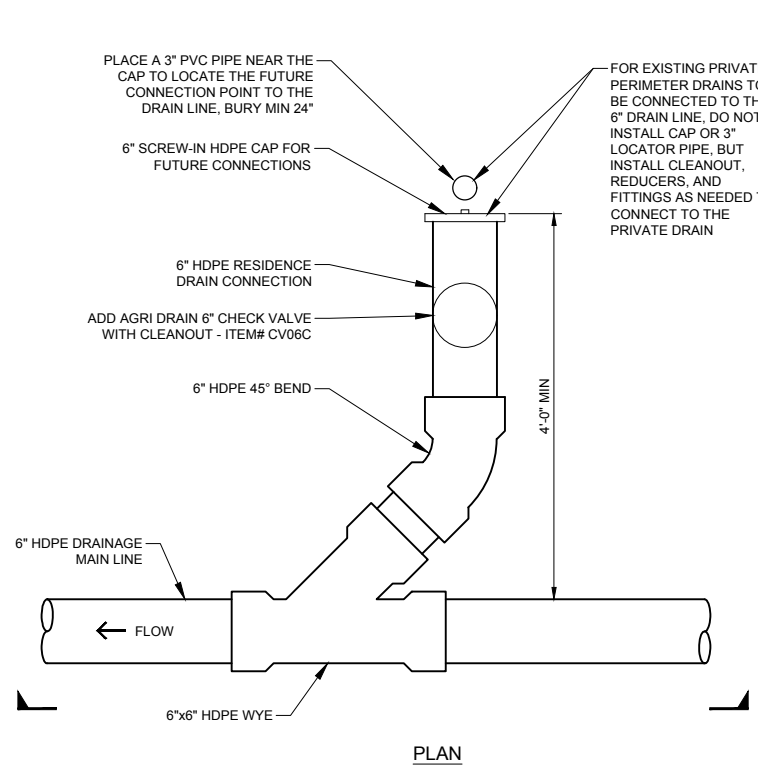
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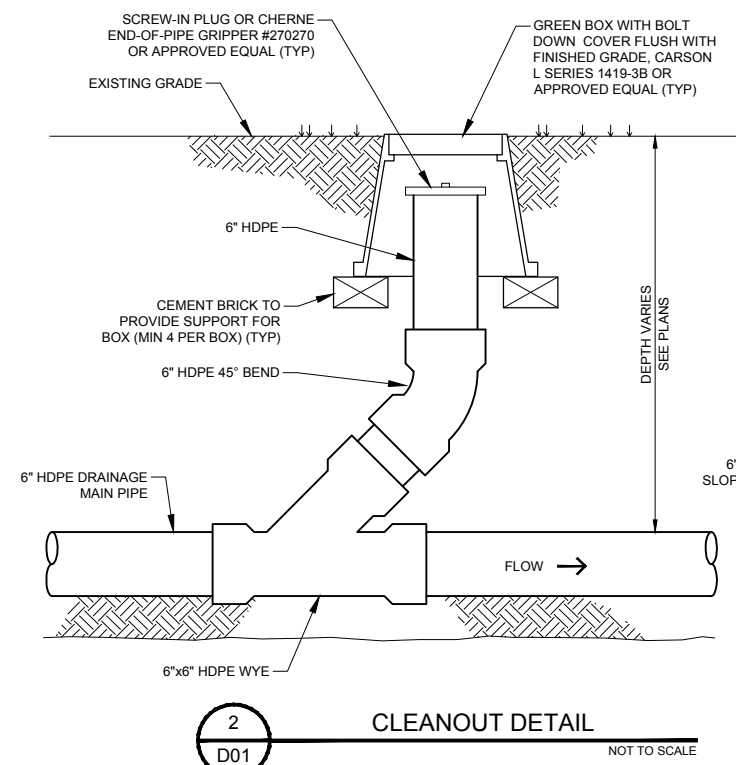
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PLAN AND PROFILE 3 OF 3

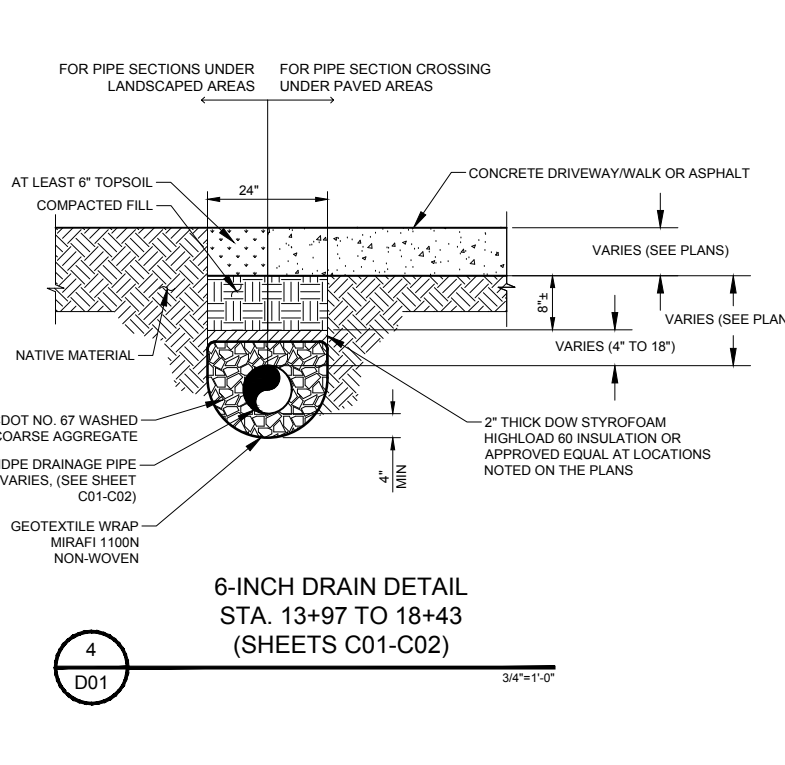
PROJECT NO. 32-1918.00
COUNTRY CLUB ESTATES
SHEET NO. C03



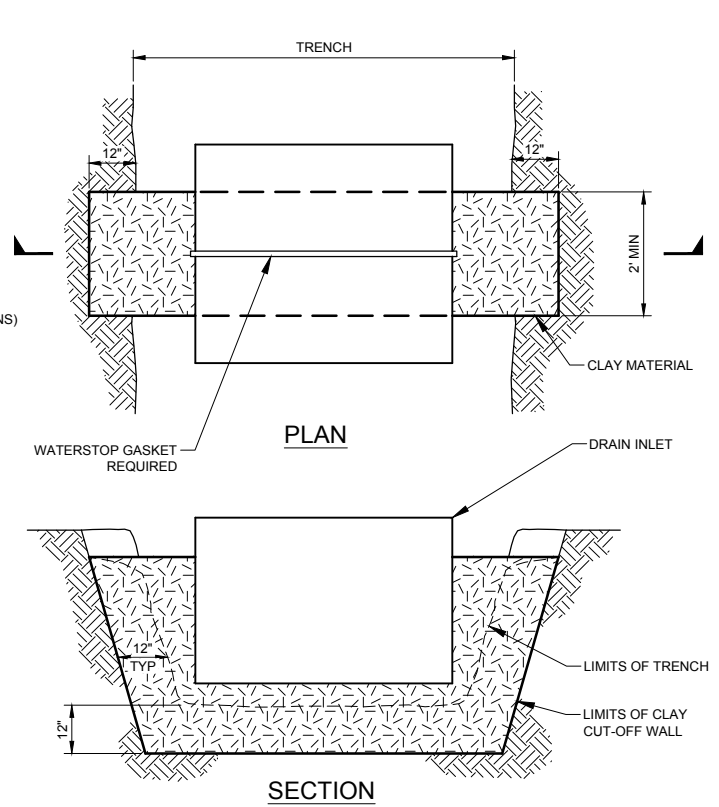
PLAN



CLEANOUT DETAIL



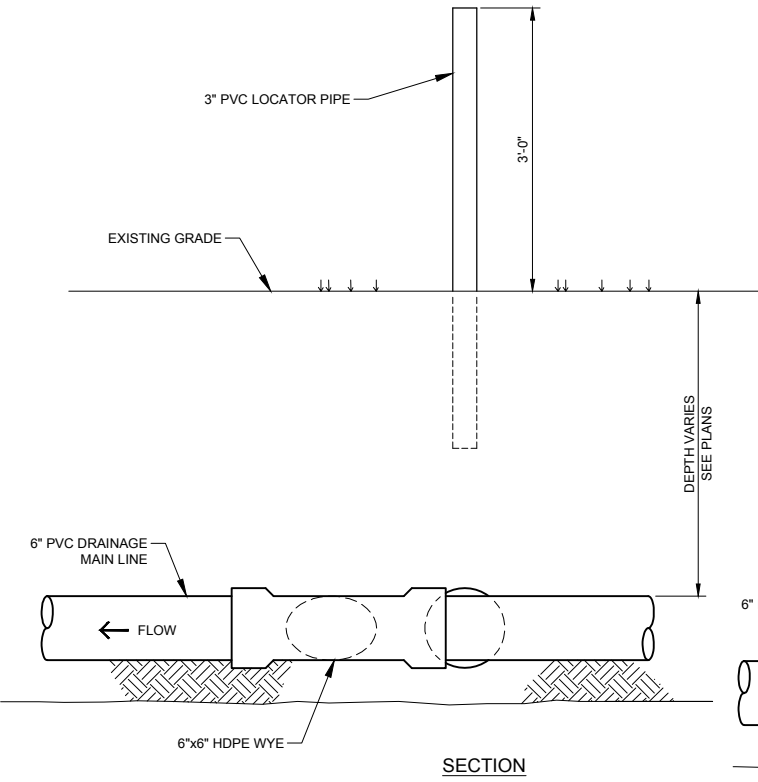
6-INCH DRAIN DETAIL
STA. 13+97 TO 18+43
(SHEETS C01-C02)



SECTION

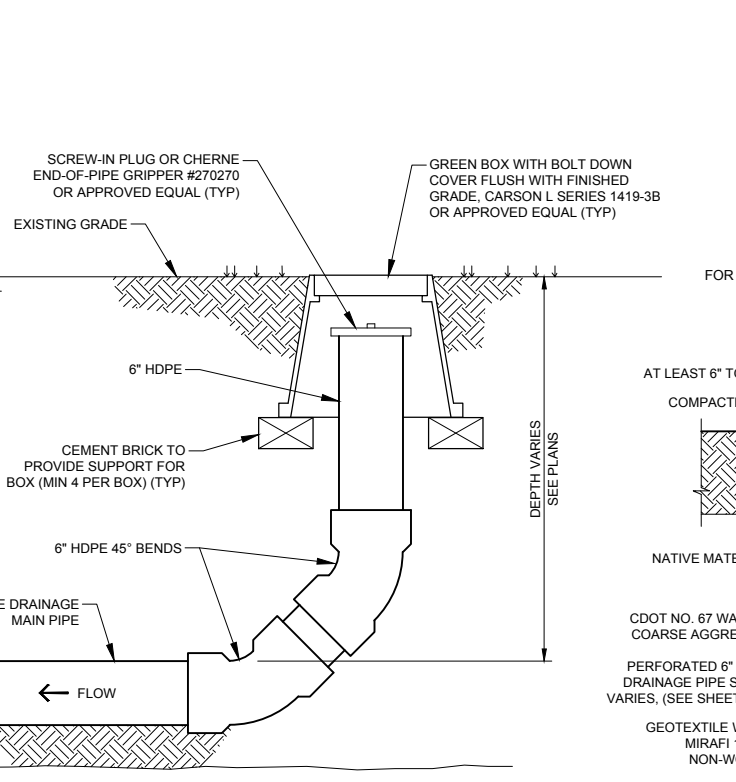
NOTES:

1. CLAY WALL EXTENDS A MINIMUM OF 12" INTO UNDISTURBED SOIL ON EACH SIDE AND ON BOTTOM OF TRENCH
2. CLAY MATERIAL TO BE CLASSIFIED AS CL, CH, OR OH

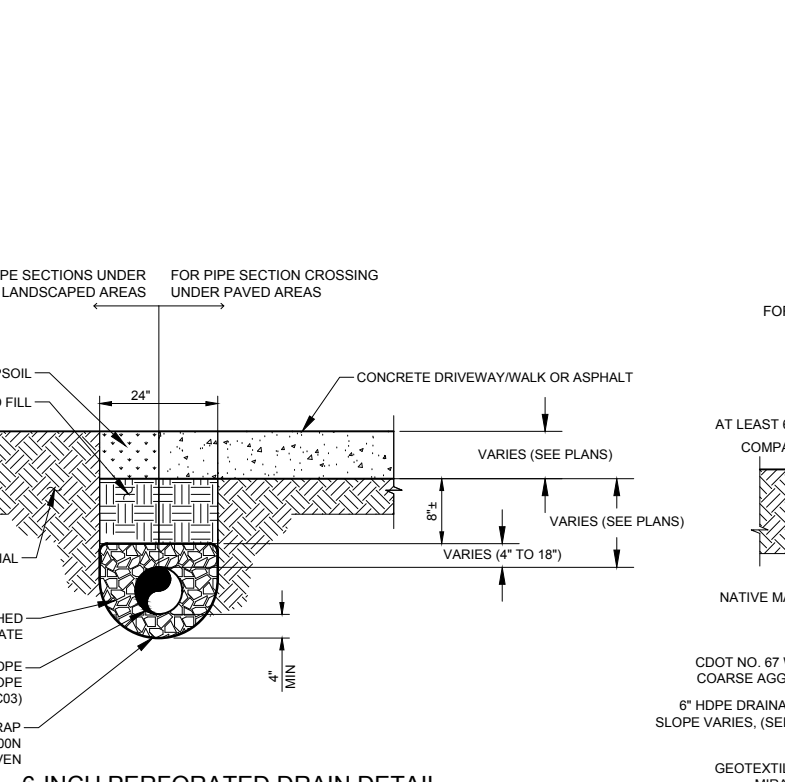


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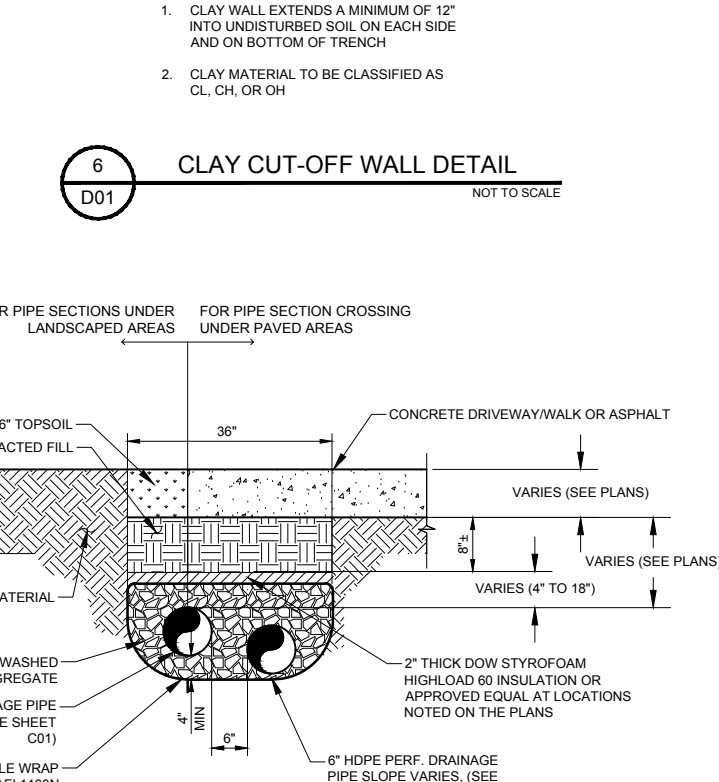
RESIDENCE TIE-IN DRAIN
CONNECTION DETAIL



CLEANOUT DETAIL



6-INCH PERFORATED DRAIN DETAIL
STA. 51+17 TO 52+18
(SHEETS C03)



6-INCH DRAIN DETAIL
STA. 13+69 TO 13+97
(SHEET C01)

COMPUTER INFORMATION	
CREATION DATE:	04/05/2019
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FILE NAME:	I:\32-1918.00 COUNTRY CLUB ESTATES\MAINDWGS 2018\SHEETS 32-1918.00 DETAILS 1.DWG

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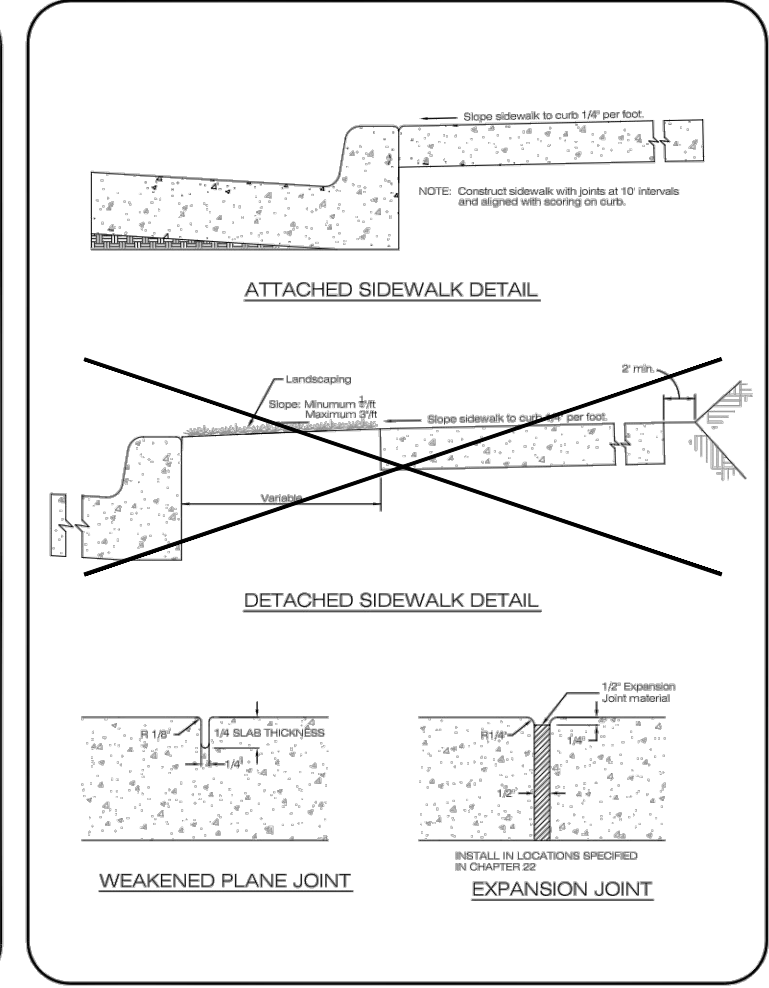
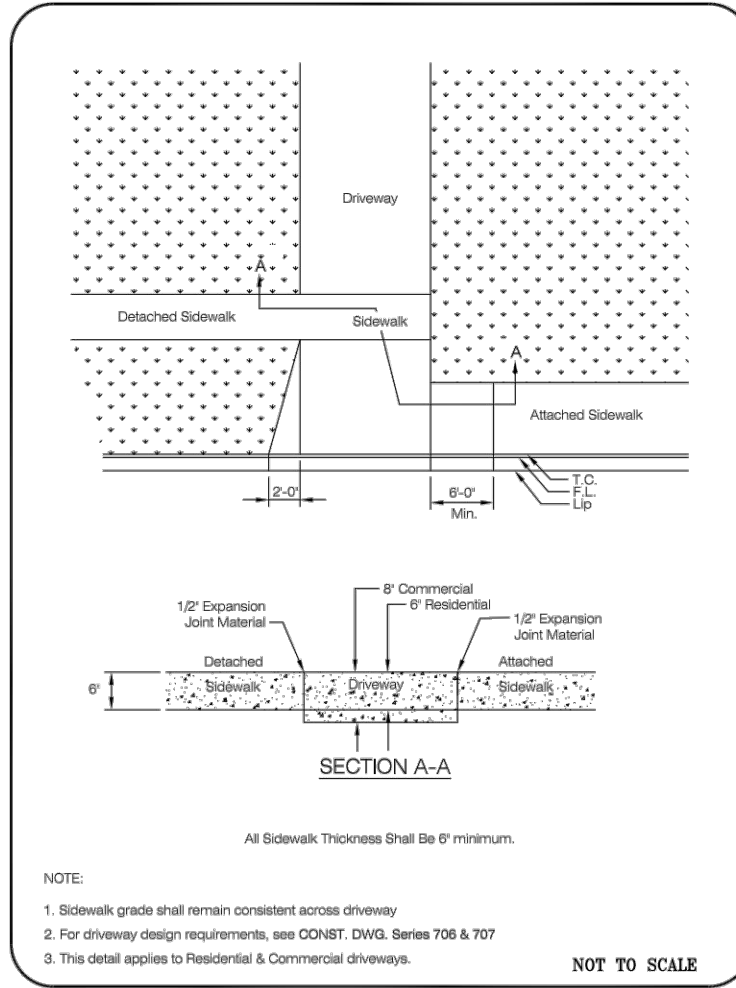
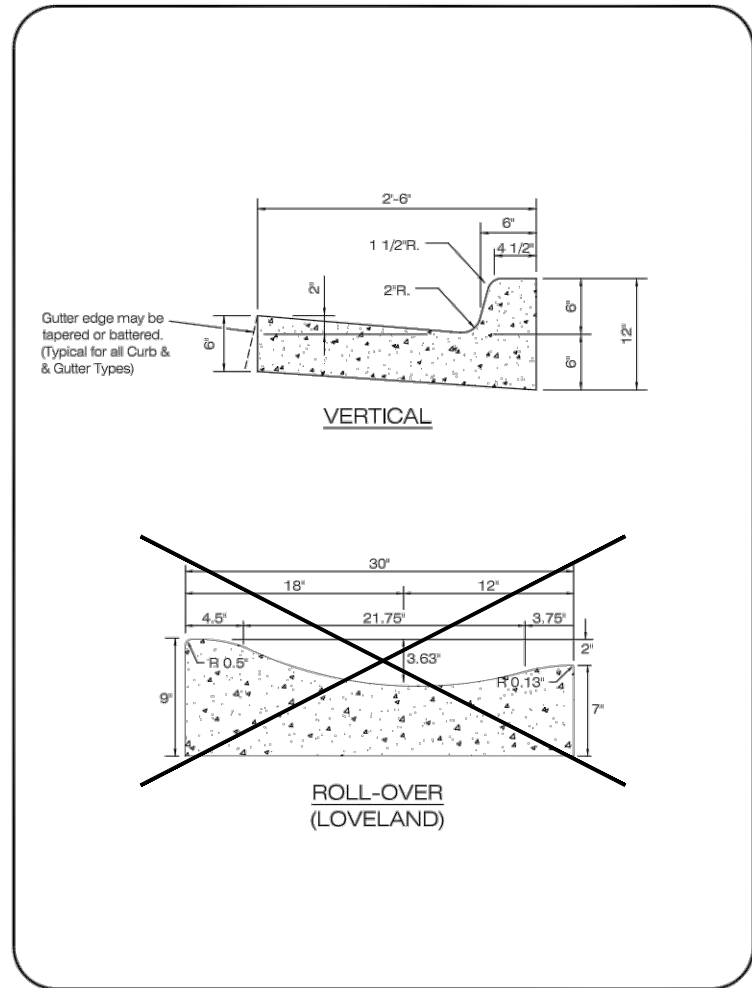
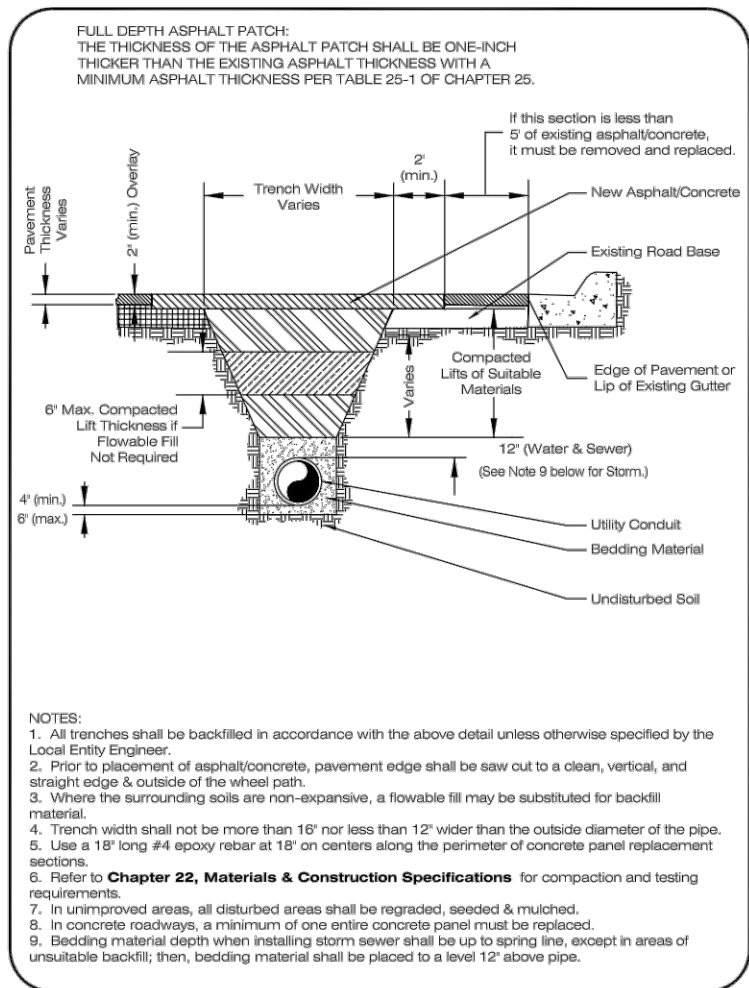


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MISCELLANEOUS DETAILS

PROJECT NO. 32-1918.00
COUNTRY CLUB ESTATES
SHEET NO. D01



TRENCH DETAIL			
LARIMER COUNTY URBAN AREA STREET STANDARDS	CONSTRUCTION DRAWINGS	REVISION NO: 1 DATE: 04/01/07	DRAWING 2201

CURB AND GUTTER			
LARIMER COUNTY URBAN AREA STREET STANDARDS	CONSTRUCTION DRAWINGS	REVISION NO: 1 DATE: 03/01/02	DRAWING 701

STANDARD SIDEWALK			
LARIMER COUNTY URBAN AREA STREET STANDARDS	CONSTRUCTION DRAWINGS	REVISION NO: 4 DATE: 02/17/15	DRAWING 1601

SIDEWALK DETAIL			
LARIMER COUNTY URBAN AREA STREET STANDARDS	CONSTRUCTION DRAWINGS	REVISION NO: 2 DATE: 04/01/07	DRAWING 1602

COMPUTER INFORMATION	
CREATION DATE:	04/05/2019
MODIFICATION DATE:	08/05/2019
FILE NAME:	I:\32\32-1918.00 COUNTRY CLUB ESTATES\MAIN\DWGS 2018\ SHEETS 32-1918.00 DETAILS 2.DWG

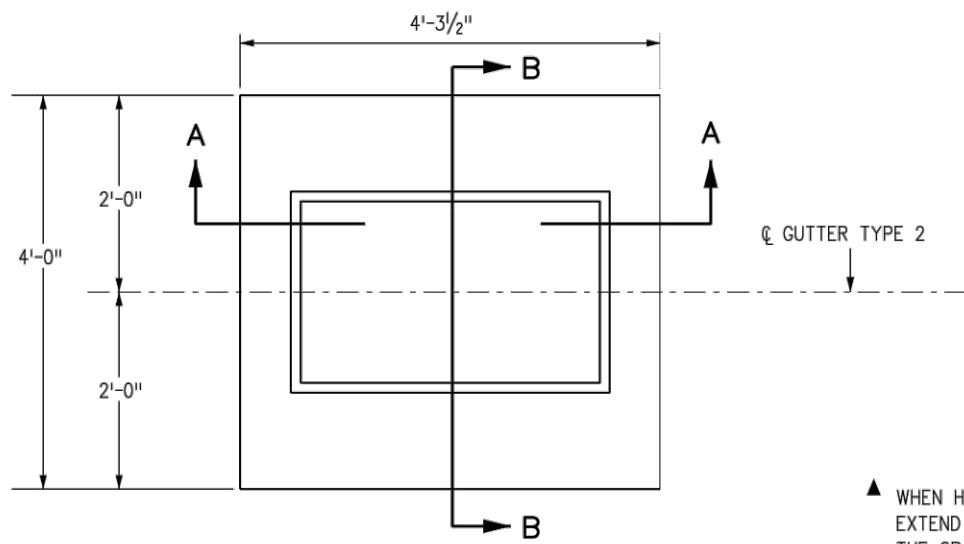
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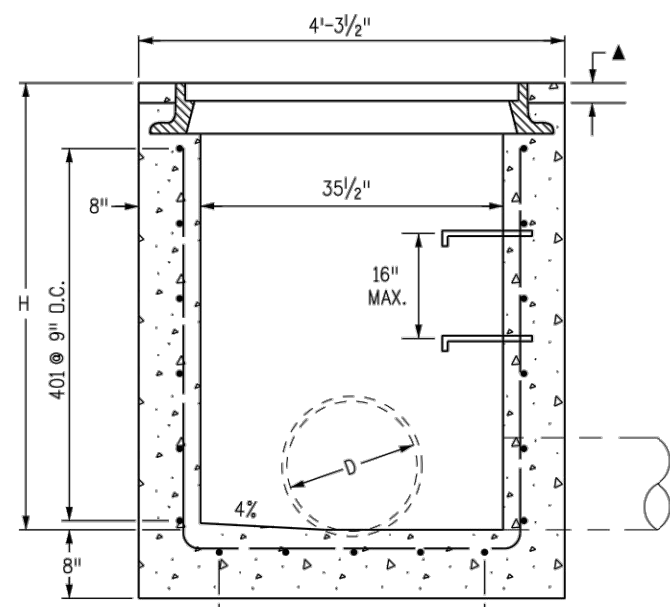
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TRENCH, CURB & GUTTER, AND SIDEWALK DETAILS

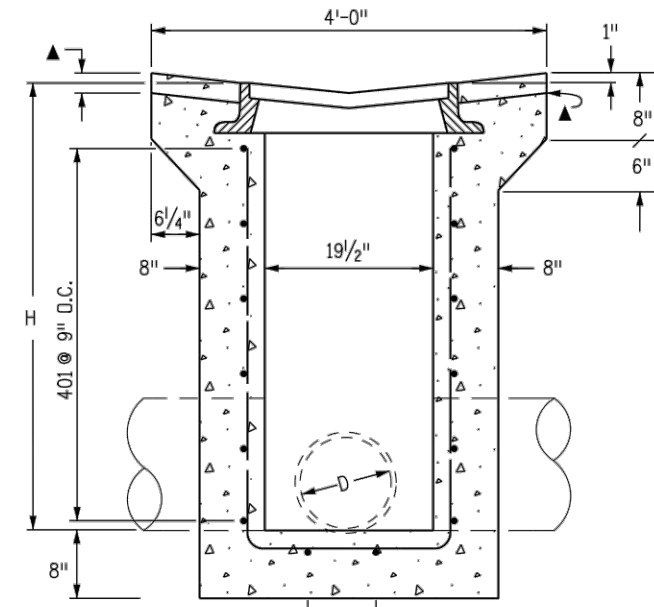
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COUNTRY CLUB ESTATES
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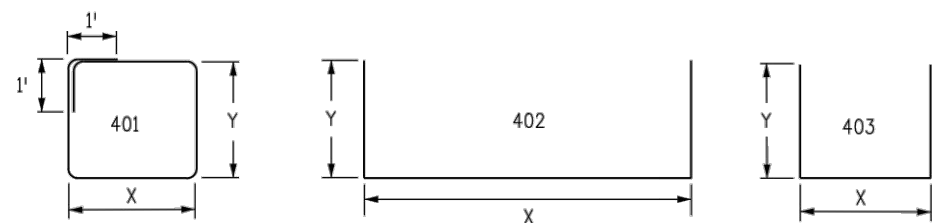
PLAN VIEW
TYPE 13 INLET FOR GUTTER TYPE 2



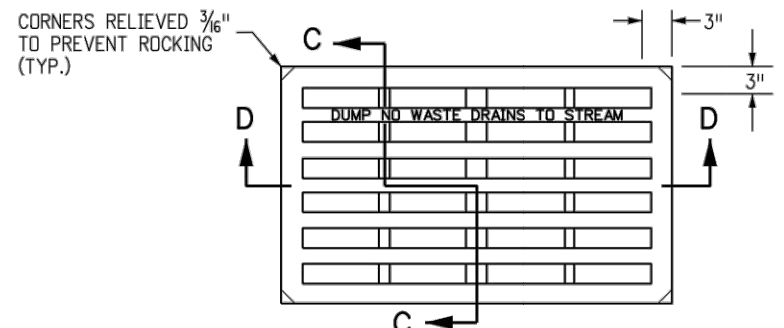
SECTION A-A
D MAX = 30 IN. FOR H > 4 FT.



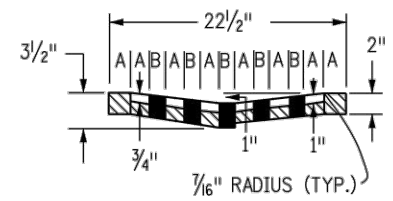
SECTION B-B
D MAX = 18 IN. FOR ALL H



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

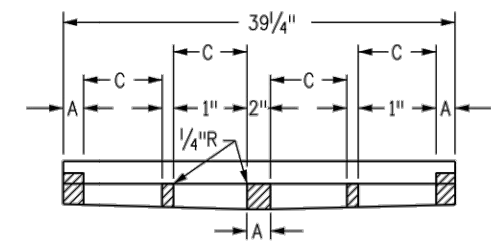


NO. 13 GRATE

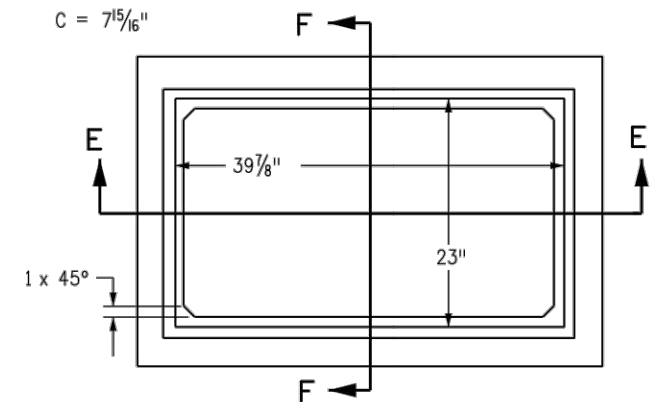


SECTION C-C

A = 1 3/4"
B = 1 1/16"
C = 7 5/16"

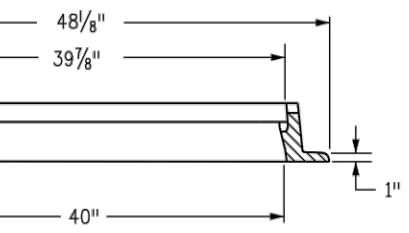


SECTION D-D

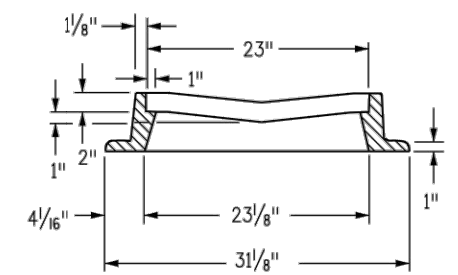


NO. 13 GRATING & FRAMES

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



SECTION E-E
APPROXIMATE WEIGHT = 590 LBS.



SECTION F-F

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 IN.
4. REINFORCING BARS SHALL BE DEFORMED #4 AND SHALL HAVE A 2 IN. MINIMUM CLEARANCE. ALL REINFORCING BARS SHALL BE EPOXY COATED.
5. 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.
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.	Ø LB.		SEC. A-A	SEC. B-B
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

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

QUANTITIES FOR ONE INLET

MARK	NO. REQ'D.	DIMENSIONS		LENGTH
		X	Y	
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 INFORMATION

CREATION DATE:	04/05/2019
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REVISIONS

NO.	DESCRIPTION
R-1	
R-2	
R-3	
R-4	
R-5	



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VOID:

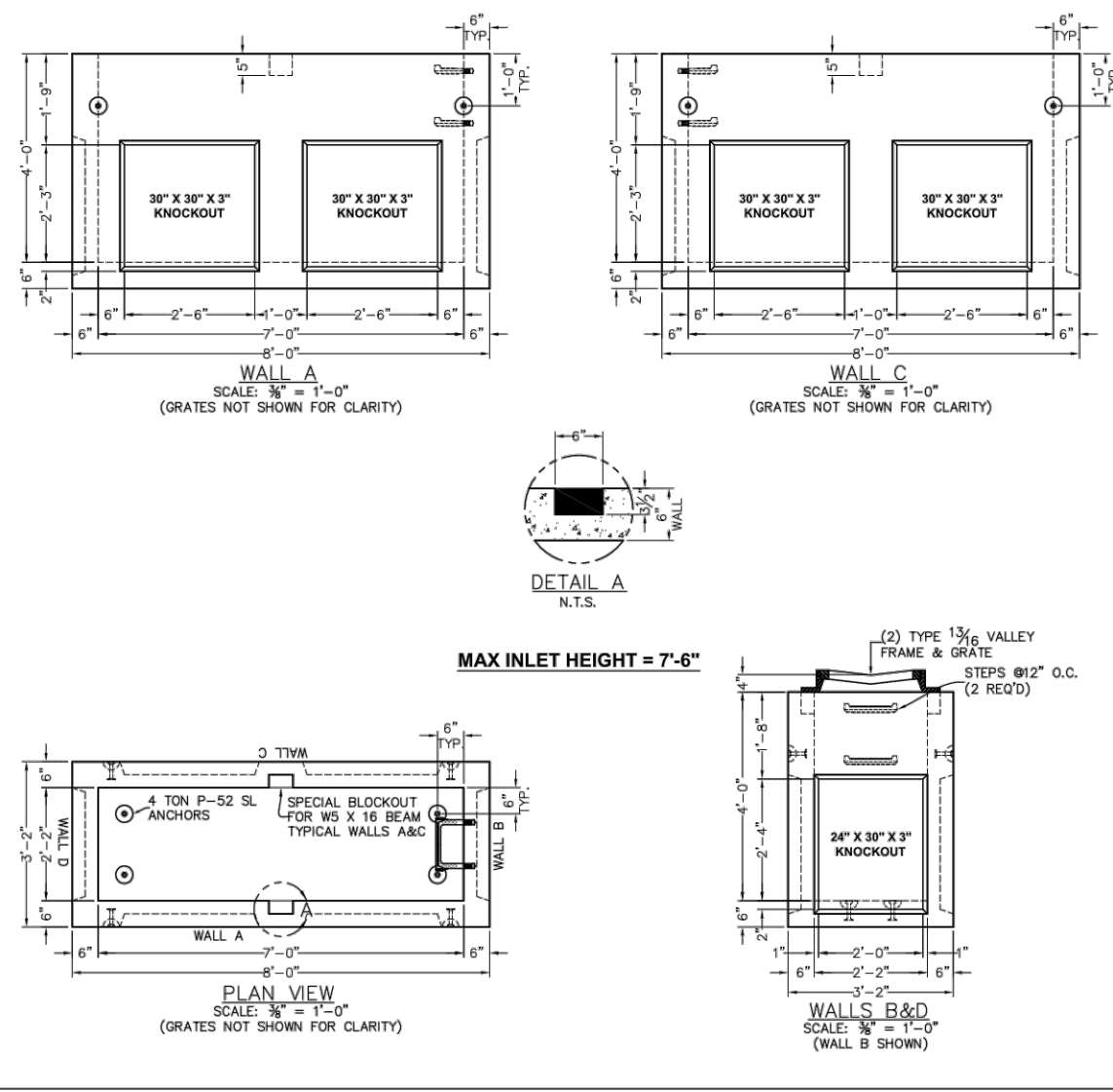
CONCRETE TYPE 13 INLET DETAIL
CDOT STANDARD PLAN M-604-13

PROJECT NO. 32-1918.00
COUNTRY CLUB ESTATES
SHEET NO. D03

I-3386

Single Valley Gutter Inlet Frame & Optional Grates

(Type 13 "A" Grate or Type 16 "L" - Vane Grate)



- DESIGN NOTES**
- DESIGN LOADINGS:
A. AASHTO HS-20-44, W/ IMPACT.
B. SOIL WEIGHT = 120 PCF.
C. EQUIV. FLUID PRESSURE = 40 PCF.
D. 80 PSF LATERAL LIVE LOAD SURCHARGE
 - CONCRETE 28 DAY COMPRESSIVE STRENGTH SHALL BE 6000 PSI (MIN.)
 - STEEL REINFORCEMENT: REBAR, ASTM A-615 GRADE 60
 - CEMENT: ASTM C-150 SPECIFICATIONS

BILL OF MATERIALS

TYPE	QTY
STD. TYPE VALLEY F&GS	2
4 TON P-52 SL ANCHORS	8
STEPS	2
WSX16 BEAM	1
CONCRETE MIX 8501740	SEE WEIGHTS

PRODUCT WEIGHTS

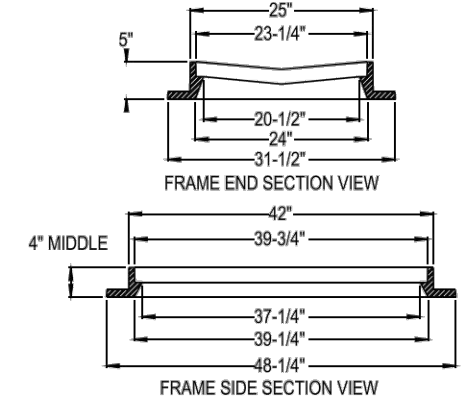
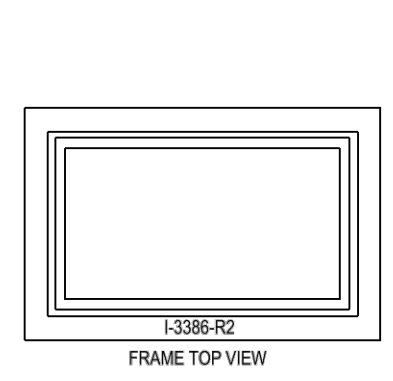
BASE	6,688 LBS. 1.65 yd ³
TOTAL	6,688 LBS. 1.65 yd ³
DRAWN BY: MATT PURDY SOLD BY: AMCOR	
DATE: 8/9/2008 SCALE: 3/8"=1'-0" PAGE 1 OF 1	
DWG NAME: 110-13-16 D. Valley Bases ORDER #	

CDOT DOUBLE 13/16 VALLEY
4'-0" BASE SECTION
ITEM CODE-1213800
OLDCASTLE STANDARD
SUBITTAL DRAWING

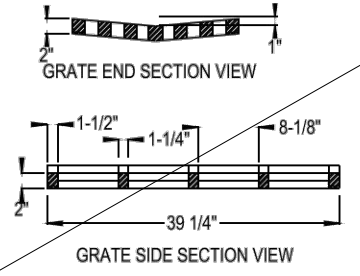
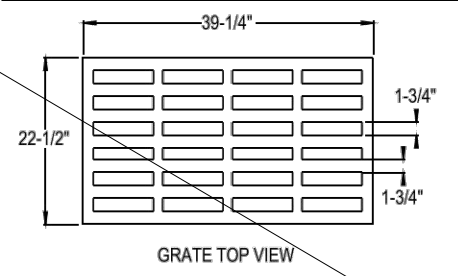
APPROVED: [Signature] DATE: []
REVISION DATE: []

Oldcastle Precast
Amcor

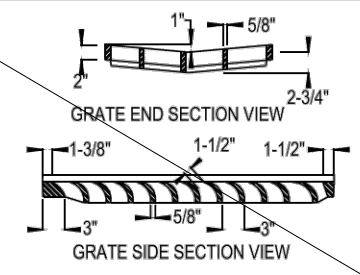
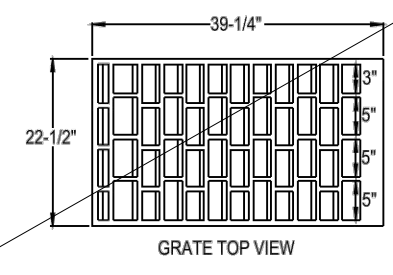
8392 RIVERVIEW PARKWAY LITTLETON, CO 80125 PHONE:(303) 791-1100



FRAME VIEWS



I-3386-01 "A" GRATE (TYPE 13)



I-3386-04 "L" or "VANE" GRATE (TYPE 16)

FRAME ENDS MAY BE CUT OFF TO MAKE MULTIPLE UNITS

CAST IRON conforms to ASTM A-48-93 Class 35B Meets H-20 Wheel Loading	D&L model No. I-3386 for Valley Gutter	D&L Foundry & Supply CA Sales: (707) 557-4525 fax: (707) 557-4655 UT Sales: (801) 785-5015 fax: (801) 785-0835 WA Sales: (509) 765-7952 fax: (509) 765-8124
	Estimated Weight of I-3386 complete with "A" Grate = 601 lbs. with "L" Grate = 612 lbs.	
Designation: I-3386 for ValleyGutter	Date: December 2002	Prepared by: Jesse Walker D&L Supply (not to scale)

COMPUTER INFORMATION

CREATION DATE:	04/05/2019
MODIFICATION DATE:	08/05/2019
FILE NAME:	I:\32\32-1918.00 COUNTRY CLUB ESTATES\MAINDWGS 2018\ SHEETS 32-1918.00 DETAILS 11.DWG

REVISIONS

NO.	DESCRIPTION
R-1	
R-2	
R-3	
R-4	
R-5	



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NO REVISIONS:

REVISED:

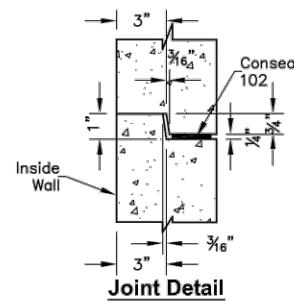
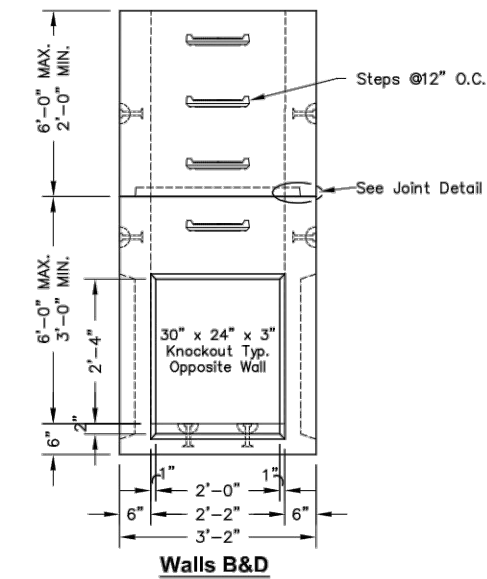
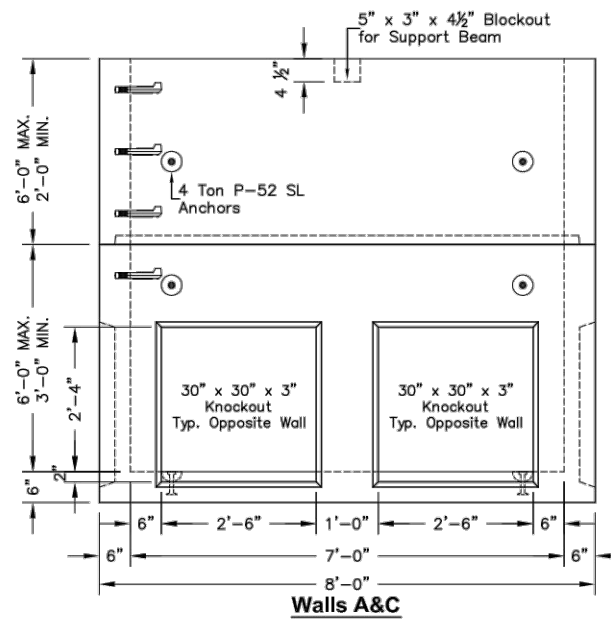
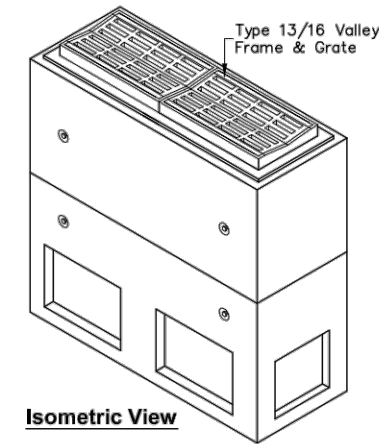
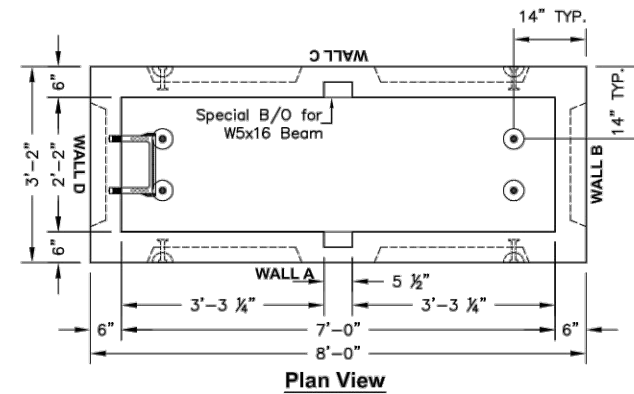
VOID:

**CONCRETE DOUBLE TYPE 13
INLET DETAILS - 1 OF 2**

PROJECT NO. 32-1918.00

COUNTRY CLUB ESTATES

SHEET NO. D04



- NOTES:**
- All Inlets are Designed and Manufactured according to ASTM C913
 - Inlets are Suitable for HS-20 Loading.
 - Bases are Available with Flat Top or Joint Keyway.
 - Custom Hole Size & Location Available.

Type 13/16 STD. Risers		
Height	Weight	Lift Gear
2'-0"	3,050 lbs.	4 Ton Swift Lift
3'-0"	4,575 lbs.	4 Ton Swift Lift
4'-0"	6,100 lbs.	4 Ton Swift Lift
5'-0"	7,625 lbs.	4 Ton Swift Lift
6'-0"	9,150 lbs.	4 Ton Swift Lift
Type 13/16 STD. Bases		
Height	Weight	Lift Gear
3'-0"	5,163 lbs.	4 Ton Swift Lift
4'-0"	6,688 lbs.	4 Ton Swift Lift
5'-0"	8,213 lbs.	4 Ton Swift Lift
6'-0"	9,738 lbs.	4 Ton Swift Lift

COMPUTER INFORMATION

CREATION DATE: 04/05/2019
 MODIFICATION DATE: 08/05/2019
 I:\32\32-1918.00 COUNTRY CLUB ESTATES\MAINDWGS 2018\SHEETS
 FILE NAME: 32-1918.00 DETAILS 12.DWG

- (R-1)
- (R-2)
- (R-3)
- (R-4)
- (R-5)

REVISIONS



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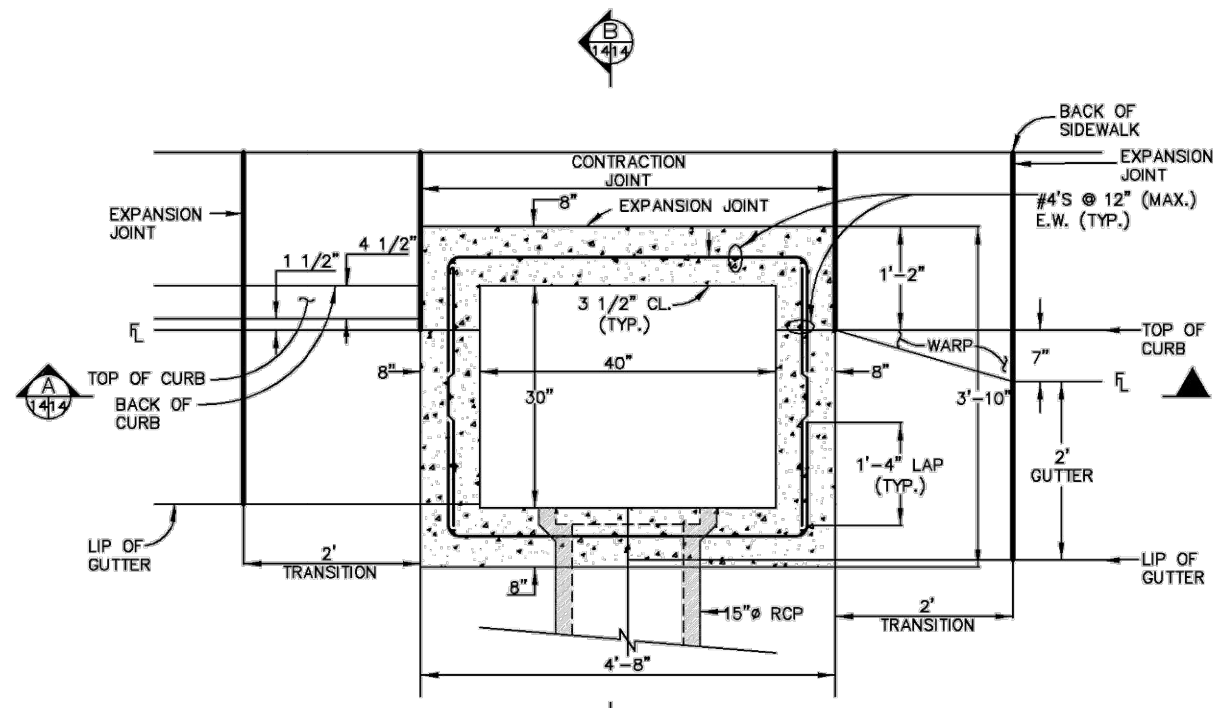
NO REVISIONS:
 REVISED:
 VOID:

**CONCRETE DOUBLE TYPE 13
 INLET DETAILS - 2 OF 2**

PROJECT NO. 32-1918.00

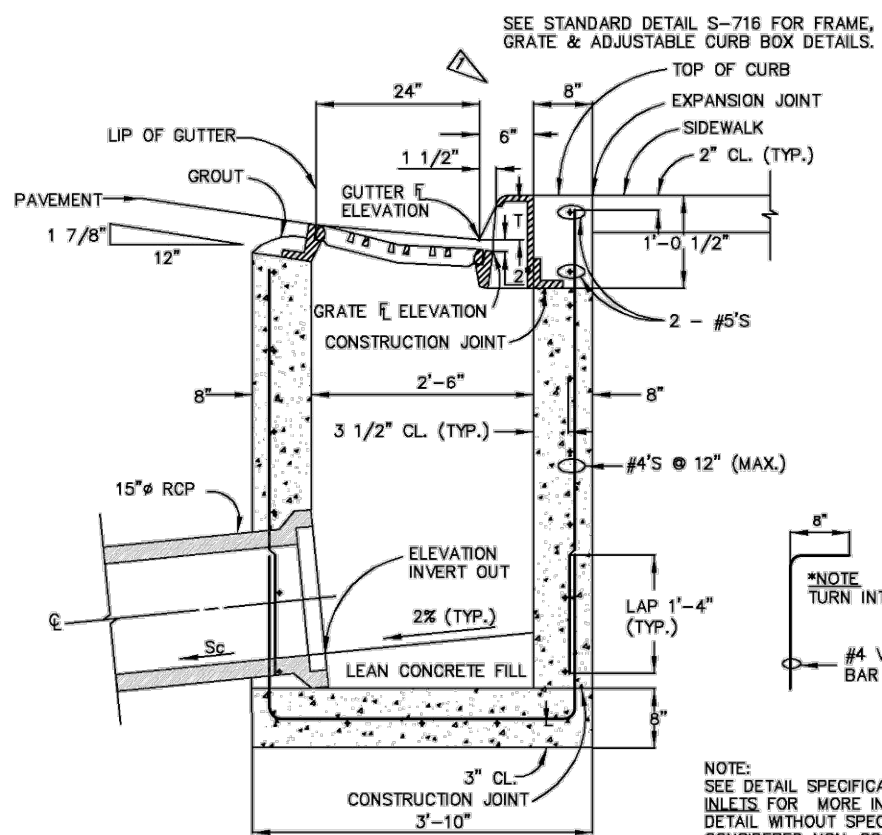
COUNTRY CLUB ESTATES

SHEET NO. D05



PLAN VIEW
NO SCALE

'T' = THROAT OPENING
'T' = 6" FOR 6" VERTICAL CURB & GUTTER
'T' = 5" FOR COMBINATION CURB GUTTER & SIDEWALK DROP FROM GUTTER ELEVATION TO GRATE ELEVATION (TRANSITION) IS 2".



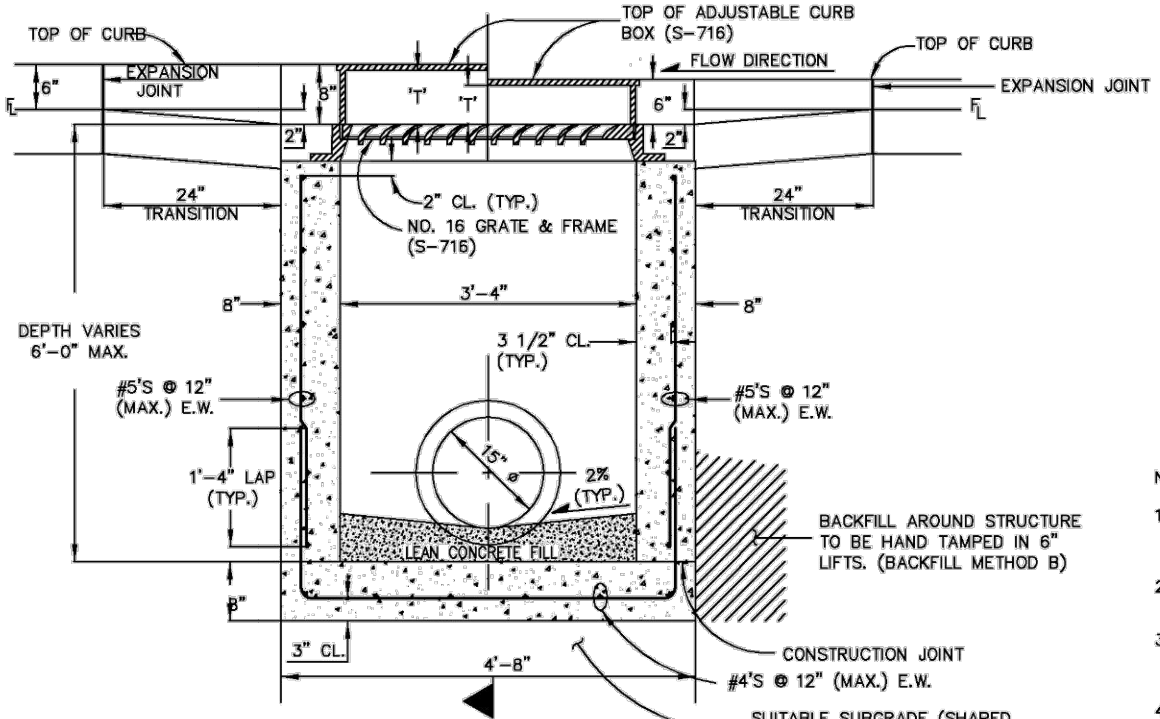
SECTION
NO SCALE

NOTE:
SEE DETAIL SPECIFICATIONS SECTION 11.04 STORM INLETS FOR MORE INFORMATION. USE OF THIS DETAIL WITHOUT SPECIFICATIONS SHALL BE CONSIDERED NON-COMPLIANT.

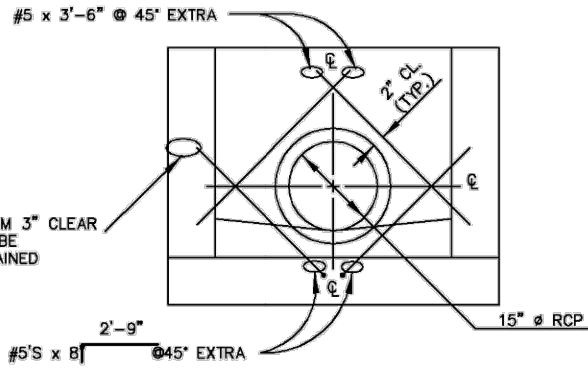
CONTRACTOR TO NOTCH & BLOCK OUT AROUND PIPE OPENING AND FORM SMOOTH RADIUS AROUND PIPE WITH NON SHRINK GROUT.

VERTICAL CURB AND GUTTER

COMBINATION CURB, GUTTER AND SIDEWALK



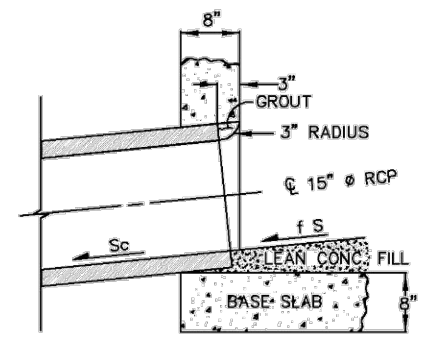
SECTION
NO SCALE



**-DETAIL-
REBAR PLACEMENT AROUND CONNECTOR**
NO SCALE

NOTES:

- FOR PAYMENT PURPOSES, INLET STRUCTURES SHALL ALSO INCLUDE 2'-0" CURB & GUTTER TRANSITION SECTION AT EACH END OF INLET PLUS SIDEWALK SECTIONS WHERE REQUIRED BEHIND INLET STRUCTURE AND TRANSITION SECTIONS.
- SUB-GRADE SHALL BE A GRADATION EQUAL TO CLASS B BEDDING COMPACTED TO 95% MAXIMUM DRY DENSITY. AASHTO DESIGNATION T-180.
- SUB-GRADE SHALL BE SHAPED UNDISTURBED MATERIAL OR OVEREXCAVATED AND BACKFILLED WITH CLASS B BEDDING MATERIAL, COMPACTED PER WMD SPECIFICATIONS.
- FLOOR SLOPE MAY BE POURED MONOLITHIC WITH BASE.
- Sc = SLOPE OF CONNECTOR = 2% MIN.
- UNLESS OTHERWISE SPECIFIED ON THE DRAWINGS OR OTHERWISE APPROVED, ALL #16 INLETS SHALL BE CONSTRUCTED WITH AN ADJUSTABLE C.I. CURB BOX (S-716).
- DESIGN CONDITIONS FOR INLET ALLOWS DEPTHS OF 6' (MAX.). FOR INLETS MORE THAN 6 FEET IN DEPTH, SHOP DRAWINGS AND DESIGN ANALYSIS SHALL BE SUBMITTED FOR APPROVAL.



**-DETAIL-
CONNECTOR OUTLET**
NO SCALE

NOTES (CONT.):

- ALL REINFORCING STEEL SHALL BE ASTM, A-615, GRADE 60 DEFORMED BARS. DIAMETER OF BEND MEASURED ON THE INSIDE OF THE BAR SHALL BE A MINIMUM OF 6 BAR DIAMETER.
- ALL WORK SHALL CONFORM TO AASHTO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES", FIFTEENTH EDITION, 1992.
- NO FORMWORK SHALL REMAIN INSIDE STRUCTURE WHEN COMPLETE.
- CONCRETE SHALL HAVE A 28 DAY COMPRESSIVE STRENGTH OF 4500 PSI.
- SPLICING OF REINFORCING STEEL SHALL BE PERMITTED ONLY WHERE DETAILED IN DRAWINGS.
- INLET WALLS SHALL BE FORMED BOTH INSIDE AND OUTSIDE. CASTING OF SIDEWALLS AGAINST EARTH IS NOT PERMITTED.
- LEAN CONCRETE FILL TO BE f_c = 2000 PSI.
- FOR THROUGH STRUCTURES, BENCHES MUST COME TO TOP OF PIPE.
- NO CORNER PENETRATIONS ON STRUCTURE.

COMPUTER INFORMATION	
CREATION DATE:	04/05/2019
MODIFICATION DATE:	08/05/2019
FILE NAME:	32-1918.00 DETAILS 9.DWG

REVISIONS	
R-1	
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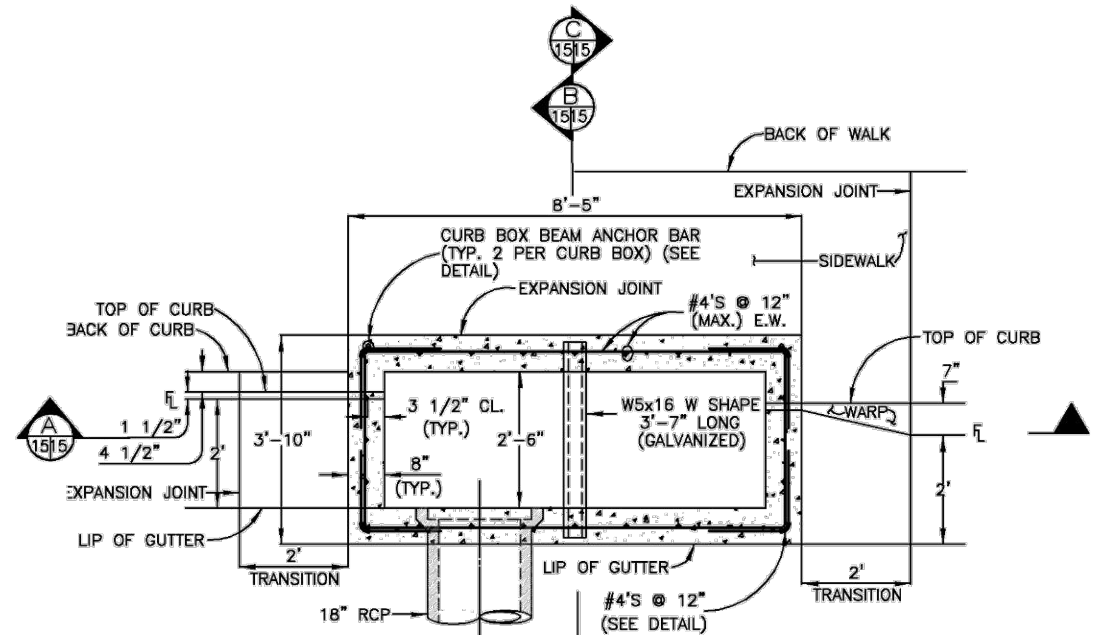


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CONCRETE NO. 16 INLET DETAIL - 1 OF 2

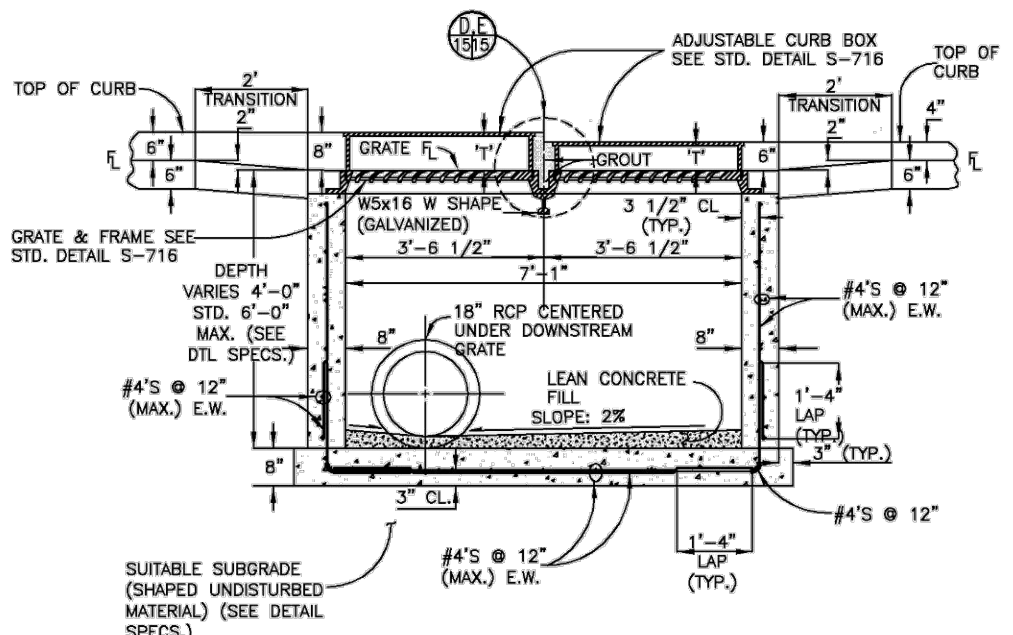
PROJECT NO. 32-1918.00
COUNTRY CLUB ESTATES
SHEET NO. D06



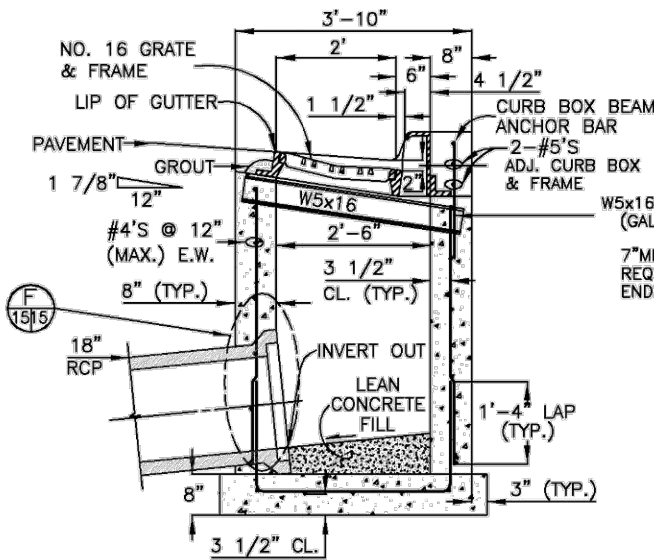
6" VERTICAL CURB AND GUTTER **COMBINATION CURB GUTTER AND SIDEWALK**

PLAN
NO SCALE

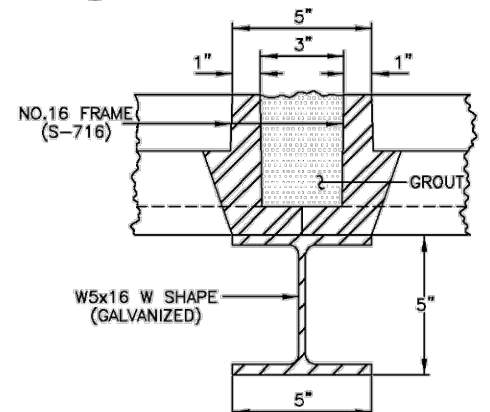
T = THROAT OPENING
 T = 6" FOR 6" VERTICAL CURB & GUTTER
 T = 5" FOR COMBINATION CURB GUTTER & SIDEWALK
 DROP FROM GUTTER FL ELEVATION TO GRATE FL ELEVATION (TRANSITION) IS 2"



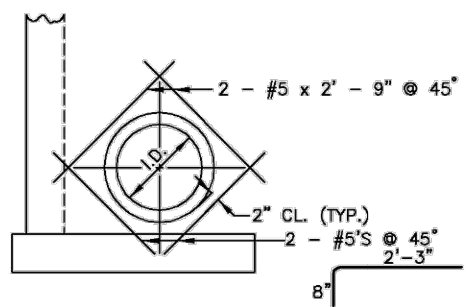
SECTION -
A VERTICAL CURB AND GUTTER
NO SCALE



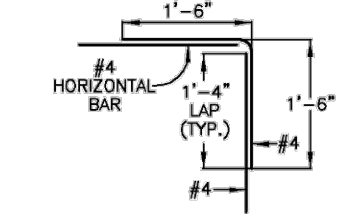
SECTION -
B VERTICAL CURB AND GUTTER
NO SCALE



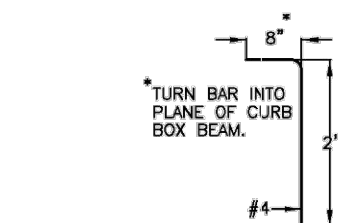
DETAIL -
E FRAME PLACEMENT ON SUPPORT RAIL (TYP.)
NO SCALE



DETAIL -
F REBAR PLACEMENT INLET WALL PENETRATION (TYP.)
NO SCALE

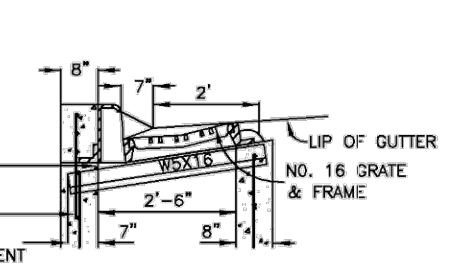


DETAIL -
G TYPICAL CORNER REBAR PLACEMENT
NO SCALE

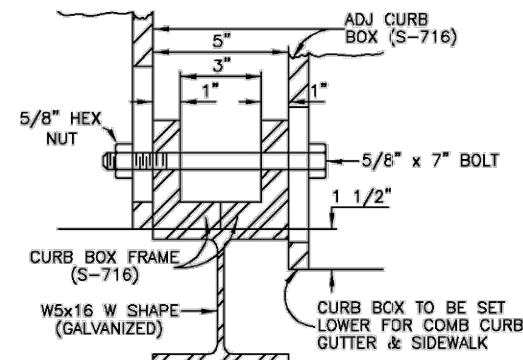


DETAIL -
H CURB BOX BEAM ANCHOR BAR (TYP.)
NO SCALE

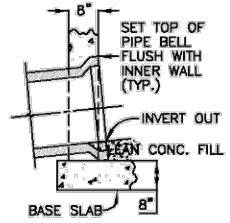
NOTES:
 1. SEE DETAIL SPECIFICATIONS SECTION 11.05 STORM INLETS FOR MORE INFORMATION. USE OF THIS DETAIL WITHOUT SPECIFICATIONS SHALL BE CONSIDERED NON-COMPLIANT.
 2. ALSO SEE GENERAL NOTES ON S-616.1.



SECTION -
C COMBINATION CURB GUTTER AND SIDEWALK
NO SCALE



DETAIL -
D PLACEMENT OF ADJ. CURB BOX ON SUPPORT RAIL (TYP.)
NO SCALE



DETAIL -
F CONNECTOR PIPE END TREATMENT (TYP.)
NO SCALE

COMPUTER INFORMATION

CREATION DATE:	04/05/2019
MODIFICATION DATE:	08/05/2019
FILE NAME:	32-1918.00 DETAILS 10.DWG

REVISIONS

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CONCRETE NO. 16 INLET DETAIL - 2 OF 2

PROJECT NO. 32-1918.00

COUNTRY CLUB ESTATES

SHEET NO. D07

LEGEND

H = MAXIMUM ALLOWABLE HEIGHT OF COVER OVER THE TOP OF THE PIPE, EXCLUDING PAVEMENT THICKNESS.

FILL HEIGHTS ARE BASED ON AASHTO M304 POLYVINYL CHLORIDE (PVC) PIPE WITH OUTER, RIBBED WALL AND SMOOTH INNER WALL, AND ON AASHTO T180 MINIMUM RELATIVE COMPACTION OF 95% OR 90%.

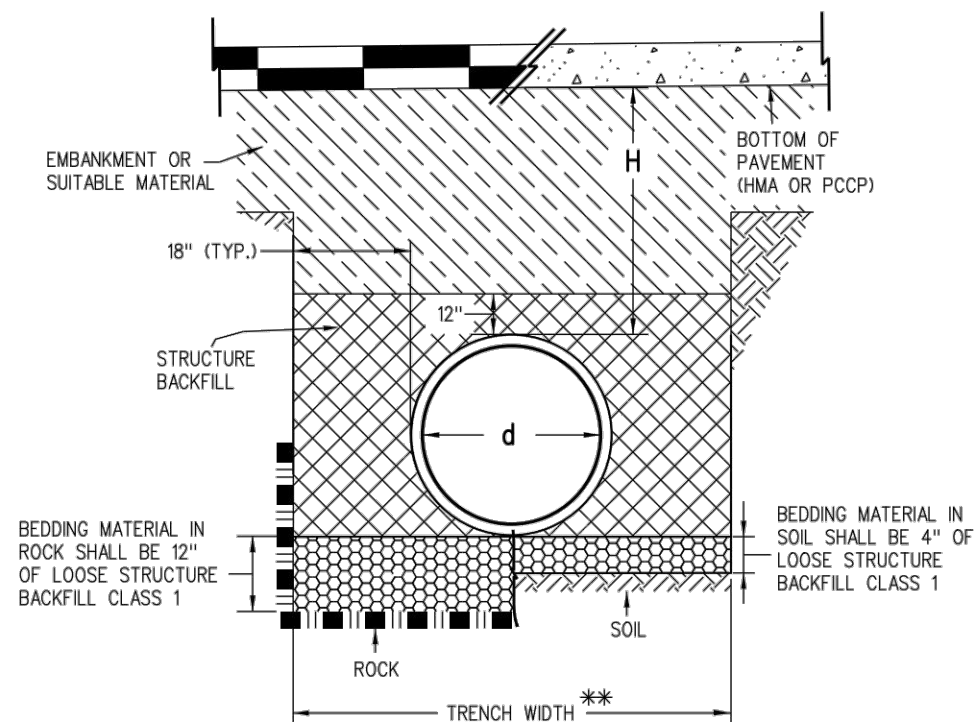
FILL HEIGHTS, FOR INSTALLATION WITH HIGH WATER TABLE, REQUIRE A SPECIAL DESIGN. THE MAXIMUM HEIGHT IN HIGHWATER LOCATIONS SHOULD BE 15 FEET OR BASED ON AASHTO LRFD DESIGN SPECIFICATIONS.

THE MINIMUM COVER SHALL BE AS SHOWN ON THESE TABLES OR CONFORM TO AASHTO REQUIREMENTS, WHICHEVER IS GREATER. THE MINIMUM COVER FOR PIPE IS MEASURED FROM THE TOP OF THE PIPE TO THE BOTTOM OF THE PAVEMENT: HMA OR PCCP.

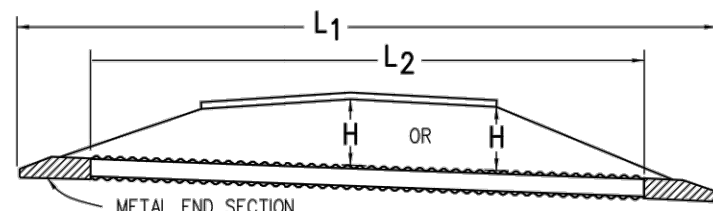
THE MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE SUBGRADE DURING CONSTRUCTION. THE MINIMUM COVER IS BASED ON DUAL AXLE LOADS UP TO 50,000 POUNDS.

L₁ = LENGTH OF PIPE TO BE MEASURED WHEN PLACED IN ACCORDANCE WITH SECTION 624.

L₂ = LENGTH OF PIPE TO BE MEASURED WHEN PLACED IN ACCORDANCE WITH SECTION 603.



INSTALLATION OF PIPE

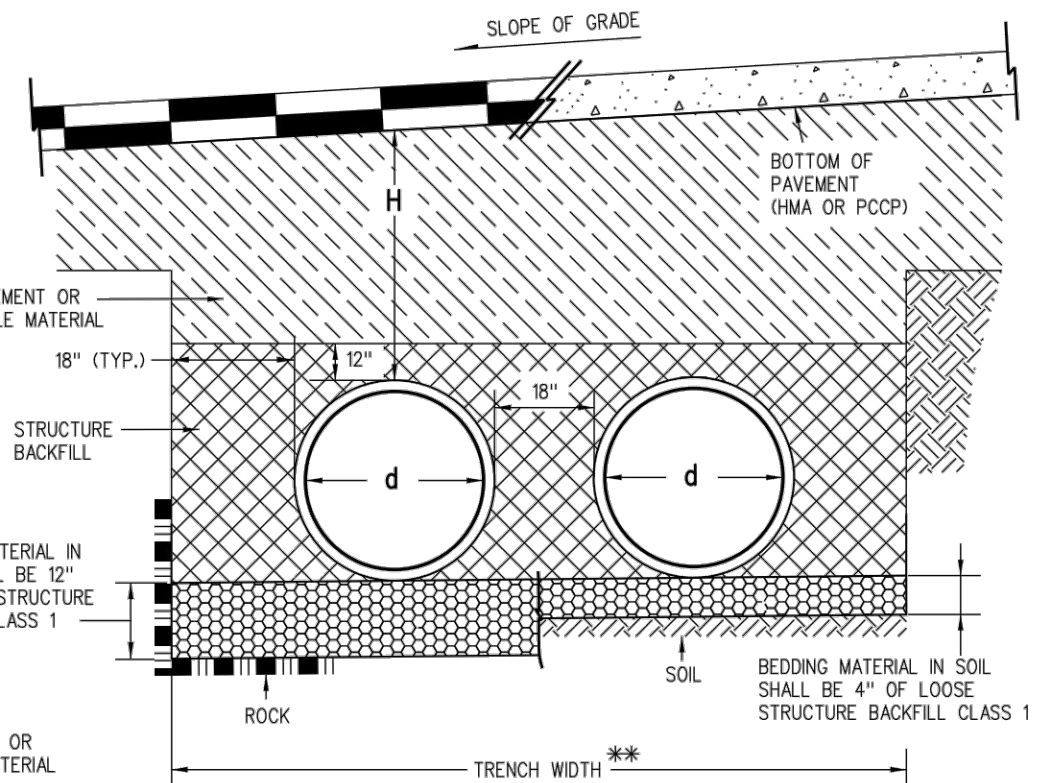


NOTE: USE THE **H** THAT IS GREATER FOR MAXIMUM ALLOWABLE FILL HEIGHT.

PIPE WITH END SECTIONS

GENERAL NOTES

1. ALL PIPES SHALL MEET THE REQUIREMENTS OF AASHTO M304 FOR POLYVINYL CHLORIDE (PVC) PROFILE WALL DRAIN PIPE WITH 46 PSI WALL STIFFNESS PER ASTM F949.
2. FOR PIPES WITH DIAMETERS OF 15 INCHES OR LESS, SOLID WALL PVC PIPES MEETING AASHTO M278 MAY BE USED.
3. WHEN A PIPE IS TO BE EXTENDED, THE SAME PIPE MATERIAL AND SIZE AS IN THE ORIGINAL INSTALLATION SHALL BE USED.
4. MINIMUM COVER SHALL BE PROVIDED DURING CONSTRUCTION TO PROTECT THE PIPE FROM DAMAGE.
5. WHEN INSTALLING A GUARDRAIL OR A SIGN POST DIRECTLY ABOVE A PIPE, THE POST'S BOTTOM MUST BE AT LEAST 1 FOOT ABOVE THE TOP OF THE PIPE. THE HOLE FOR THE POST SHALL BE DRILLED INTO THE SOIL.
6. STRUCTURE BACKFILL MATERIAL SHALL BE CLASS 1.
7. FOR PIPES 24 INCHES OR LESS IN DIAMETER, H MIN. MAY BE REDUCED TO ONE FOOT FOR LOW VOLUME APPROACH ROADS NOT ON STATE HIGHWAYS.

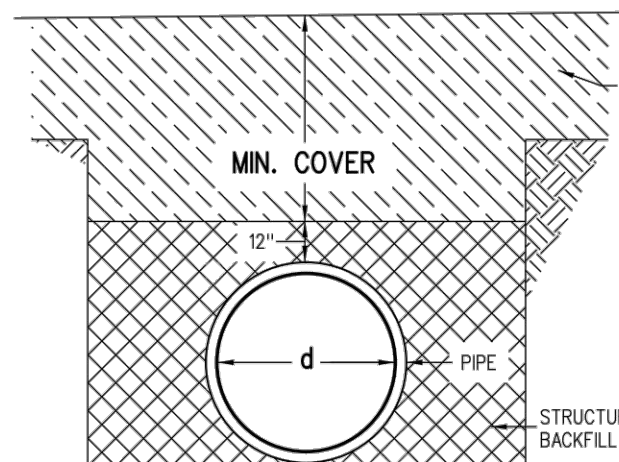


INSTALLATION OF MULTIPLE PIPES

** TRENCH WIDTH ASSUMES STABLE IN-SITU SIDE WALL

PIPE DIAMETER, d (IN.)	H MINIMUM HEIGHT OF COVER (FT.)	H MAXIMUM HEIGHT OF COVER (FT.)	
		95% COMPACTION	90% COMPACTION
12	2	65	55
15	2	59	51
18	2	63	53
21	2	58	49
24	2	58	49
30	2	56	47
36	2	56	47

MINIMUM AND MAXIMUM COVER



CONSTRUCTION MINIMUM COVER FOR PIPE

NOMINAL PIPE DIAMETER (IN.)	MINIMUM COVER (IN.) FOR INDICATED AXLE LOADS (KIPS)			
	18.0-50.0	50.0-75.0	75.0-110.0	110.0-150.0
24 - 36	24.0	30.0	36.0	36.0

AASHTO MINIMUM COVER FOR CONSTRUCTION LOADS

COMPUTER INFORMATION	
CREATION DATE:	04/05/2019
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FILE NAME:	32-1918.00 DETAILS 6.DWG

REVISIONS	
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(R-2)	
(R-3)	
(R-4)	
(R-5)	

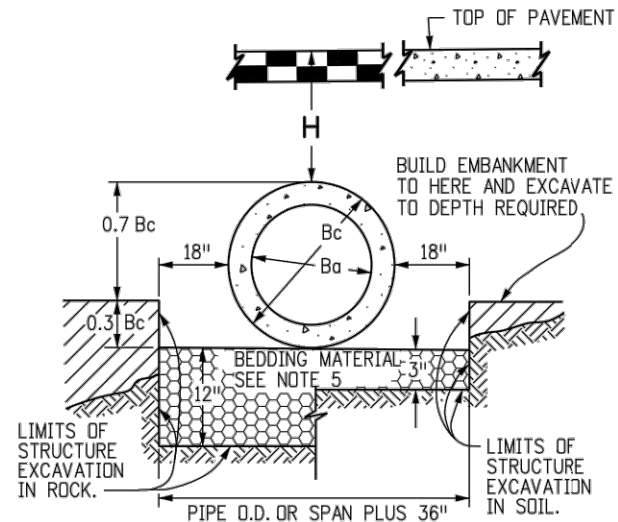


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PVC PIPE BEDDING DETAIL
CDOT STANDARD PLAN M-603-5

PROJECT NO. 32-1918.00
COUNTRY CLUB ESTATES
SHEET NO. D08



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

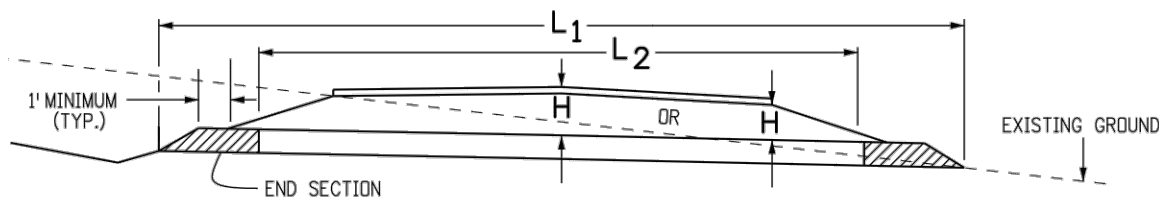
PIPE INSTALLATION
(WITH 0.7 PROJECTION RATIO)

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.		FT.		IN.		FT.	IN.			FT.
12	2	0.40					23	14	2-3/4	0.49
15	2-1/4	0.49								
18	2-1/2	0.58								
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								
33	3-3/4	1.01					38	24	3-3/4	0.79
36	4	1.10					45	29	4-1/2	0.95
42	4-1/2	1.28	29	45	4-1/2	1.35				
48	5	1.45	34	53	5	1.58	53	34	5	1.10
			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)



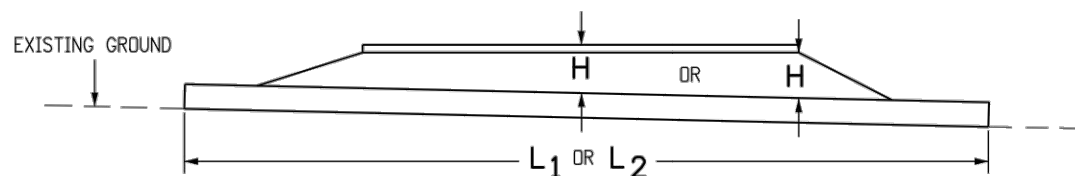
CONCRETE PIPE WITH END SECTIONS

NOTE: USE THE H THAT IS GREATER FOR MAXIMUM ALLOWABLE FILL HEIGHT.

H = HEIGHT OF FILL OVER TOP OF PIPE, INCLUDING PAVEMENT THICKNESS.

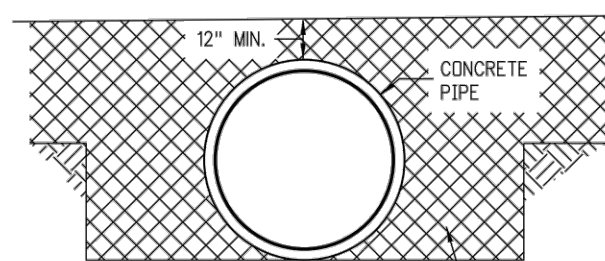
L1 = LENGTH OF PIPE TO BE MEASURED WHEN PLACED IN ACCORDANCE WITH SECTION 624.

L2 = 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.



CONSTRUCTION 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)	1 TO 18	1 TO 25	± 25 TO 37	± 37 TO 45	
VERTICAL ELLIPTICAL (VE)	1 TO 18	1 TO 25	± 25 TO 37	± 37 TO 45	± 45 TO 62
HORIZONTAL ELLIPTICAL (HE)	1 TO 18	1 TO 25	± 25 TO 37		

ALLOWABLE RANGE OF HEIGHTS FOR FILL OVER REINFORCED CONCRETE PIPE

(ALL SIZES)

GENERAL NOTES

REINFORCED CONCRETE PIPE

1. FILL HEIGHTS GREATER THAN MAXIMUM ALLOWED IN THE HEIGHTS OF FILL TABLE ON THIS SHEET REQUIRE SPECIAL DESIGN OF STRUCTURE.
2. PIPE DESIGN IS BASED ON SAFETY FACTOR OF 1.33 ON ULTIMATE STRENGTH.
3. THE HEIGHTS OF FILL OVER TOP OF PIPE ARE BASED ON UNIT WEIGHT OF SOIL AT 135 LBS. PER CUBIC FT.
4. PIPE CLASS IS DETERMINED FROM 0.01 IN. CRACK D-LOAD.
5. 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.
6. CHANGES IN DESIGN FACTORS REQUIRE COMPENSATING CHANGES IN PIPE DESIGN.
7. MINIMUM WALL THICKNESS DIMENSIONS ARE BASED ON AASHTO M 170 (WALL B) FOR CIRCULAR PIPE, AND AASHTO M 207 FOR ELLIPTICAL PIPE.
8. SPACING FOR MULTIPLE PIPE INSTALLATIONS SHALL CONFORM TO THE DETAILS SHOWN ON STANDARD PLAN M-206-1.
9. 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.

COMPUTER INFORMATION	
CREATION DATE:	04/05/2019
MODIFICATION DATE:	08/05/2019
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FILE NAME:	32-1918.00 DETAILS 7.DWG

REVISIONS	
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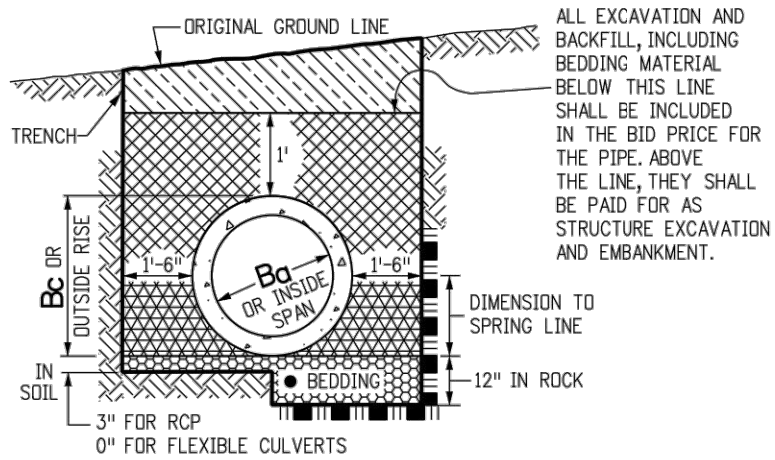


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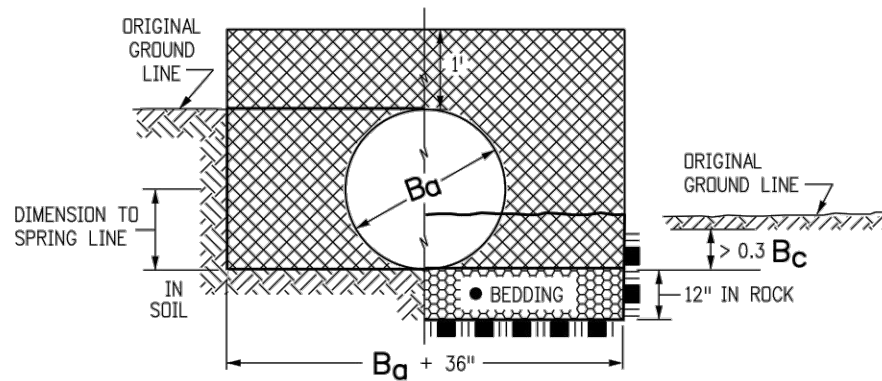
CONCRETE PIPE BEDDING DETAIL
CDOT STANDARD PLAN M-603-2

PROJECT NO. 32-1918.00
COUNTRY CLUB ESTATES
SHEET NO. D09



PIPE IN TRENCH

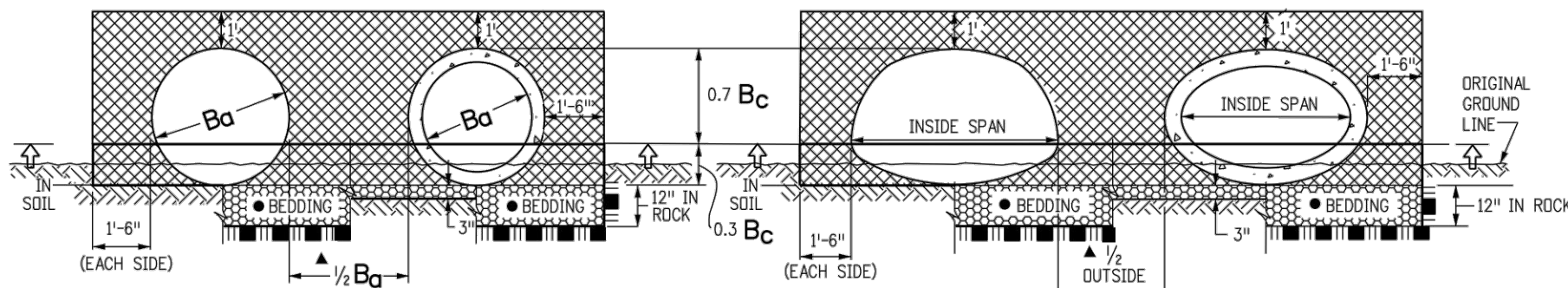
- THE BEDDING MATERIAL FOR RIGID PIPE IN SOIL SHALL BE 3 IN. OF LOOSE STRUCTURE BACKFILL (CLASS 1 OR 2). BEDDING IS NOT REQUIRED FOR FLEXIBLE PIPE IN SOIL. BEDDING MATERIAL FOR RIGID OR FLEXIBLE PIPE IN ROCK SHALL BE 12 IN. OF LOOSE STRUCTURE BACKFILL, CLASS 1.



CIRCULAR PIPE

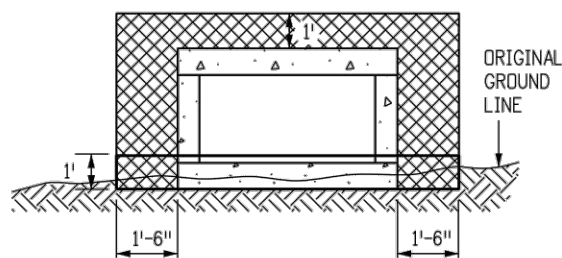
(WHERE ORIGINAL GROUND LINE IS BETWEEN 0.3 Bc AND Bc + 1 FT. ABOVE FLOWLINE)

- ▲ WHEN TWO OR MORE CONDUITS ARE LAID SIDE-BY-SIDE, THEY SHALL BE PLACED SO THAT THEY ARE 1/2 OUTSIDE DIAMETER, OR 1/2 OUTSIDE SPAN, OR 3 FT. APART, WHICHEVER IS LESS. HOWEVER, IF END SECTIONS ARE USED, THE MINIMUM SPACING SHALL BE 1 FT. BETWEEN END SECTIONS.



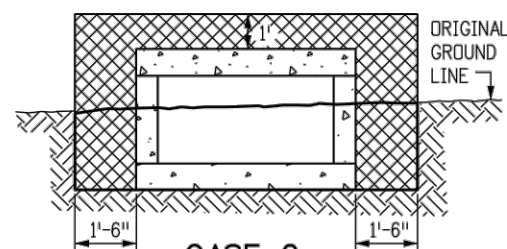
CIRCULAR PIPE IN FILL

ARCH OR ELLIPTICAL PIPE IN FILL



CASE 1

APPLIES WHEN THE ORIGINAL GROUND LINE IS LESS THAN 1 FT. ABOVE THE BOTTOM OF THE BOX CULVERT. THE EMBANKMENT SHALL BE BUILT UP TO 1 FT. ABOVE THE BOTTOM OF THE BOX CULVERT AND THEN EXCAVATED TO THE BOTTOM OF THE BOX CULVERT. THIS EMBANKMENT AND EXCAVATION WILL NOT BE MEASURED AND PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE COST OF THE WORK.

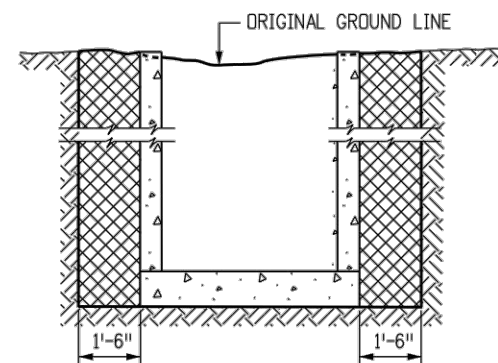


CASE 2

APPLIES WHEN THE ORIGINAL GROUND LINE IS MORE THAN 1 FT. ABOVE THE BOTTOM OF THE BOX CULVERT.

CONCRETE BOX CULVERT

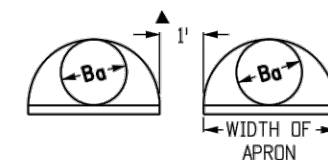
IN BOTH CASES, THE TRENCH (OUTLINED BY THE THICK SOLID LINE) SHALL THEN BE EXCAVATED TO ACCOMMODATE CONSTRUCTION OF THE BOX CULVERT.



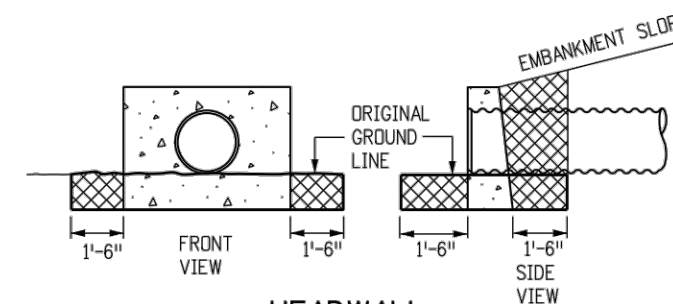
DROP INLETS AND DIVISION BOXES

- GENERAL NOTES**
1. EXCAVATION AND BACKFILL PATTERNS DIFFERENT FROM THOSE INDICATED ON THESE SHEETS WILL BE SHOWN ELSEWHERE ON THE PLANS.
 2. EXCAVATION FOR CHANNEL CHANGE OR CHANNEL IMPROVEMENT WILL BE EITHER UNCLASSIFIED EXCAVATION OR MUCK EXCAVATION AND WILL BE NOTED ON THE PLANS. EXCAVATION FROM THE CHANNEL FLOWLINE TO THE DEPTH REQUIRED FOR THE NEW STRUCTURE AND INCIDENTAL CHANNEL EXCAVATION WILL BE PAID FOR AS STRUCTURE EXCAVATION.
 3. STRUCTURE FOOTINGS WHICH ARE LOCATED IN ROCK SHALL BE POURED OUT TO UNDISTURBED ROCK WITHOUT FORMING IN CONFORMANCE WITH SUBSECTION 601.09(b).
 4. STRUCTURAL PLATE CULVERTS SHALL BE CONSTRUCTED AS SHOWN ON THE PLANS.
 5. B_o EQUALS THE INSIDE DIAMETER OF A PIPE AND B_c EQUALS THE OUTSIDE DIAMETER OF A PIPE. FOR THIN WALLED PIPES, IT IS ASSUMED THAT B_o = B_c.
 6. APPROXIMATE STRUCTURE EXCAVATION AND BACKFILL QUANTITIES, UP TO 1 FT. OVER THE PIPE WILL BE SHOWN ON THE PLANS, FOR INFORMATION ONLY.

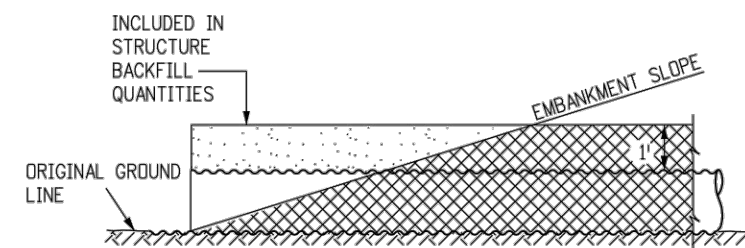
- LEGEND**
- STRUCTURE EXCAVATION LIMITS
 - STRUCTURE BACKFILL, CLASS 1 OR 2, AS SHOWN ON PLANS
 - STRUCTURE BACKFILL, CLASS 1
 - EMBANKMENT MATERIAL
 - EARTH
 - ROCK
 - BEDDING
 - CONCRETE
 - ↑ = WHEN FLOW LINE OF CULVERT IS LESS THAN 0.3 B_c BELOW THE ORIGINAL GROUND LINE, EMBANKMENT SHALL BE BUILT UP TO 0.3 B_c ABOVE THE FLOW LINE AND TRENCH EXCAVATED TO THE BOTTOM OF PIPE OR AS SHOWN.



CONDUIT WITH END SECTIONS



HEADWALL



END OF PIPE

COMPUTER INFORMATION	
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EXCAVATION AND BACKFILL DETAIL
CDOT STANDARD PLAN M-206-1

PROJECT NO. 32-1918.00
COUNTRY CLUB ESTATES
SHEET NO. D10