

CONSTRUCTION PLANS
FOR
WORTHINGTON PLACE APARTMENTS
SOUTHWEST 1/4 SECTION 21, TOWN 1 NORTH, RANGE 1 WEST
CITY OF LESLIE, INGHAM COUNTY, MICHIGAN

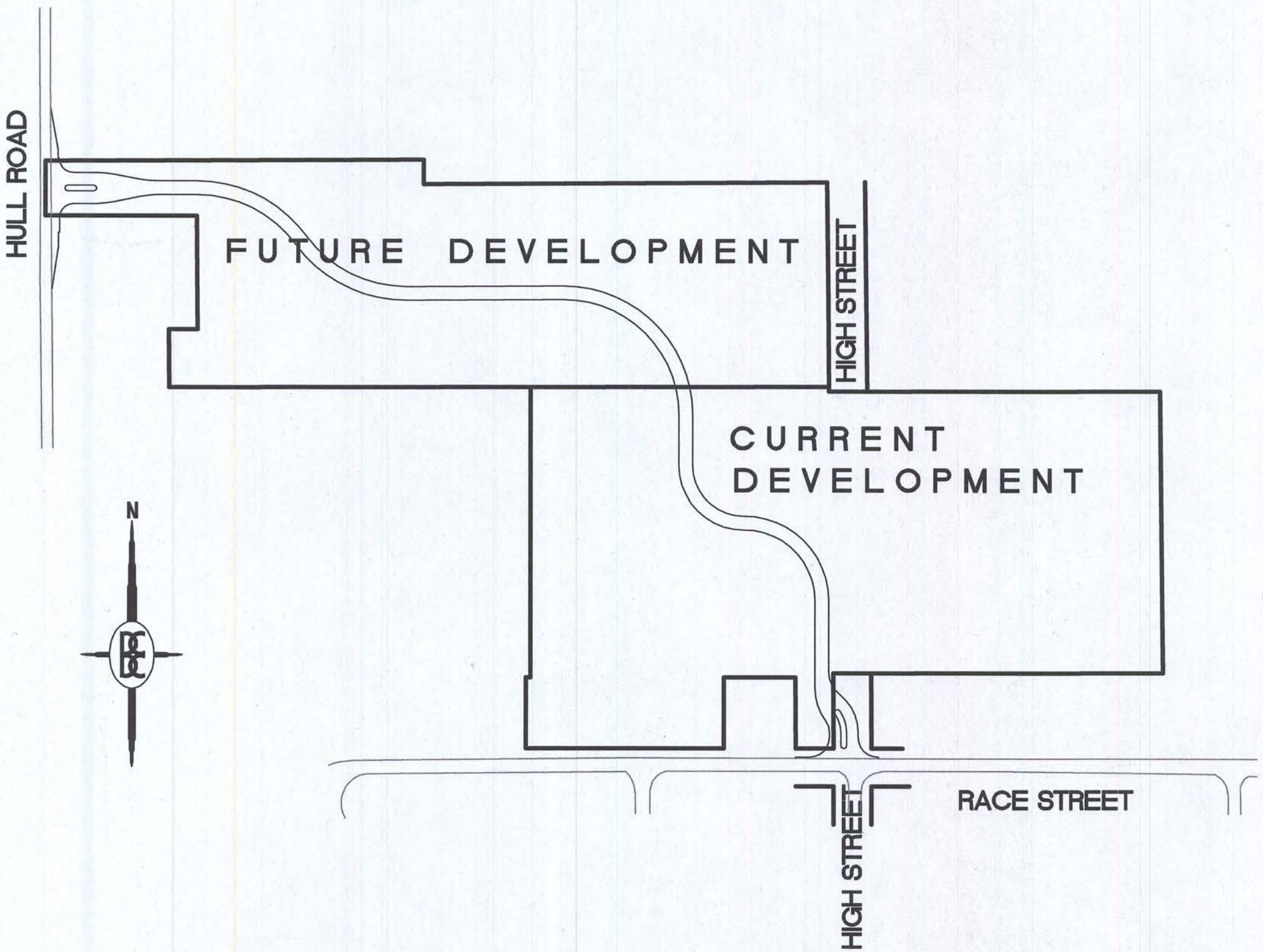
LEGAL DESCRIPTION

AS FURNISHED BY CLIENT:

PART OF THE SOUTHWEST 1/4 OF SECTION 21, T1N-R1W, LESLIE TOWNSHIP, INGHAM COUNTY, MICHIGAN, MORE PARTICULARLY DESCRIBED AS FOLLOWS: COMMENCING AT THE WEST 1/4 CORNER OF SAID SECTION; THENCE ALONG THE WEST LINE OF SECTION 21 AND IN HULL ROAD, S 00]14'20" E, 930.00 FEET, TO THE POINT OF BEGINNING OF THE PARCEL TO BE DESCRIBED; THENCE N 89]45'40" E, 660.00 FEET; THENCE S 00]14'20" E, 42.40 FEET; THENCE N 89]45'40" E, 703.31 FEET; THENCE ALONG THE WEST LINE OF HIGH STREET, A 66 FT WIDE ROAD AS SHOWN ON THE PLAT OF "WENDY ACRES", A SUBDIVISION AS RECORDED IN LIBER 27 OF PLATS ON PAGE 1 OF THE INGHAM COUNTY RECORDS, S 00]37'50" E (PLATTED AS S 00]33' W), 171.85 FEET, TO A CONCRETE MONUMENT AT THE SOUTHWEST CORNER OF SAID "WENDY ACRES"; THENCE S 00]19'25" E, 195.00 FEET; THENCE N 89]52'43" E, 577.91 FEET, TO A FOUND IRON PIPE ; THENCE S 00]35'24" E, 494.37 FEET (RECORDED AS S 00]22'50" E, 495 FEET), TO A CAPPED IRON ROD NO. 21275; THENCE ALONG THE NORTH LINE OF BLOCK 5 OF "WALKER, RUST & GROUT'S ADDITION TO THE VILLAGE OF LESLIE", AS RECORDED IN LIBER 1 OF PLATS ON PAGE 22 OF THE INGHAM COUNTY RECORDS, S 89]56'30" W, 574.65 FEET, TO A CAPPED IRON ROD AT THE NORTHWEST CORNER OF HIGH STREET (66 FT WIDE) AS SHOWN ON SAID PLAT; THENCE ALONG THE WEST LINE OF SAID HIGH STREET, S 00]10'54" E, 132.00 FEET, TO A CAPPED IRON ROD NO. 21275; THENCE ALONG THE SOUTH LINE OF LOTS 27 AND 28 AND THE VACATED 16 FT. WIDE ALLEY ADJACENT TO LOT 28 OF "POTTER'S REPLAT OF BLOCKS 1, 2 AND 3 OF WALKER, RUST AND GROUT'S ADDITION TO THE VILLAGE OF LESLIE", A SUBDIVISION AS RECORDED IN LIBER 3 OF PLATS ON PAGE 5 OF THE INGHAM COUNTY RECORDS, SAID LINE ALSO BEING THE NORTH LINE OF RACE STREET (66 FT WIDE PUBLIC ROAD), N 89]59'26" W, 66.00 FEET; THENCE ALONG THE WEST LINE OF SAID LOT 27, N 00]10'54" W, 124.50 FEET, TO A POINT IN THE CENTER OF THE 15 FOOT WIDE VACATED ALLEY ADJACENT TO THE NORTH LINE OF SAID "POTTER'S REPLAT"; THENCE ALONG THE CENTERLINE OF THE VACATED ALLEY, N 89]59'26" W, 125.00 FEET; THENCE ALONG THE COMMON LINE TO LOTS 21 AND 22 OF "POTTER'S REPLAT", S 00]10'54" E, 124.50 FEET, TO THE NORTH LINE OF RACE STREET; THENCE ALONG THE SOUTH LINE OF LOTS 21-19 OF SAID "POTTER'S REPLAT" AND LOTS 19-28 OF "POTTER'S ADDITION TO THE VILLAGE OF LESLIE", A SUBDIVISION AS RECORDED IN LIBER 3 OF PLATS ON PAGE 6 OF THE INGHAM COUNTY RECORDS, N 89]59'26" W, 345.49 FEET, TO A CAPPED IRON ROD NO. 21275 AT THE CENTER OF THE 16 FOOT WIDE VACATED ALLEY ADJACENT TO THE WEST LINE OF LOT 28 OF SAID "POTTER'S ADDITION; THENCE ALONG THE CENTERLINE OF THE VACATED ALLEY, N 00]01'51" E, 124.50 FEET TO THE INTERSECTION WITH THE CENTERLINE OF THE VACATED 15 FOOT WIDE ALLEY ADJACENT TO THE NORTH LINE OF SAID "POTTER'S ADDITION"; THENCE ALONG THE CENTERLINE OF THE VACATED ALLEY, S 89]59'26" E, 8.00 FEET; THENCE N 00]00'17" W, 508.65 FEET; THENCE ALONG THE SOUTH LINE OF THE SOUTHWEST 1/4 OF SECTION 21 AS PREVIOUSLY SURVEYED BY RONNIE M. LESTER, LICENSED LAND SURVEYOR NO. 18998, AND RECORDED IN LIBER 6 ON PAGES 870-872 OF THE INGHAM COUNTY RECORDS, S 89]56'25" W, 630.62 FEET; THENCE N 00]14'20" W, 101.50 FEET; THENCE N 89]56'25" E, 49.50 FEET; THENCE N 00]14'20" W, 200.00 FEET; THENCE S 89]56'25" W, 264.00 FEET; THENCE ALONG THE WEST LINE OF SECTION 21 AND IN HULL ROAD, N 00]14'20" W, 95.40 FEET, TO THE POINT OF BEGINNING; CONTAINING 23.93 ACRES, MORE OR LESS, AND SUBJECT TO THE RIGHTS OF THE PUBLIC OVER THE EXISTING HULL ROAD (33 FT. WIDE 1/2 RIGHT OF WAY). ALSO INCLUDING THE USE OF THE EXISTING HIGH STREET (66 FT. WIDE PUBLIC ROAD) AND RACE STREET (66 FT. WIDE PUBLIC ROAD). ALSO SUBJECT TO ANY OTHER EASEMENTS OR RESTRICTIONS OF RECORD.

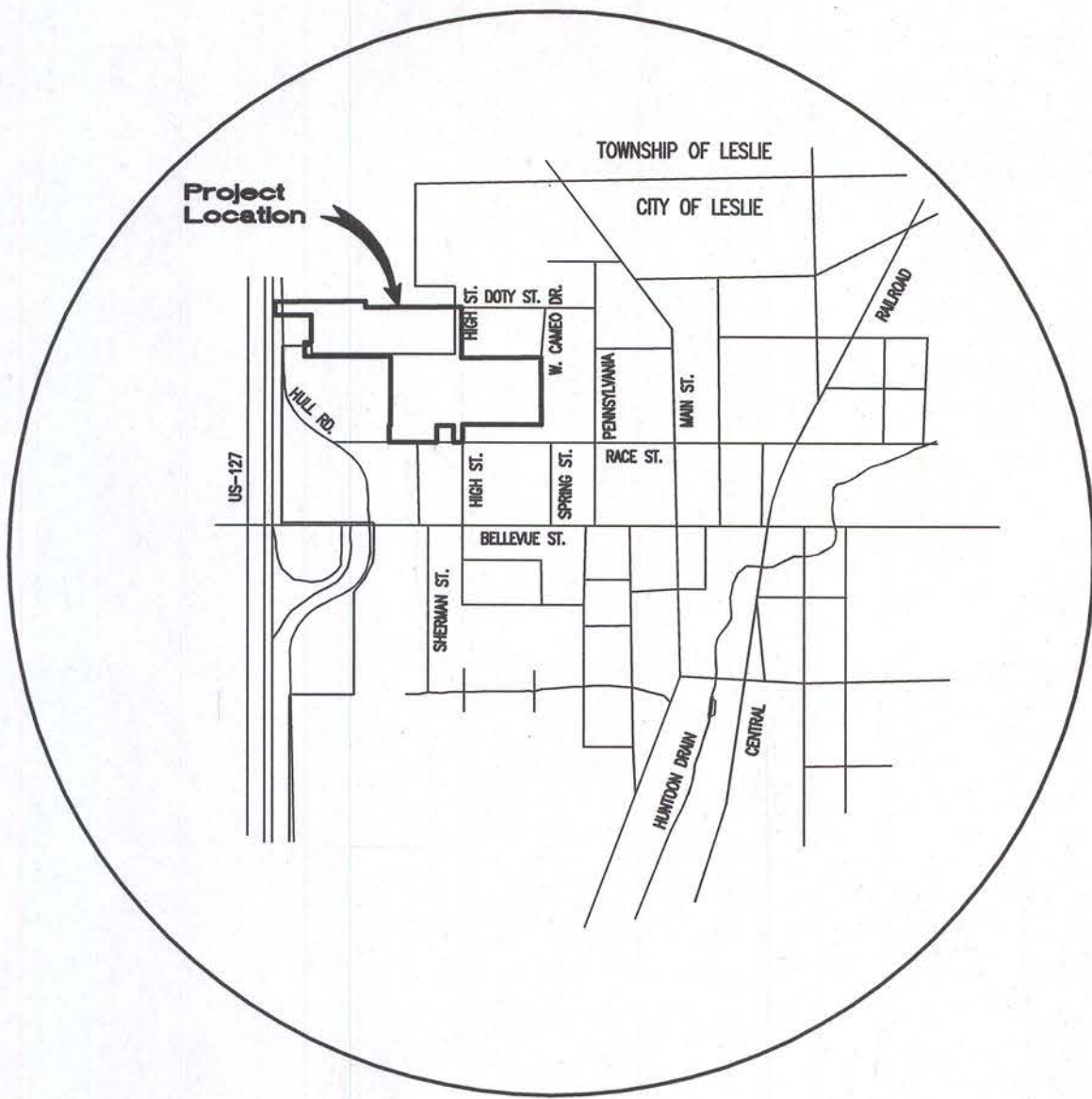
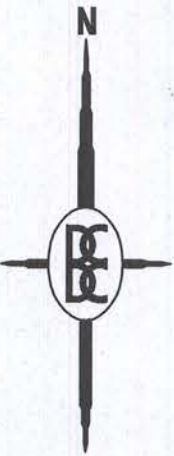
GENERAL NOTES

1. NOTIFY THE CITY OF LESLIE (517-589-8236) A MINIMUM OF 48 HOURS PRIOR TO THE START OF CONSTRUCTION.
2. ALL CONSTRUCTION MUST CONFORM TO THE CURRENT STANDARDS AND SPECIFICATIONS ADOPTED BY THE MUNICIPALITY, COUNTY AND STATE.
3. UTILITIES TO BE UNDERGROUND.
4. CALL MISS DIG A MINIMUM OF 72 HOURS PRIOR TO THE START OF CONSTRUCTION.
5. ALL SOIL EROSION AND SILT MUST BE CONTROLLED AND CONTAINED ON SITE.
6. ALL EXCAVATION UNDER OR WITHIN 3 FEET OF PAVEMENT AND STRUCTURES, EXISTING OR PROPOSED, SHALL BE BACKFILLED AND COMPACTED WITH SAND (CLASS II MDOT).
7. THE CONTRACTOR IS RESPONSIBLE FOR ALL DAMAGE TO EXISTING UTILITIES
8. PRIOR TO THE ISSUANCE OF AN OCCUPANCY PERMIT, ENGINEERING SITE INSPECTION IS REQUIRED.



OVERALL SITE MAP

1" = 200'



LOCATION MAP

SCALE: 1" = 1/4 MILE

SHEET INDEX

SHEET NO.	DESCRIPTION
1	COVER SHEET
2	FINAL SITE PLAN
3	LANDSCAPE PLAN
4	GRADING & SOIL EROSION CONTROL PLAN
5	GENERAL UTILITY PLAN
6	WORTHINGTON PLACE PLAN & PROFILE
7	WORTHINGTON COURT SOUTH PLAN & PROFILE
8	WORTHINGTON COURT NORTH PLAN & PROFILE
9	STORM SEWER PLAN & PROFILE
10	SANITARY SEWER PLAN & PROFILE
11	WATERMAIN PLAN & PROFILE
12	DRAINAGE CALCULATIONS
13	PAVING & SOIL EROSION DETAILS
14	UTILITY DETAILS

WORTHINGTON PLACE

PREPARED FOR:

FIELEK BUILDERS
P.O. BOX 89
SOUTH LYON, MI 48178
CONTACT: JULIE FIELEK
PHONE: 248-437-2728

PREPARED BY:



LIVESTON COUNTY: 3121 E. GRAND RIVER AVE. HOWELL, MI. 48843 (800) 246-6735 FAX (517) 548-1670
OWLAND COUNTY: 7125 ORCHARD LAKE RD. SUITE 300 WEST BLOOMFIELD, MI. 48322 (800) 785-0360 FAX (248) 626-8480

INDEMNIFICATION STATEMENT

THE CONTRACTOR SHALL HOLD HARMLESS THE DESIGN PROFESSIONAL, MUNICIPALITY, COUNTY, STATE AND ALL OF THEIR SUB-CONSULTANTS, PUBLIC AND PRIVATE UTILITY COMPANIES, AND LAND OWNERS FOR DAMAGES TO INDIVIDUALS AND PROPERTY, REAL OR OTHERWISE, DUE TO THE OPERATIONS OF THE CONTRACTOR AND/OR THEIR SUB-CONTRACTORS.

6	CH	DRAIN COMMISSIONER	09/21/05
5	CH	DRAIN COMMISSIONER	08/03/05
4	EO	DRAIN COMMISSIONER	5/18/05
3	EO	MDEO, CMS ENERGY	03/19/04
2	EO	ENTRANCE APPROACH & DRAIN COMMISSION	02/04/04
1	NO	BY CK REVISION PER	DATE

ISSUE DATE: 10/15/03
JOB NO. 2-03069

NOTE: PRESENTLY BEARING HULL ROAD SPEED LIMIT AND SITE DISTANCE REQUIREMENTS TO BE REDUCED TO 35 MPH. ALL WORK WITHIN THE HULL ROAD RIGHT-OF-WAY SHALL BE IN ACCORDANCE WITH THE CURRENT STANDARDS OF THE CITY OF LESLIE.

ROAD DESIGN INFORMATION

LINE TABLE		
LINE	LENGTH	BEARING
L1	61.20	N00°10'54"W
L2	127.27	N00°10'54"W
L3	89.99	N00°03'30"W
L4	273.14	S89°45'40"W
L5	263.99	S89°45'40"W

CURVE TABLE					
CURVE	RADIUS	CENTRAL ANGLE	ARC LENGTH	CHORD LENGTH	BEARING DIRECTION
C1	60.00	40°18'12"	42.21	41.34	N20°20'00"W
C2	100.00	41°33'56"	72.55	70.96	N19°44'18"W
C3	135.00	90°18'27"	212.78	191.43	N45°20'08"W
C4	100.00	90°25'52"	152.63	141.95	N45°18'26"W
C5	213.50	90°10'50"	335.04	302.41	N45°08'55"W
C6	225.00	54°09'55"	212.71	204.87	N63°09'23"W
C7	225.00	54°09'55"	212.71	204.87	N63°09'23"W

Zoning

PARCEL 1: R-M1 DISTRICT - MULTIPLE FAMILY RESIDENTIAL
PARCEL 2: R-M1 DISTRICT - MULTIPLE FAMILY RESIDENTIAL
PARCEL 3: R-M1 DISTRICT - MULTIPLE FAMILY RESIDENTIAL
PARCEL 4: R-M1 DISTRICT - MULTIPLE FAMILY RESIDENTIAL

Parcel Acreage

23.80 ACRES +/- GROSS AREA
9.45 ACRES +/- NET FOR THIS PHASE

Maximum Lot Coverage Allowed

NOT TO EXCEED 35% OF NET LOT AREA
BUILDING COVERAGE PROVIDED: 1.70 ACRES
18.00% FOR NET AREA THIS PHASE

Minimum Setback Requirements

FRONT: 40 FEET FROM ANY STREET
REAR: 50 FEET TO ANY REAR PROPERTY LINE
SIDE: 20 TO AN INTERIOR SIDE PROPERTY LINE
OTHER: 25 FEET TO PRIVATE ACCESS DRIVES

Building Separation Requirements

MINIMUM REQUIRED:
FRONT TO FRONT / REAR TO REAR / OR FRONT TO REAR: 55 FEET
SIDE TO SIDE: 25 FEET

Private Streets Within Development

MINIMUM WIDTH REQUIRED: 20 FEET
MINIMUM WIDTH PROVIDED: 24 FEET

Parking Requirements

REQUIRED:
TWO (2) SPACES (9' x 20') PER DWELLING UNIT = 128 UNITS = 256 SPACES
PROVIDED:
269 SPACES AT RESIDENCES (10 HANDICAP SPACES AND 262 STANDARD SPACES)
20 SPACES AT CLUBHOUSE (2 HANDICAP SPACES AND 18 STANDARD SPACES)
3 SPACES AT MAILBOX KIOSK TURNOUT (12' x 23' PARALLEL PARKING)

Proposed Sewerage System

PUBLIC SANITARY SEWER

Proposed Water System

PUBLIC WATER SUPPLY

Proposed Electrical Service

CONSUMERS ENERGY

Proposed Gas Service

CONSUMERS ENERGY

Proposed Telephone Service

SBC

Site Access

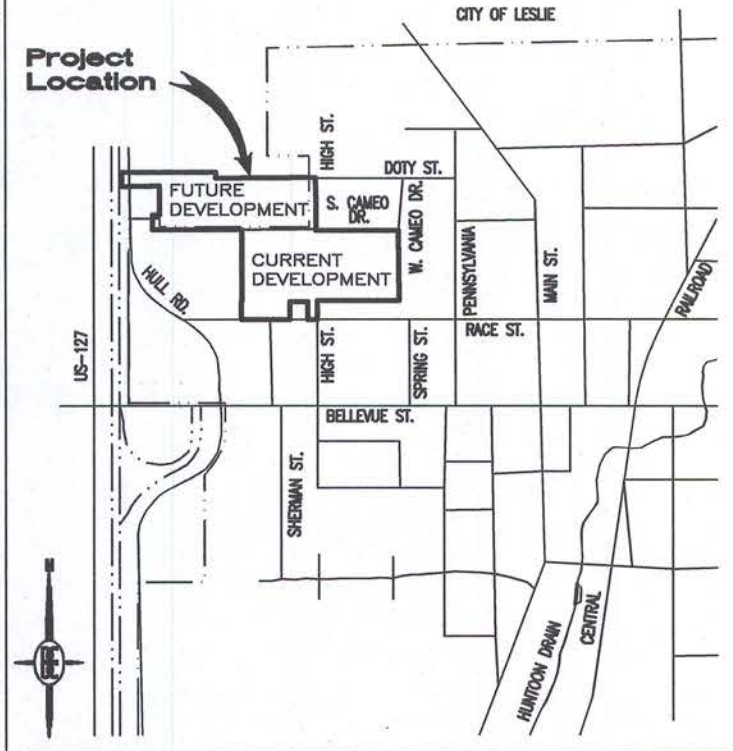
MAIN SOUTH ENTRANCE - RACE STREET
SECONDARY WEST ENTRANCE - HULL ROAD

Dwelling Unit Breakdown

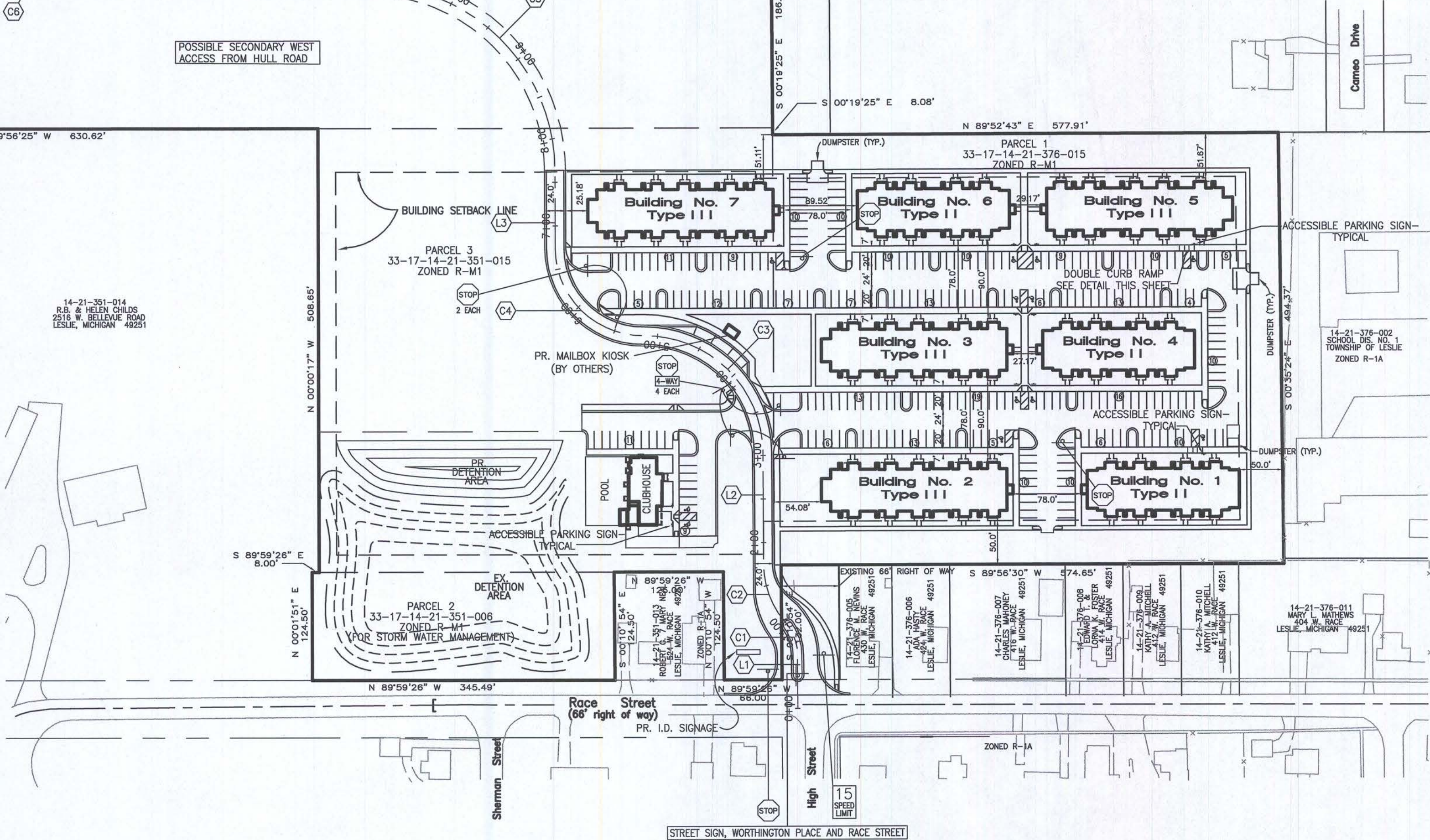
TYPE II BUILDING: 3 BUILDINGS
16 UNITS TOTAL -
(24) TWO BEDROOM UNITS (24) TWO SPLIT BEDROOM UNITS
TYPE III BUILDING: 4 BUILDINGS
20 UNITS TOTAL -
(16) ONE BEDROOM UNITS (48) TWO SPLIT BEDROOM UNITS (16) THREE BEDROOM UNITS
TOTAL NUMBER OF UNITS PROPOSED: 128 UNITS

DESCRIPTION OF A 23.93 ACRE PARCEL:

Part of the Southwest 1/4 of Section 21, T1N-R1W, Leslie Township, Ingham County, Michigan, more particularly described as follows: Commencing at the West 1/4 Corner of said Section; thence along the West line of Section 21 and in Hull Road, S 00°14'20" E, 930.00 feet, to the POINT OF BEGINNING of the Parcel to be described; thence N 89°45'40" E, 660.00 feet; thence S 00°14'20" E, 42.40 feet; thence N 89°45'40" E, 703.31 feet; thence along the West line of High Street, a 66 ft wide Road as shown on the plat of "Wendy Acres", a subdivision as recorded in Liber 27 of Plats on Page 1 of the Ingham County records, S 00°37'50" E (platted as S 00°33' W), 171.85 feet, to a concrete monument at the Southwest Corner of said "Wendy Acres"; thence S 00°19'25" E, 195.00 feet; thence N 89°52'43" E, 577.91 feet, to a found iron pipe; thence S 00°35'24" E, 494.37 feet (recorded as S 00°22'50" E, 495 feet), to a capped iron rod No. 21275; thence along the North line of Block 5 of "Walker, Rust & Groat's Addition to the Village of Leslie", as recorded in Liber 1 of Plats on Page 22 of the Ingham County Records, S 89°56'30" W, 574.65 feet, to a capped iron rod at the Northwest Corner of High Street (66 ft wide) as shown on said plat; thence along the West line of said High Street, S 00°10'54" E, 132.00 feet, to a capped iron rod No. 21275; thence along the South line of Lots 27 and 23 and the vacated 16 ft. wide alley adjacent to Lot 28 of "Potter's Replat of Blocks 1, 2 and 3 of Walker, Rust & Groat's Addition to the Village of Leslie", as recorded in Liber 3 of Plats on Page 5 of the Ingham County Records, said line also being the North line of Race Street (66 ft wide Public Road), N 89°59'28" W, 66.00 feet; thence along the West line of said Lot 27, N 00°10'54" W, 124.50 feet, to a point in the center of the 15 foot wide vacated alley adjacent to the North line of said "Potter's Replat"; thence along the centerline of the vacated alley, N 89°59'28" W, 125.00 feet; thence along the common line to Lots 21 and 22 of "Potter's Replat", S 00°10'54" E, 124.50 feet, to the North line of Race Street; thence along the South line of Lots 21-19 of said "Potter's Replat" and Lots 19-28 of "Potter's Addition to the Village of Leslie", a subdivision as recorded in Liber 3 of Plats on Page 6 of the Ingham County Records, N 89°59'28" W, 345.49 feet, to a capped iron rod No. 21275 at the center of the 16 foot wide vacated alley adjacent to the West line of Lot 28 of said "Potter's Addition"; thence along the centerline of the vacated alley, N 00°10'51" E, 124.50 feet to the intersection with the centerline of the vacated 15 foot wide alley adjacent to the North line of said "Potter's Addition"; thence along the centerline of the vacated alley, S 89°59'28" E, 8.00 feet; thence N 00°00'17" W, 508.85 feet; thence along the South line of the Northwest 1/4 of the Southwest 1/4 of Section 21 as previously surveyed by Ronnie M. Lester, Licensed Land Surveyor No. 18998, and recorded in Liber 6 on Pages 870-872 of the Ingham County Records, S 89°56'25" W, 630.62 feet; thence N 00°14'20" W, 101.50 feet; thence N 89°56'25" E, 48.50 feet; thence N 00°14'20" W, 200.00 feet; thence S 89°56'25" W, 264.00 feet; thence along the West line of Section 21 and in Hull Road, N 00°14'20" W, 95.40 feet, to the POINT OF BEGINNING; Containing 23.93 acres, more or less, and subject to the rights of the public over the existing Hull Road (33 ft. wide 1/2 Right of Way). Also including the use of the existing High Street (66 ft. wide Public Road) and Race Street (66 ft. wide Public Road). Also subject to any other easements or restrictions of record.



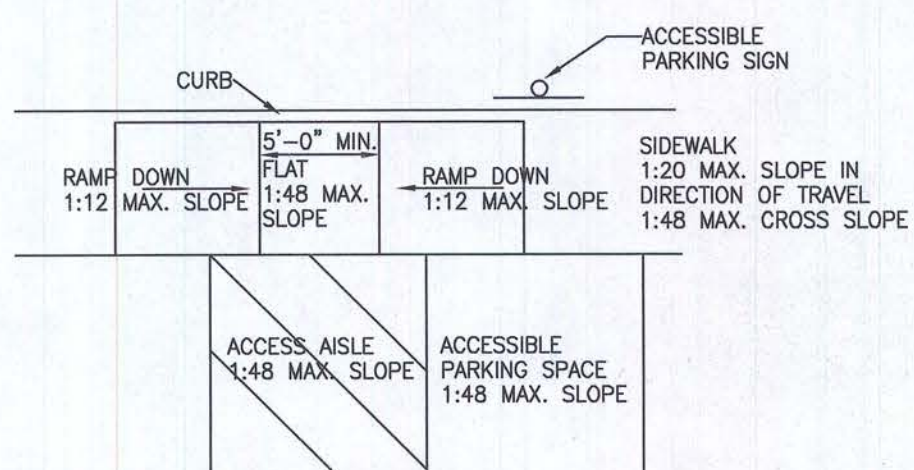
100 50 0 50 100 200 300
SCALE: 1" = 100'



ENTRANCE SIGN DETAIL
(NO SCALE)

NOTE:
ALL WORK WITHIN THE RACE STREET AND HIGH STREET ROAD RIGHT-OF-WAYS SHALL BE IN ACCORDANCE WITH THE CURRENT STANDARDS OF THE CITY OF LESLIE.

NOTE:
ALL SIGNS SHALL BE PROVIDED TO THE STANDARDS AND SPECIFICATIONS OF THE CITY OF LESLIE, INGHAM COUNTY, AND THE STATE OF MICHIGAN AS APPLICABLE.

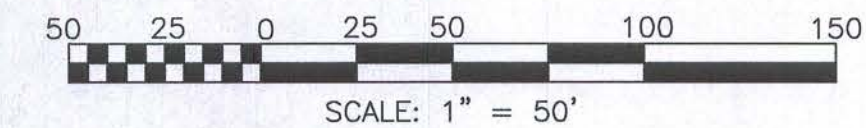
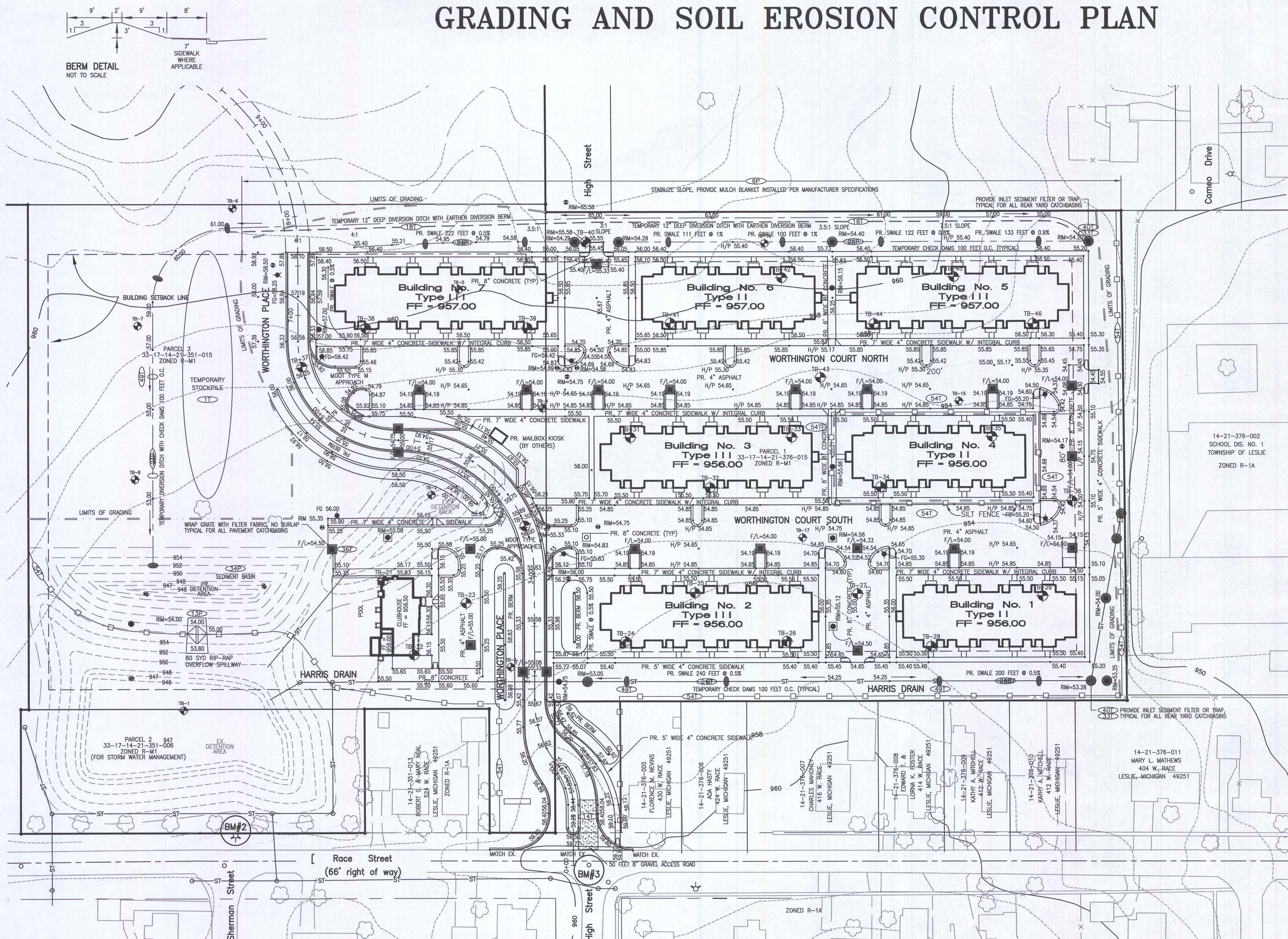


DOUBLE CURB RAMP DETAIL
(NO SCALE)

LEGEND

PROPOSED (PR)	EXISTING (EX)	
FF	FF	FINISHED FLOOR ELEVATION
MH	MH	MANHOLE STRUCTURE
IN	IN	INLET STRUCTURE
CB	CB	CATCHBASIN STRUCTURE
RY	RY	REAR-YARD STRUCTURE
ES	ES	END-SECTION
GV	GV	GATEVALVE STRUCTURE
HY	HY	HYDRANT
UP	UP	UTILITY POLE
SN	SN	SANITARY SEWER
SL	SL	SANITARY LEAD
FM	FM	FORCE MAIN
PS	PS	PRESSURE SEWER
ST	ST	STORM SEWER
WM	WM	WATER MAIN
WL	WL	WATER LEAD
FO	FO	FIBER OPTIC
OH	OH	OVERHEAD WIRE
C	C	CABLE
E	E	ELECTRIC
G	G	GAS
T	T	TELEPHONE
○	○	MANHOLE
□	□	INLET / CATCHBASIN
⊞	⊞	FLARED END-SECTION
⊙	⊙	GATE VALVE
⊕	⊕	HYDRANT
⊖	⊖	UTILITY POLE
⊗	⊗	SIGN

GRADING AND SOIL EROSION CONTROL PLAN



GENERAL GRADING AND PAVING NOTES

- * THREE (3) WORKING DAYS BEFORE YOU DIG, CALL MISS DIG, 800-482-7171, TOLL FREE, FOR THE LOCATION OF UNDERGROUND FACILITIES.
- * THE CITY OF LESLIE, TOWNSHIP OF LESLIE, AND ALL PERTINENT POLICE AND FIRE SAFETY AGENCIES SHALL BE NOTIFIED THREE (3) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION.
- * THE CONTRACTOR IS RESPONSIBLE FOR ALL WORK TO BE IN ACCORDANCE WITH THE CITY OF LESLIE, TOWNSHIP OF LESLIE, INGHAM COUNTY DRAIN COMMISSION, INGHAM COUNTY ROAD COMMISSION AND STATE OF MICHIGAN, AS APPLICABLE, UNDER THE JURISDICTION OF EACH AGENCY.
- * THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS AND PAY PERMIT AND REVIEW FEES.
- * THE CONTRACTOR IS RESPONSIBLE FOR DAMAGES AND REPAIRS TO PERSONS OR PROPERTY, DUE TO THEIR OPERATIONS.
- * ALL SOIL EROSION AND SEDIMENTATION SHALL BE CONTROLLED AND CONTAINED ON-SITE.
- * PROOF ROLL ALL SUB-GRADE SURFACES TO ACHIEVE 95% MAXIMUM DENSITY BY MODIFIED PROCTOR TEST.
- * AREAS OF FILL SHALL BE DONE IN 12" MAXIMUM LIFTS, COMPACTED TO ACHIEVE 95% MAXIMUM DENSITY BY MODIFIED PROCTOR TEST.
- * NATIVE SOILS SHALL BE TESTED PRIOR TO FILLING. SOILS THAT ARE DETERMINED UNSUITABLE SHALL NOT BE USED FOR FILL IN PROXIMITY OF A ONE ON ONE (1 ON 1) ZONE OF INFLUENCE, BEGINNING THREE (3) FEET OUTSIDE THE LIMITS OF PROPOSED OR FUTURE STRUCTURES AND PAVEMENTS. ONLY SUITABLE OR ENGINEERED MATERIAL SHALL BE USED FOR FILL, COMPACTED TO 95% MAXIMUM DENSITY BY MODIFIED PROCTOR TEST.
- * ALL WORK FOR THIS PROJECT SHALL BE CONSIDERED INCIDENTAL, INCLUDING OVER-EXCAVATION OF UNSUITABLE SOILS, ENGINEER BACKFILL, RESTORATION OF GRADE AND ANY OBSTACLES ENCOUNTERED DURING OPERATIONS.
- * THE SCOPE OF WORK IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR. ENGINEERING ESTIMATE QUANTITIES SHALL BE CONSIDERED APPROXIMATE.
- * DRIVES AND PARKING SHALL BE 4" ASPHALT OVER 8" AGGREGATE. MDOT TYPE F-4 CONCRETE CURB AND GUTTER SHALL BE USED IN THE MAIN ROAD, CURB ISLANDS THAT CONTAIN CATCHBASIN CASTINGS, AND GENERALLY IN ALL AREAS THAT GRADES FALL TOWARD THE CURB. MODIFIED F-4 SHALL BE USED FOR ALL AREAS THAT GRADES FALL AWAY FROM THE CURB.
- * CONCRETE PAVEMENTS AND 6"x6" UTILITY STRUCTURE CASTING APRONS SHALL BE 8" MINIMUM UNIFORM CONCRETE, 3500 PSI, OVER 6" MDOT CLASS II SAND BASE. CONCRETE SIDEWALK SHALL BE 4" MINIMUM UNIFORM, 3000 PSI, OVER 4" MDOT CLASS II SAND BASE.
- * ALL GRADES AT CURBS AND SIDEWALKS WITH INTEGRAL CURBS ARE GUTTER GRADES OR TOP OF PAVEMENT. ADD 0.50 FEET TO SUCH GRADES FOR TOP OF CURB OR TOP OF SIDEWALK ELEVATION.
- * SEE DETAIL SHEET FOR PAVEMENT SECTIONS AND ADDITIONAL NOTES.

DETENTION CALCULATIONS

BASED ON INGHAM COUNTY DRAIN COMMISSION DESIGN STANDARDS.

TOTAL DRAINAGE AREA: 44.4 ACRES

A AREA ACRES C IMPERVIOUS FACTOR CA ACRES-IMP

24.3 0.28 6.80

20.1 0.56 11.26

COMPOUND C: 18.06 / 44.4 = 0.41

DETENTION BASIN 100 YEAR STORM

MAXIMUM ALLOWABLE OUTFLOW: $Q_o = 0.15 \text{ CFS/ACRE} \times 44.4 \text{ ACRES} = 6.66 \text{ CFS}$

$Q_o = Q_p / CA = 6.66 / 18.06 = 0.37 \text{ CFS/ACRE-IMP}$

STORAGE TIME (ORIFICE OUTLET):

$T = -25 + \text{SQRT}[(10312.5/Q_o)] = -25 + 167.23 = 142.23 \text{ MINUTES}$

VOLUME OF STORAGE PER ACRE-IMP: $V_s = (16500T / T + 25) - 40(T)Q_o = 14033 - 2105 = 11928 \text{ CFT/ACRE-IMP}$

TOTAL VOLUME OF STORAGE REQUIRED: $V_t = V_s \times CA = 11928 \times 18.06 \text{ ACRES-IMP} = 215,420 \text{ CFT}$

SEDIMENT BASIN 1 YEAR STORM

STORAGE TIME (ORIFICE OUTLET):

$T = -25 + \text{SQRT}[(2700/Q_o)] = -25 + 85.42 = 60.42 \text{ MINUTES}$

VOLUME OF STORAGE PER ACRE-IMP: $V_s = (4320T / T + 25) - 40(T)Q_o = 3056 - 894 = 2162 \text{ CFT/ACRE-IMP}$

TOTAL VOLUME OF STORAGE REQUIRED: $V_t = V_s \times CA = 2162 \times 18.06 \text{ ACRES-IMP} = 39,045 \text{ CFT}$

EXISTING DETENTION BASIN

ELEV AREA VOLUME

954 45850 954 15170

952 36875 82,725 952 10645 25,815

950 28735 65,610 950 6640 17,285

948 21545 50,280 948 3220 9860

947 18870 20,107.5 947 1785 2,492.5

$\Sigma = 219,722 \text{ CFT}$

ORIFICE OUTLET CALCULATIONS:

$Q = 0.82 \text{ A SQRT}(2 \text{ g h}) = Q_o = 0.15 \text{ CFS/ACRE} \times 44.4 \text{ ACRES} = 6.66 \text{ CFS}$

$g = 32.2 \text{ FT/SEC}^2$

$h = 954 - 947.5 = 6.5 \text{ FEET}$

$A = 6.66/0.82 \text{ SQRT}(2 \times 32.2 \times 6.5) = 0.5250 \text{ SFT}$

DIAMETER = 0.82 FEET OR 10 INCHES, 12 INCH DIAMETER PIPE EXISTING

LEGEND

PROPOSED (PR) EXISTING (EX)

900 900

956.50 922.08

FF FF

FG FG

F/L F/L

RIM RIM

INV INV

MANHOLE

INLET / CATCHBASIN

FLARED END-SECTION

GATE VALVE

HYDRANT

UTILITY POLE

SIGN

SOIL BORING LOCATION

SOIL EROSION CONTROL MEASURE

(P=PERMANENT, T=TEMPORARY)

SILT FENCE

LIMITS OF GRADING/CLEARING

TYPE F-4 CURB & GUTTER

MODIFIED F-4 CURB & GUTTER

AREA OF DISTURBANCE: 512,800 SFT OR 11.772 ACRES

PROPOSED CONST. SCHEDULE

FOR THE YEAR 2005

ACTIVITY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
CLEAR, GRUB BUILDING												
UNDERGROUND UTILITY												
BUILDING SITE CONSTRUCTION												
FINAL GRADING												
PAVING, CURB, LANDSCAPE, SEED/MULCH												

BENCHMARKS

BM#2 ARROW ON HYDRANT NORTH SIDE OF RACE STREET AT SHERMAN STREET

ELEVATION = 955.99 U.S.C.S.

BM#3 NORTH RIM OF SANITARY MANHOLE AT [] HIGH STREET AND RACE STREET

ELEVATION = 961.20 U.S.C.S.

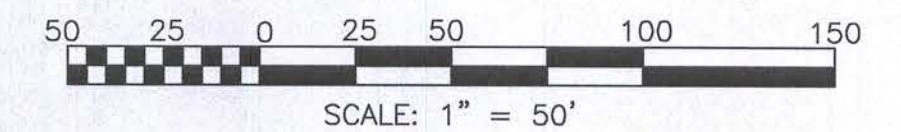
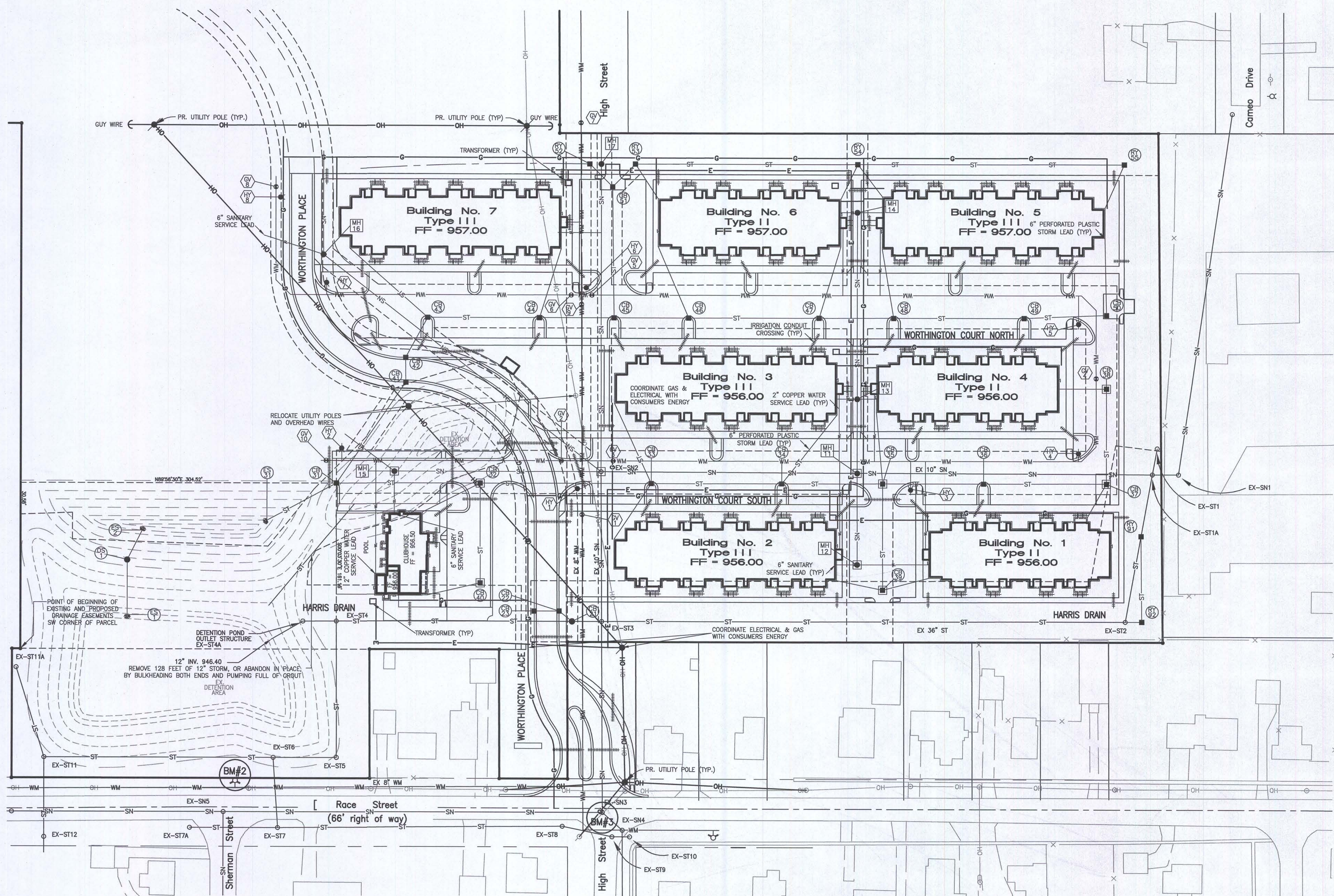
BM#4 NAIL AND TAG SET IN WEST SIDE OF 30" SUGAR MAPLE, 90 FEET SOUTH OF

DRIVEWAY OF HOUSE #4331, EAST SIDE OF HULL ROAD

ELEVATION = 1008.54 U.S.C.S.

1	STRIPPING & STOCKPILE TOPSOIL	TOPSOIL MAY BE STOCKPILED ABOVE BORROW AREAS TO ACT AS A EROSION STOCKPILE SHOULD BE TEMPORARILY SEED
6	SEEDING WITH MULCH AND/OR MATING	ESTABLISHMENT OF VEGETATION COVER EFFECTIVE FOR DRAINAGEWAYS WITH LOW VELOCITY FIRST PLACED IN SMALL QUANTITIES BY EXPERIENCED PERSONNEL SHOULD INCLUDE PROPOSED TOPSOIL (ED)
13	RIP-RAP, RUBBLE, CATIONS	USED WHERE VEGETATION IS NOT EASILY ESTABLISHED EFFECTIVE FOR HIGH VELOCITIES OR HIGH CONCENTRATIONS PERMITS RUNOFF TO INFILTRATE SOIL DISPERSES ENERGY ALONG AS SYSTEM OUTLETS
14	AGGREGATE COVER	STABILIZES SOIL SURFACE, THIS MINIMUM EROSION PERMITS CONSTRUCTION TRAFFIC IN AREAS REQUIRED MAY BE USED AS PART OF PERMANENT BASE CONSTRUCTION OF PAVED AREAS
15	PAVING	PROTECTS AREAS WHICH CANNOT OTHERWISE BE PROTECTED, BUT INCREASES RUNOFF VELOCITY BRUSHING SURFACE WILL HELP SLOW VELOCITY
16	CURB & GUTTER	KEEPS HIGH VELOCITY RUNOFF ON PAVED AREAS FROM LEAVING PAVED SURFACE COLLECTS AND CONDUCTS RUNOFF TO ENCLOSED DRAINAGE SYSTEM OR PREPARED DRAINAGEWAY
18	DRAINAGE BERM	DIRECTS WATER FROM VULNERABLE AREAS COLLECTS AND DIRECTS WATER TO PREPARED DRAINAGEWAYS MAY BE PLACED AS PART OF NORMAL CONSTRUCTION OPERATION
24	GROUDED WATERWAY	MUCH MORE STABLE FORM OF DRAINAGEWAY THAN BARE CHANNEL GRASS TENDS TO SLOW RUNOFF AND FILTER OUT SEDIMENT USED WHERE DRAIN CHANNEL WOULD BE ERODED
33	SEDIMENT TRAP	MAY BE CONSTRUCTED OF A VARIETY OF MATERIALS TRAPS SEDIMENT AND REDUCES VELOCITY OF FLOW CAN BE CLEARED AND EXPANDED AS NEEDED
34	SEDIMENT BASIN	TRAPS SEDIMENT RELEASES RUNOFF AT NON-EROSIVE INLETS CONTRASTS RUNOFF AT SYSTEM OUTLETS CAN BE VISUAL MONITORED
35	OR STORM SEWER	SYSTEM REMOVES COLLECTED RUNOFF FROM SITE, PARTICULARLY FROM PAVED AREAS CAN ACCEPT LARGE CONCENTRATIONS OF RUNOFF CONDUCTS RUNOFF TO MUNICIPAL SEWER SYSTEM OR STABILIZED OUTFALL LOCATION USE CATCH BASINS TO COLLECT SEDIMENT
36	CATCH BASIN, DRAIN INLET	COLLECTS HIGH VELOCITY CONCENTRATED RUNOFF MAY USE FLOW CLOTH OVER INLET
37	SOD FILTER	INTERFERES AND EASY TO CONSTRUCT PROVIDES IMMEDIATE PROTECTION PROTECTS AREAS AROUND INLETS FROM EROSION
38	SLOW FLOW FILTER	INTERFERES AND EASY TO CONSTRUCT CAN BE LOCATED AS NECESSARY TO COLLECT SEDIMENT MAY BE USED IN CONJUNCTION WITH SLOW FENCE FOR ADDITIONAL SLOBBY
39	ROCK FILTER	CAN UTILIZE MATERIAL FOUND ON SITE EASY TO CONSTRUCT FILTERS SEDIMENT FROM RUNOFF
40	INLET SEDIMENT FILTER	EASY TO SHAPE COLLECTS SEDIMENT MAY BE CLEARED AND EXPANDED AS NEEDED
49	CHECK DAMS	REDUCES FLOW VELOCITY CATCHES SEDIMENT CAN BE CONSTRUCTED OF LOGS, STEW, HWY, ROCK, LUMBER, MASONRY OR SAND BAGS
54		USES DESTRUCTIBLE FABRIC AND POST OR POLES. EASY TO CONSTRUCT AND LOCATE AS NECESSARY (SEE DETAIL SHEET)

GENERAL UTILITY PLAN



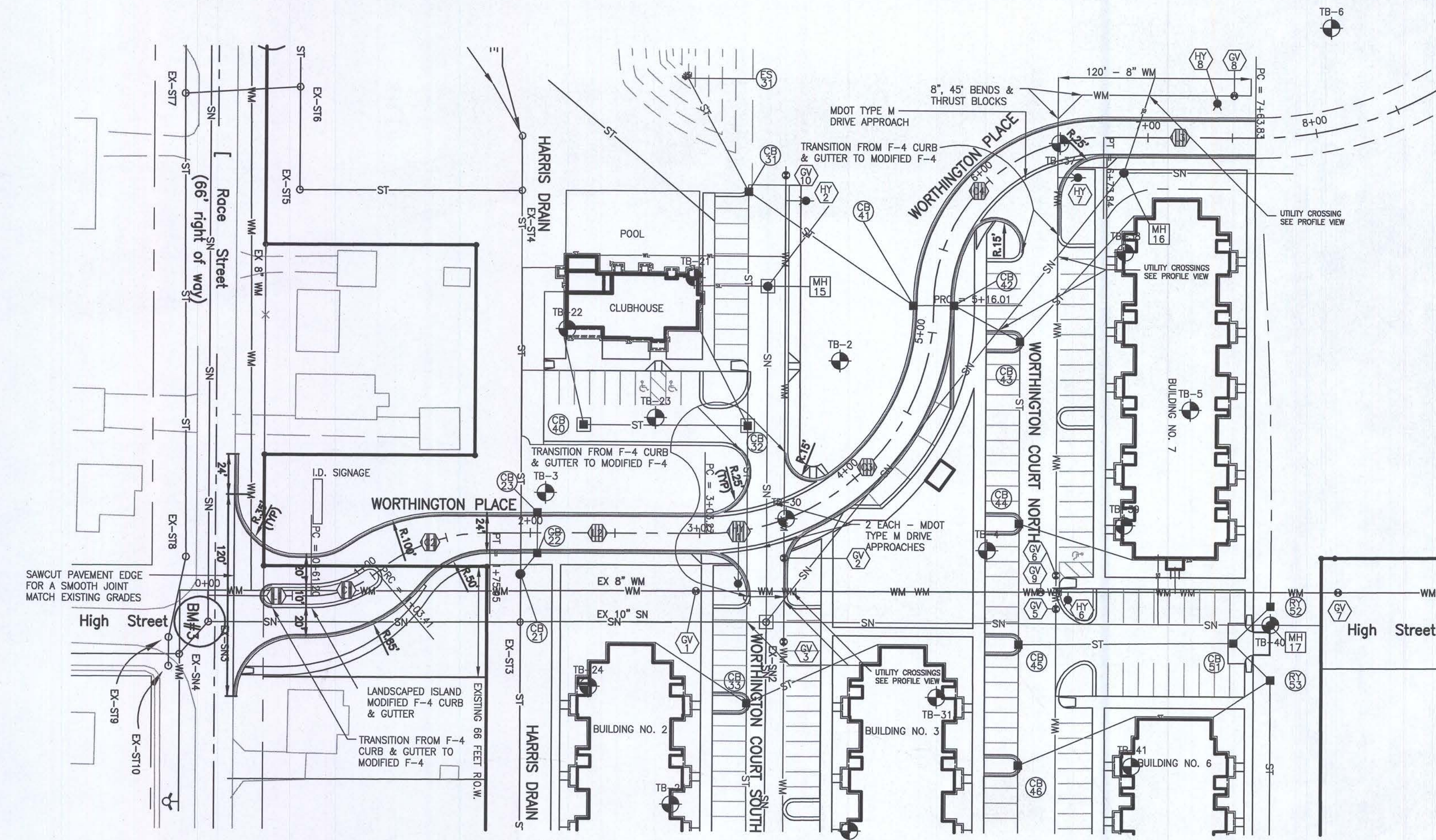
GENERAL UTILITY NOTES

- * THREE (3) WORKING DAYS BEFORE YOU DIG, CALL MISS DIG, 800-482-7171, TOLL FREE, FOR THE LOCATION OF UNDERGROUND FACILITIES
- * THE CITY OF LESLIE, TOWNSHIP OF LESLIE, AND ALL PERTINENT POLICE AND FIRE SAFETY AGENCIES SHALL BE NOTIFIED THREE (3) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION
- * THE CONTRACTOR IS RESPONSIBLE FOR ALL WORK TO BE IN ACCORDANCE WITH THE CITY OF LESLIE, LESLIE TOWNSHIP, INGHAM COUNTY DRAIN COMMISSION, INGHAM COUNTY ROAD COMMISSION, THE STATE OF MICHIGAN, AND FEDERAL REGULATIONS, AS APPLICABLE, UNDER THE JURISDICTION OF EACH AGENCY.
- * THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS AND PAY PERMIT AND REVIEW FEES.
- * THE CONTRACTOR IS RESPONSIBLE FOR DAMAGES AND REPARATIONS TO PERSONS OR PROPERTY, DUE TO THEIR OPERATIONS.
- * CONSUMERS ENERGY IS IN CHARGE OF ELECTRICAL AND GAS SERVICE IN THIS AREA. CABLE AND TELEPHONE USE THEIR POLICIES. COORDINATE WITH THEM TO REPRESENT THEIR INTERESTS REGARDING ALL UTILITY SERVICES.
- * UTILITY EXCAVATIONS THAT ARE IN PROXIMITY OF ONE (1) OR ONE (1) ZONE OF INFLUENCE, BEGINNING THREE (3) FEET OUTSIDE THE LIMITS OF PROPOSED AND FUTURE STRUCTURES AND PAVEMENTS, SHALL BE BACKFILLED IN MAXIMUM 12" LIFT WITH ENGINEERED MATERIAL, MOD CLASS II GRANULAR FILL, COMPACTED TO 95% MAXIMUM DENSITY BY MODIFIED PROCTOR TEST, AND ALL OTHER UTILITY STRUCTURES SHALL BE BACKFILLED WITH A MINIMUM SUITABLE NATIVE SOILS IN MAXIMUM 12" LIFTS COMPACTED TO 95% MAXIMUM DENSITY BY MODIFIED PROCTOR TEST.
- * ALL WORK FOR THIS PROJECT SHALL BE CONSIDERED INCIDENTAL, INCLUDING ENGINEERED BACKFILL OF UTILITIES, AND MAINTENANCE OF GRADE AND OF ANY OBSTACLES ENCOUNTERED DURING OPERATIONS.
- * THE SCOPE OF WORK IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR. ENGINEERING ESTIMATE QUANTITIES SHALL BE CONSIDERED APPROXIMATE. PIPE LENGTHS ARE MEASURED FROM [] TO [] OF STRUCTURES.
- * ALL UTILITY STRUCTURES SHALL BE 4" PRESTRESSED CONCRETE WITH PREMIUM JOINTS. MANHOLE CONES SHALL BE THE ECCENTRIC TYPE UNLESS SPECIFIED FLAT-TOP. FLAT-TOPS SHALL BE PRE-CAST REINFORCED CONCRETE WITH ECCENTRIC ENTRY HOLES. INLETS AND CATCH BASINS SHALL BE PROVIDED FOR ALL STRUCTURES. ALL STRUCTURES SHALL BE 4 FEET INTERIOR DIAMETER UNLESS SPECIFIED OTHERWISE.
- * STRUCTURE CASTINGS SHALL BE PROVIDED TO THE SPECIFICATION OF THE MUNICIPALITY, OR OTHERWISE BE EAST JORDAN IRON WORKS (EJW), AND SUBJECT TO THE APPROVAL OF THE DESIGN ENGINEER.
- * CATCH BASIN COVERS SHALL BE 24" DIA.
- * EACH END SECTION SHALL HAVE A RODENT GUARD PLACED OVER THE OPENING.
- * SANITARY TRUNK SEWER AND FITTINGS SHALL BE ACRYLONITRILE-BUTADIENE-ETHYLENE (ABS) DRAIN PIPE OR SUBSTAINVIL CHLORIDE (PVC) STANDARD DIMENSION RATIO (SDR) 35 AND SANITARY BUILDING SEWER LEADS AND FITTINGS SHALL BE SHALL BE PVC SDR 23.5, OR APPROVED EQUAL BY THE AGENCIES HAVING JURISDICTION.
- * SANITARY CLEANOUT ASSEMBLIES SHALL BE PROVIDED FOR ALL BUILDING LEADS. APPROPRIATE 18" DIA. 4" DIA. DIAMETER RISERS SHALL BE PROVIDED SO THAT THE THREADED CAP SHALL BE LOCATED ADJACENT TO THE EXTERIOR OF THE BUILDING FOUNDATION, FLUSH WITH FINISHED GRADE.
- * STORM TRUNK SEWER SHALL BE PVC SDR 23.5, HIGH DENSITY POLYETHYLENE (HDPE), OR SMOOTH LINED CORRUGATED PLASTIC PIPE (SLOPP), OR APPROVED EQUAL. ALL AGENTS AGENTS SHALL BE PROVIDED WITH A 12" DIA. (12" DIA.) DOWNSPOUT COLLECTION SYSTEM SHALL BE PERFORATED PVC 23.5, HDPE, OR SLOPP WITH GEOTEXTILE SOCK.
- * ALL DOWNSPOUTS SHALL BE CONNECTED TO A PRIVATE DRAINAGE COLLECTION SYSTEM (AS APPLICABLE) FOR 12" DIA. DOWNSPOUTS. PROVIDE GEOTEXTILE IN GEOTEXTILE SOCK SHALL ENCOMPASS THE ENTIRE BUILDING FOOTPRINT. AT ALL GREENBELTS BETWEEN SIDEWALKS, AND ADDITIONALLY AT INTERIOR CORNERS AS NECESSARY, RISERS WITH YARD DRAINS SHALL BE INSTALLED TO ALLEVATE WATER PRESSURE TO ALL BUILDINGS.
- * WATER MAIN SHALL BE DUCTILE IRON PIPE (DIP) CLASS 52, AND BUILDING SERVICE LEADS SHALL BE 2" TYPE K COPPER PIPE, OR APPROVED EQUAL BY THE AGENCIES HAVING JURISDICTION. ALL FITTINGS SHALL BE INCIDENTAL AND PROPER FOR USE WITH THE PIPE MATERIALS. PROVIDE 5.5 FEET MINIMUM COVER OVER WATER MAIN.
- * HYDRANTS AND VALVES SHALL BE IN ACCORDANCE WITH THE MUNICIPALITY HAVING JURISDICTION, OR OTHERWISE BE EJW STANDARDS AND BE SUBJECT TO THE APPROVAL OF THE DESIGN ENGINEER.
- * MINIMUM 18" CLEARANCE SHALL BE MAINTAINED BETWEEN PIPES AT JOINTS AND CROSSINGS. PROVIDE 12" MIN. CLEARANCE, PROVIDE PEASTONE BEDDING BETWEEN PIPES. PROVIDE 12" MIN. CLEARANCE, PROVIDE CEMENT BEDDING UNDER BOTTOM PIPE, AND BETWEEN BOTH PIPES, IF ANY UTILITY CONFLICTS OCCUR, STOP WORK IMMEDIATELY AND CONTACT THE CITY OF LESLIE, THE INGHAM COUNTY DRAIN COMMISSION, AND THE DESIGN ENGINEER FOR DIRECTION.
- * IRRIGATION COUNTRY CROSSINGS AS SHOWN ARE APPROXIMATE AND PRELIMINARY. IT IS THE RESPONSIBILITY OF THE IRRIGATION CONTRACTOR TO FINALIZE THE DESIGN AND LOCATIONS OF THE IRRIGATION SYSTEM, AND TO COORDINATE WITH THEIR DESIGNER AND THE UTILITIES AND PAVING CONTRACTORS FOR INSTALLATION OF CONDUITS AND/OR IRRIGATION LINES PRIOR TO PAVING.

LEGEND

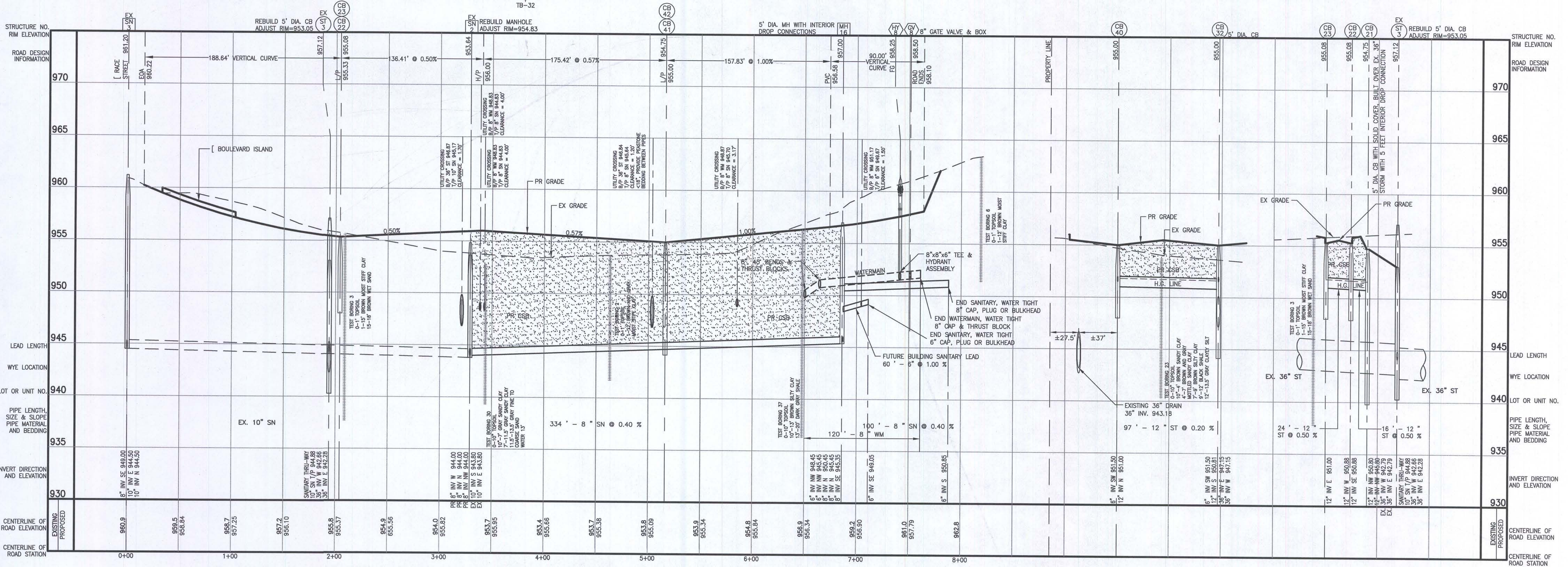
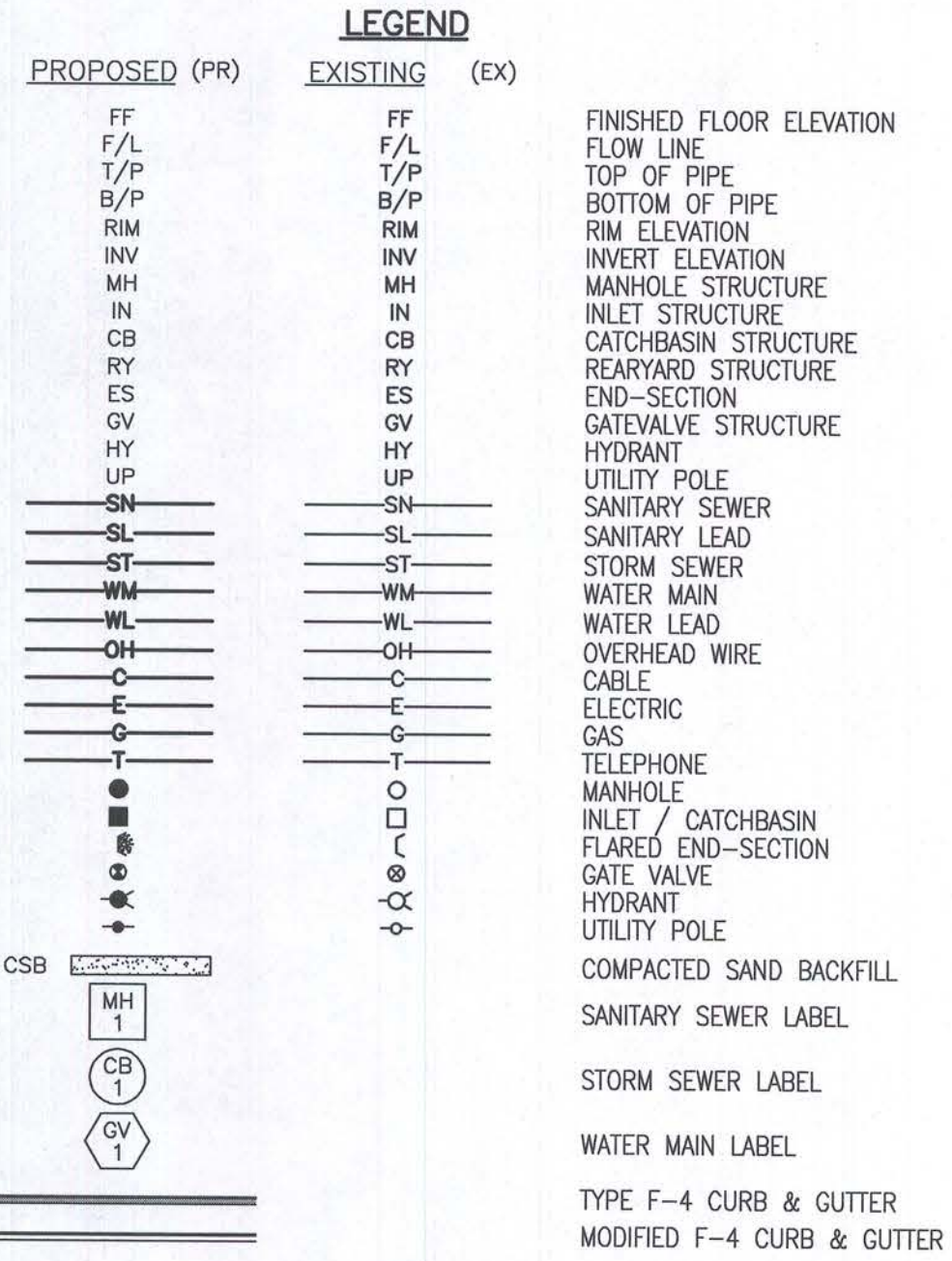
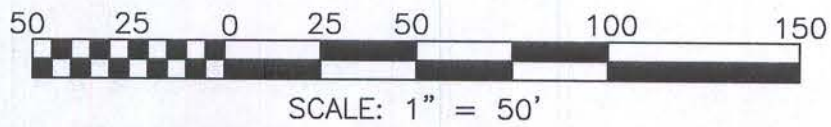
<u>PROPOSED</u> (FR)	<u>EXISTING</u>	(EX)
FF	FF	FINISHED FLOOR ELEVATION
F/L	F/L	FLOW LINE
T/P	T/P	TOP OF PIPE
B/P	B/P	BOTTOM OF PIPE
RIM	RIM	RIM ELEVATION
INV	INV	INVERT ELEVATION
MH	MH	MANHOLE STRUCTURE
IN	IN	INLET STRUCTURE
CB	CB	CATCHBASIN STRUCTURE
RY	RY	REARWARD STRUCTURE
ES	ES	END-SECTION
GV	GV	GATEVALVE STRUCTURE
UP	HY	HYDRANT
SN	SN	UTILITY POLE
ST	ST	SANITARY SEWER
WM	WM	STORM SEWER
OH	OH	WATER MAIN
C	C	OVERHEAD WIRE
E	E	CABLE
G	G	ELECTRIC
T	T	GAS
●	O	TELEPHONE
□	□	MANHOLE
■	□	INLET / CATCHBASIN
■	■	FLARED END-SECTION
⊙	⊙	GATE VALVE
⊙	⊙	HYDRANT
⊙	⊙	UTILITY POLE
MH 1		SANITARY SEWER LABEL
CB 1		STORM SEWER LABEL
GV 1		WATER MAIN LABEL

WORTHINGTON PLACE PLAN & PROFILE



LINE	LENGTH	BEARING
L1	61.20	N00°10'54"W
L2	127.27	N00°10'54"W
L3	89.99	N00°03'30"W
L4	273.14	S89°45'40"W
L5	263.99	S89°45'40"W

CURVE	RADIUS	CENTRAL ANGLE	ARC LENGTH	CHORD LENGTH	BEARING DIRECTION
1	60.00	40°18'12"	42.21	41.34	N202°00'00"W
2	100.00	41°33'56"	72.55	70.96	N194°41'18"W
3	135.00	90°18'27"	212.78	191.43	N45°20'08"W
4	100.00	90°25'52"	157.83	141.95	N45°16'26"W
5	215.00	90°10'50"	336.04	302.41	N45°08'55"W
6	225.00	54°09'55"	212.71	204.87	N67°09'22"W
7	225.00	54°09'55"	212.71	204.87	N67°09'23"W

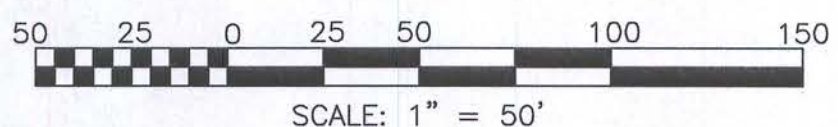
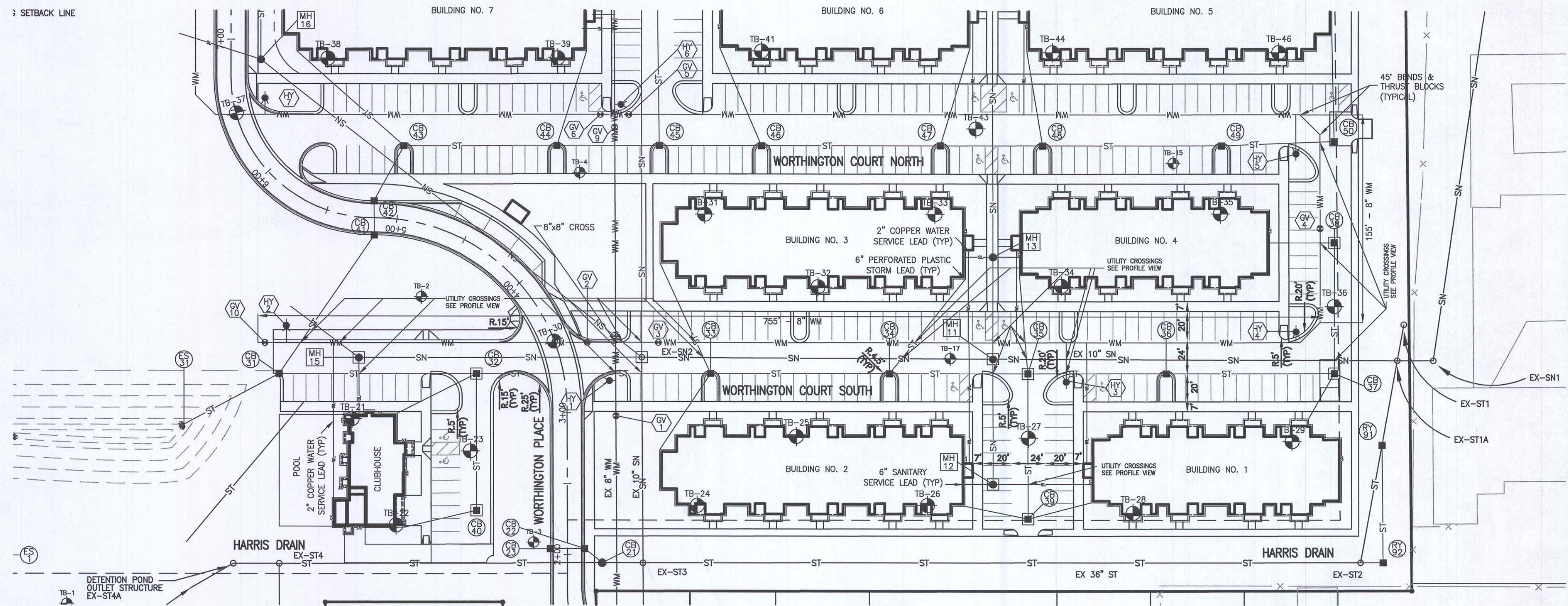


PROFILE
SCALE 1" = 50' H
1" = 5' V

NOTE: ADD 0.25
TO CENTERLINE
ELEVATION FOR
TOP OF CURB

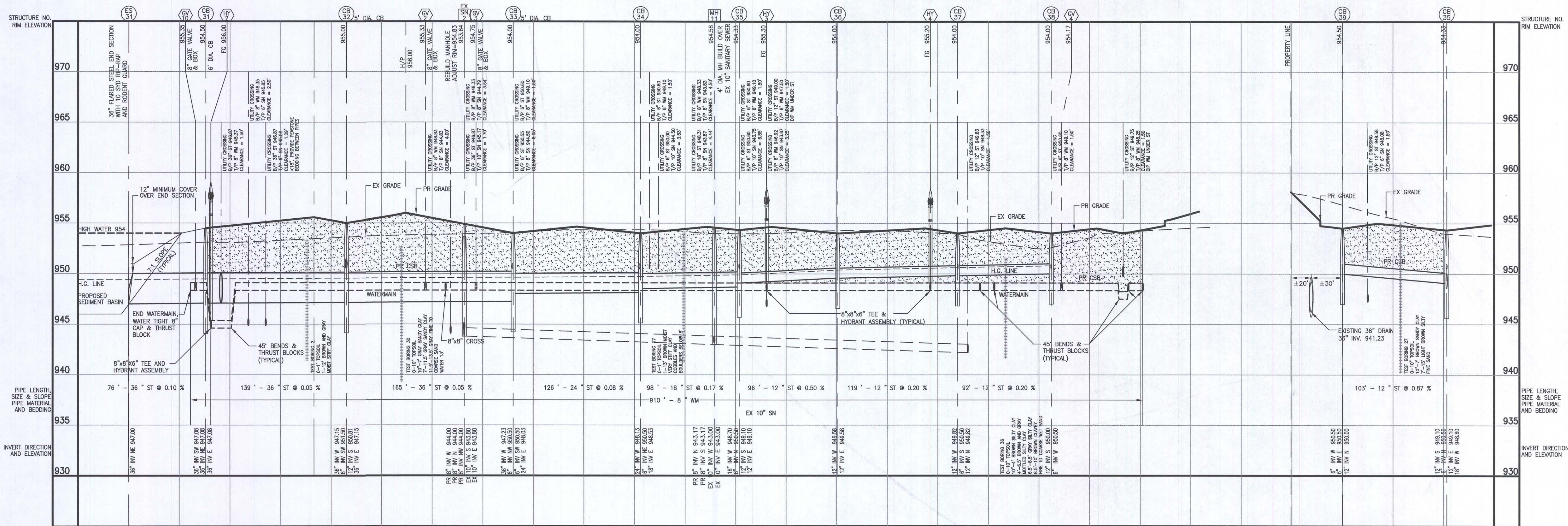
WORTHINGTON COURT SOUTH PLAN & PROFILE

3' SETBACK LINE



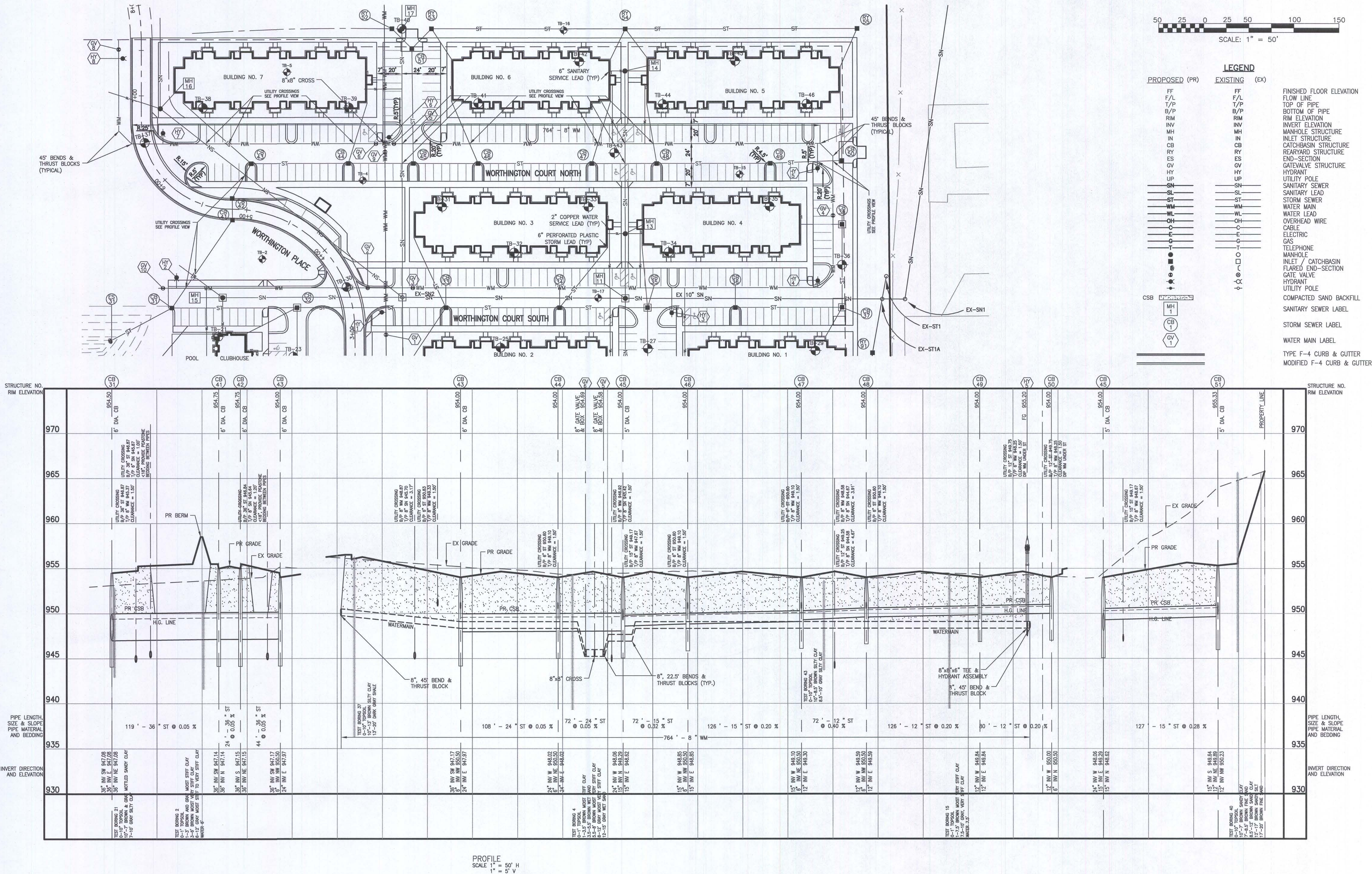
LEGEND	
PROPOSED (PR)	EXISTING (EX)
FF	FF
F/L	F/L
T/P	T/P
B/P	B/P
RIM	RIM
INV	INV
MH	MH
IN	IN
CB	CB
RY	RY
ES	ES
GV	GV
HY	HY
UP	UP
SN	SN
SL	SL
ST	ST
WM	WM
WL	WL
OH	OH
C	C
E	E
G	G
CSB	CSB
MH 1	MH 1
CB 1	CB 1
GV 1	GV 1

FINISHED FLOOR ELEVATION
FLOW LINE
TOP OF PIPE
BOTTOM OF PIPE
RIM ELEVATION
INVERT ELEVATION
MANHOLE STRUCTURE
INLET STRUCTURE
CATCHBASIN STRUCTURE
REARWARD STRUCTURE
END-SECTION
GATEVALVE STRUCTURE
HYDRANT
UTILITY POLE
SANITARY SEWER
SANITARY LEAD
STORM SEWER
WATER MAIN
WATER LEAD
OVERHEAD WIRE
CABLE
ELECTRIC
GAS
TELEPHONE
MANHOLE
INLET / CATCHBASIN
FLARED END-SECTION
GATE VALVE
HYDRANT
UTILITY POLE
COMPACTED SAND BACKFILL
SANITARY SEWER LABEL
STORM SEWER LABEL
WATER MAIN LABEL
TYPE F-4 CURB & GUTTER
MODIFIED F-4 CURB & GUTTER



PROFILE
SCALE 1" = 50' H
1" = 5' V

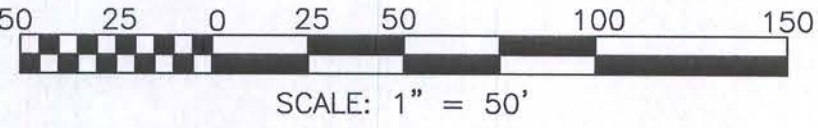
WORTHINGTON COURT NORTH PLAN & PROFILE



STORM SEWER PLAN & PROFILE

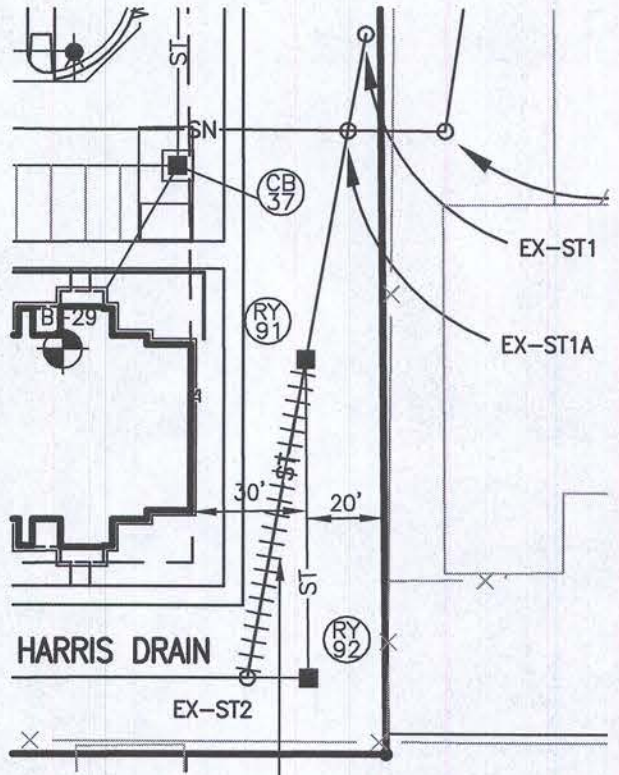
NOTES:

- 1. ALL PIPE LENGTHS SHOWN ARE FROM [] OF STRUCTURE OR FROM [] OF STRUCTURE TO OPEN END OF FLARED END SECTION.
- 2. ALL C-76 CL. III R.C. PIPE SHALL HAVE WRAPPED JOINTS.
- 3. STRUCTURE #RY92 SHALL HAVE A CATCH BASIN COVER.
- 4. STRUCTURE #RY91 SHALL HAVE A MANHOLE COVER.
- 5. STRUCTURE #RY91 WILL NOT REQUIRE A SUMP DUE TO THE ROCKY SHALE SUBSOIL.



LEGEND

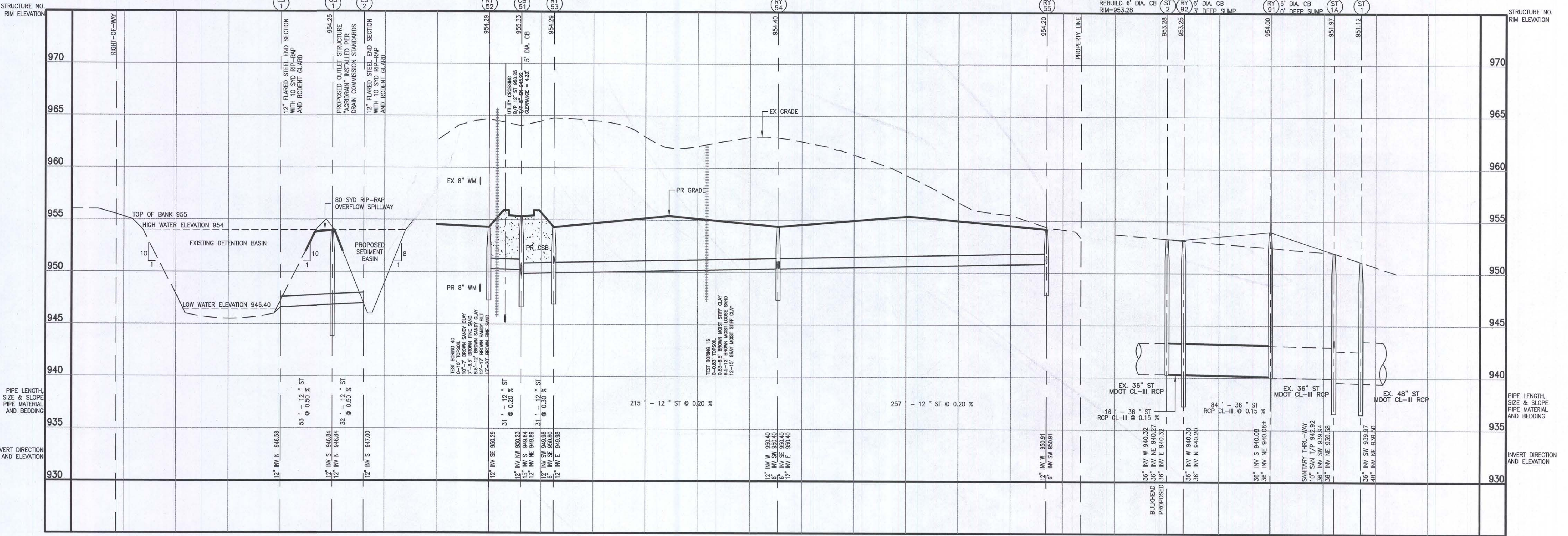
PROPOSED (PR)	EXISTING (EX)	
FF	FF	FINISHED FLOOR ELEVATION
F/L	F/L	FLOW LINE
T/P	T/P	TOP OF PIPE
B/P	B/P	BOTTOM OF PIPE
RM	RM	RIM ELEVATION
INV	INV	INVERT ELEVATION
MH	MH	MANHOLE STRUCTURE
IN	IN	INLET STRUCTURE
CB	CB	CATCHBASIN STRUCTURE
RY	RY	REARWARD STRUCTURE
ES	ES	END-SECTION
GV	GV	GATEVALVE STRUCTURE
HY	HY	HYDRANT
UP	UP	UTILITY POLE
SN	SN	SANITARY SEWER
SL	SL	SANITARY LEAD
ST	ST	STORM SEWER
WM	WM	WATER MAIN
WL	WL	WATER LEAD
OH	OH	OVERHEAD WIRE
C	C	CABLE
E	E	ELECTRIC
G	G	GAS
T	T	TELEPHONE
MH	MH	MANHOLE
IN	IN	INLET / CATCHBASIN
FL	FL	FLARED END-SECTION
GV	GV	GATE VALVE
HY	HY	HYDRANT
UP	UP	UTILITY POLE
CSB	CSB	COMPACTED SAND BACKFILL
		SANITARY SEWER LABEL
		STORM SEWER LABEL
		WATER MAIN LABEL
		TYPE F-4 CURB & GUTTER
		MODIFIED F-4 CURB & GUTTER



REMOVE OR ABANDON
IN PLACE 36" STORM
BULKHEADING BOTH
ENDS AND PUMPING
FULL OF GROUT

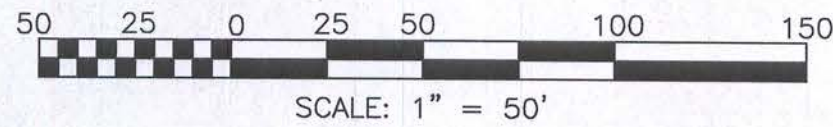
GENERAL DETENTION NOTES

* NO WATER SHALL BE ALLOWED INTO THE PROPOSED SEDIMENTATION BASIN UNTIL SLOPES ARE STABILIZED. THE TREATMENT OF THE SLOPE DEPENDS UPON THE PLANTING SCHEME THAT IS USED. IF GRASS IS PROPOSED, THREE INCHES OF GRASS OVER 90% OF THE AREA IS REQUIRED.

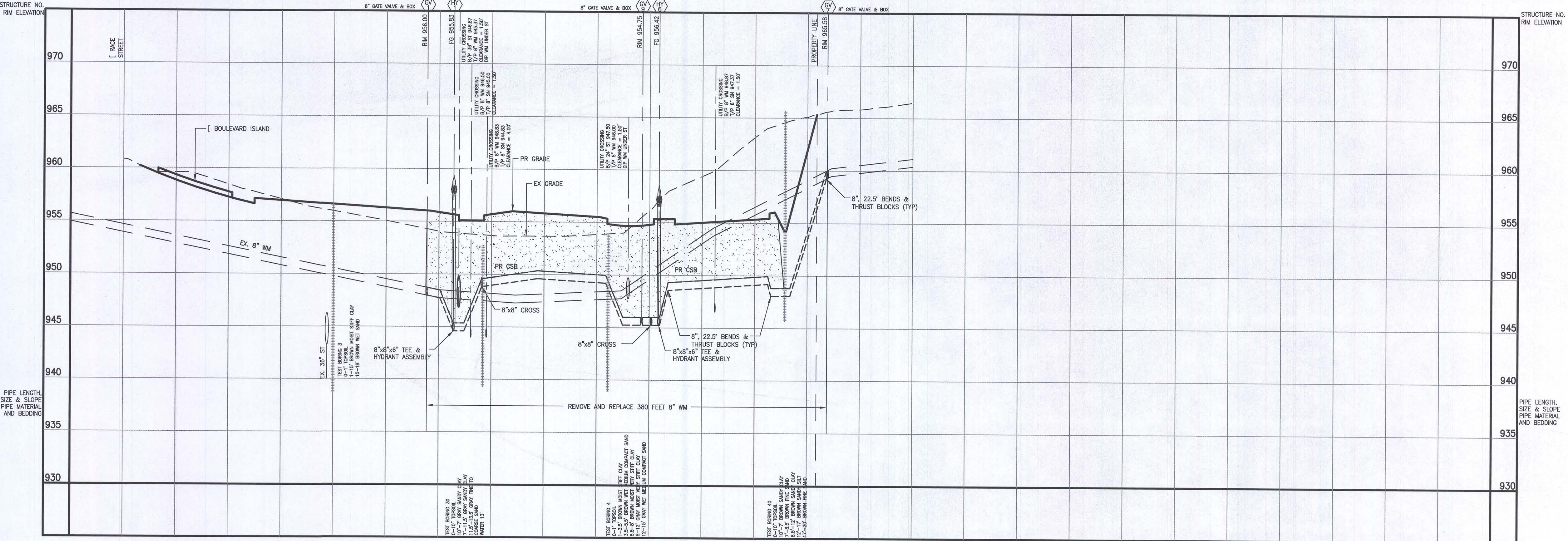
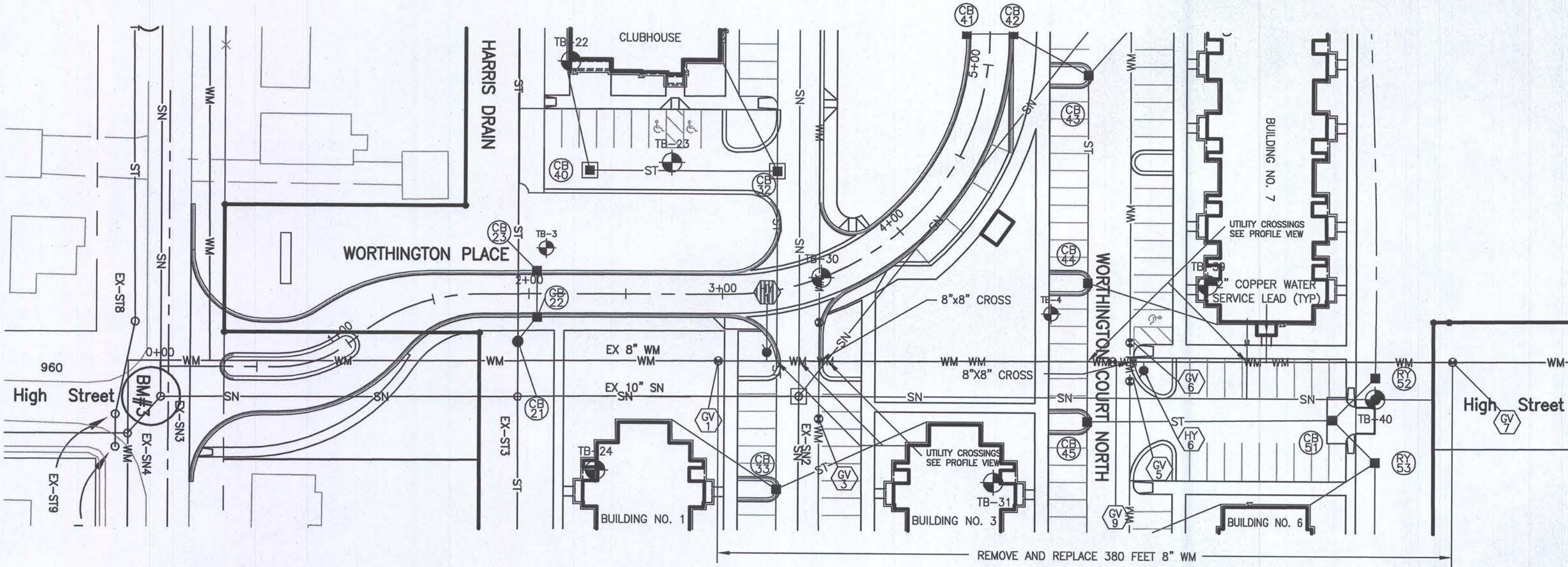


PROFILE
SCALE: 1" = 50' H
1" = 50' V

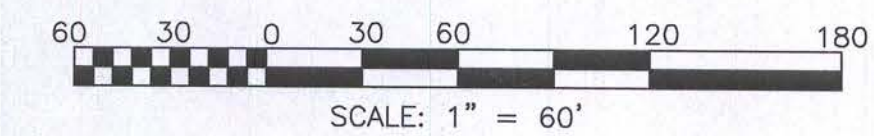
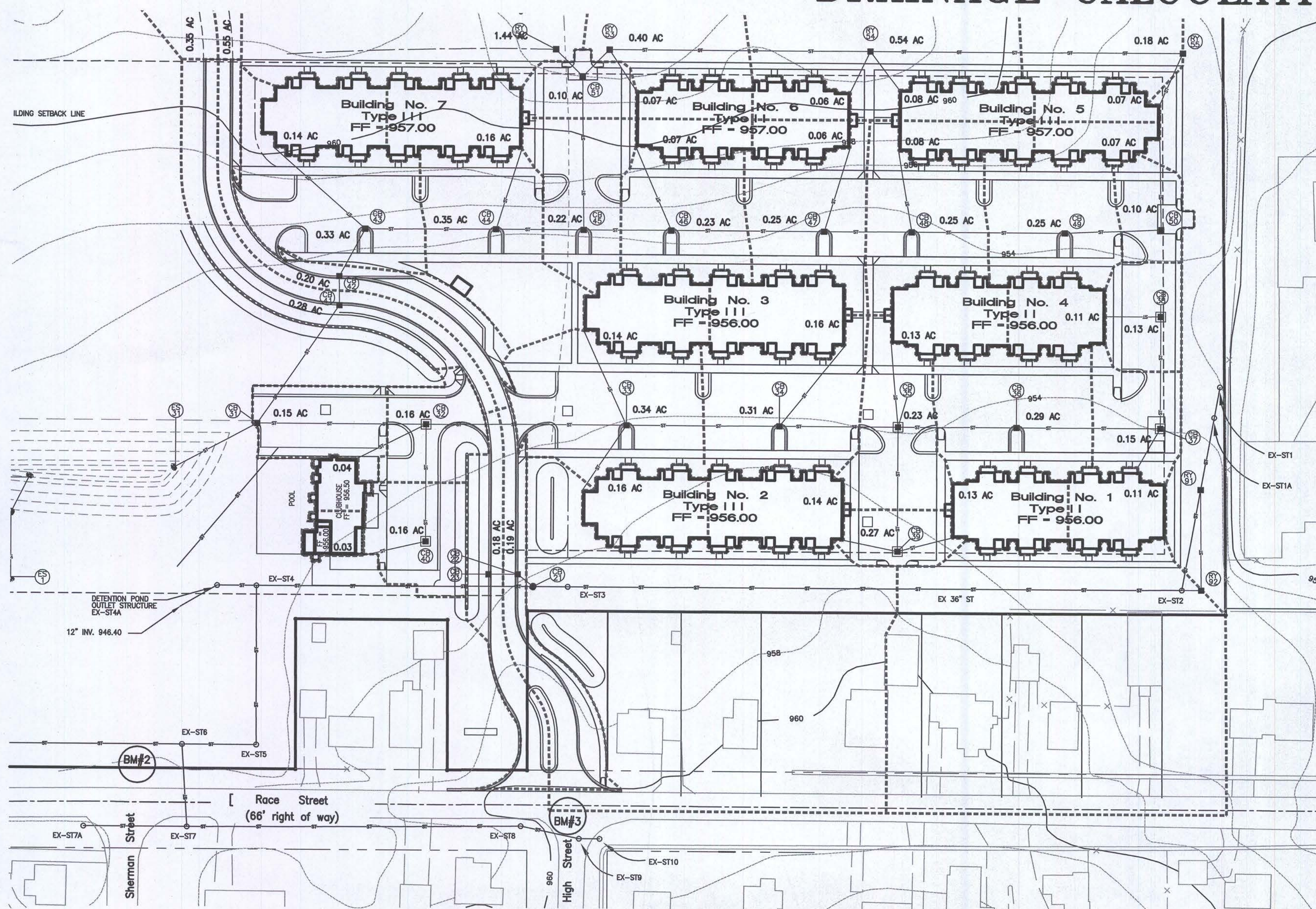
WATERMAIN PLAN & PROFILE



LEGEND		
PROPOSED (PR)	EXISTING (EX)	
FF	FF	FINISHED FLOOR ELEVATION
F/L	F/L	FLOW LINE
T/P	T/P	TOP OF PIPE
B/P	B/P	BOTTOM OF PIPE
RIM	RIM	RIM ELEVATION
INV	INV	INVERT ELEVATION
MH	MH	MANHOLE STRUCTURE
IN	IN	INLET STRUCTURE
CB	CB	CATCHBASIN STRUCTURE
RY	RY	REARYARD STRUCTURE
ES	ES	END-SECTION
GV	GV	GATEVALVE STRUCTURE
HY	HY	HYDRANT
UP	UP	UTILITY POLE
SN	SN	SANITARY SEWER
SL	SL	SANITARY LEAD
ST	ST	STORM SEWER
WM	WM	WATER MAIN
WL	WL	WATER LEAD
OH	OH	OVERHEAD WIRE
C	C	CABLE
E	E	ELECTRIC
G	G	GAS
T	T	TELEPHONE
●	○	MANHOLE
⊞	□	INLET / CATCHBASIN
⊞	⊞	FLARED END-SECTION
⊞	⊞	GATE VALVE
⊞	⊞	HYDRANT
⊞	⊞	UTILITY POLE
⊞	⊞	COMPACTED SAND BACKFILL
⊞	⊞	SANITARY SEWER LABEL
⊞	⊞	STORM SEWER LABEL
⊞	⊞	WATER MAIN LABEL
TYPE F-4 CURB & GUTTER		
MODIFIED F-4 CURB & GUTTER		



PROFILE
SCALE 1" = 50' H
1" = 5' V

[illegible][illegible]

LEGEND

PROPOSED (PR)	EXISTING	(EX)
---------------	----------	------

FF
MH
IN
CB
RY
ES
ST

●
■
○
□

CB
1

FINISHED FLOOR ELEVATION
MANHOLE STRUCTURE
INLET STRUCTURE
CATCHBASIN STRUCTURE
REARYARD STRUCTURE
END-SECTION
STORM SEWER
MANHOLE
CATCHBASIN
STORM SEWER LABEL
DRAINAGE AREA LINF

INGHAM COUNTY SOIL EROSION PERMIT TEMPORARY CONTROLS AND SEQUENCE

1. Notify Ingham County Drain Commissioner's Office 72 hours prior to start of grade work.
2. In accordance with Public Act No. 53, of 1974 the permit holder shall call Miss Dig for staking and locating of utilities, at least 72 hours in advance of the start of any work.

PERMITTING STANDARDS

3. Silt fabric fence as shown on plans shall be placed along perimeter on all low lying areas of the construction site to filter runoff before leaving project site.
4. All temporary erosion control devices shall be installed prior to the start of massive earth disruption.
5. All temporary erosion control devices as noted on plans shall be installed prior to the start of massive earth distribution.
6. Stone diapers shall be installed at the ingress/egress areas of the site prior to the start of massive earth disruption to reduce tracking of soil onto public traffic areas. Diapers shall be of 2" crushed concrete and shall be a minimum of 6' x 12' x 50'.

DETENTION PONDS

7. Detention ponds shall be excavated, topsoiled, seeded, mulched and tacked prior to the start of massive earth disruption.
8. Detention pond outlets shall be of the standpipe and stone filter system, with trash screen. Outlet flow shall not exceed .176 cubic feet of water per second/per acre. Pond dikes shall have a minimum of one (1) foot of freeboard. An emergency spillway shall be constructed within the freeboard level.
9. The emergency spillway from the detention pond shall be sodded and pegged, or rip rapped, 15 feet past the toe of the slope of the berm.
10. Dikes and berms shall be free of all organic matter.
11. All unimproved disturbed areas shall be stripped of topsoil which will be stored on-site during the excavating stage. Topsoil piles shall be seeded and mulched, or matted with straw in the non-growing season, immediately after the stripping process is completed, to prevent wind and water erosion.
12. Soil erosion controls shall be monitored daily by the on-site engineer, or contractor, whichever case applies.

SLOPES AND DITCHES

13. On-site ditches shall be of the flat bottom type, minimum width of 2' with a minimum of 3 horizontal to 1 vertical side slopes, 3:1.
14. Ditches with steep slopes will need flow checks to prevent scouring of the ditch bottom. These shall be installed as directed by the engineer or inspector.
15. Slopes in excess of 3 horizontal to 1 vertical shall not be used except with a mechanical device such as a retaining wall, terracing, or other prior approved device.

STORM DRAINS

16. All storm water structures, catch basins and/or manholes, if block, shall be plastered on both the inside and outside of the structures. Grouting and pointing will be necessary at the casting and structure joint to prevent leakage and the resulting soil movement, around the structure.
17. Pavement adjacent to street stormwater inlet structures shall be cut out after the 1st coat of paving, concrete shall be poured, and the second coat of asphalt laid over the concrete cut. Rings and castings shall be centered at this time, grouting and jointing shall also be done at this time to prevent leakage into the structures and the resulting soil movement.
18. Storm water inlets shall have as a temporary control a straw bale barrier and stone filter installed around the inlet during construction. As an alternative to the straw bale barrier, a burlap and pea stone filter may be used. Three layers of burlap fiber and a filter of pea stone minimum 1 ft. in depth can be used. Due to the porosity of the burlap filter the minimum of 1 ft. of stone is very important. The control shall be installed as soon as the structure is built and inspected daily.
19. Burlap and pea stone filters will need to be changed after each rainfall.
20. County Code requires a minimum pipe size of 12" in diameter for all catch basin leads and storm drains. All pipe shall meet the 12" diameter code size.
21. All storm drain outlets 24" in diameter or larger shall have animal guards installed to prevent entrance to the system.
22. All storm drainage pipe 30" in diameter or larger shall be pointed, at the joints on the inside with mortar, after backfilling.
23. All storm drain outlets that do not empty into the detention pond shall have a temporary 5'x10'x3' sump installed at the termination of the storm sewer. Upon completion of the stabilization work the sump area shall be filled and rip rapped with cobblestone. Silt traps shall be inspected after each storm.
24. Stormwater outlets denote a rip rap. All outlets shall be rip rapped over keyed filter fabric with a minimum of 15 sq. yards of 6" or larger cobblestone.
25. Rip rap as noted on the plan shall be of a funnel shape construction, width shall increase as distance from the outlet point increases at a 3:1 ratio.
26. Rip rap shall be of cobblestone, 6" in diameter or larger. Grouting may be necessary, and shall be a minimum of 6" in depth with the cobble set in the cement slurry.
27. Stormwater outlet is in need of a splash block if slope is 4% or greater. Splash block detail is noted on this sheet.
28. It will be necessary for the developer to have the storm drainage lines cleaned prior to final inspection by the Ingham County Drain Commissioner's office. If required, this work shall be done by a professional sewer cleaning firm and certified in writing by the project engineer. All sumps and temporary silt traps shall also be cleaned at this time.

STABILIZATION

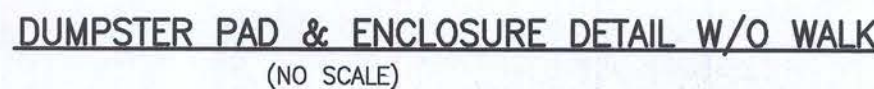
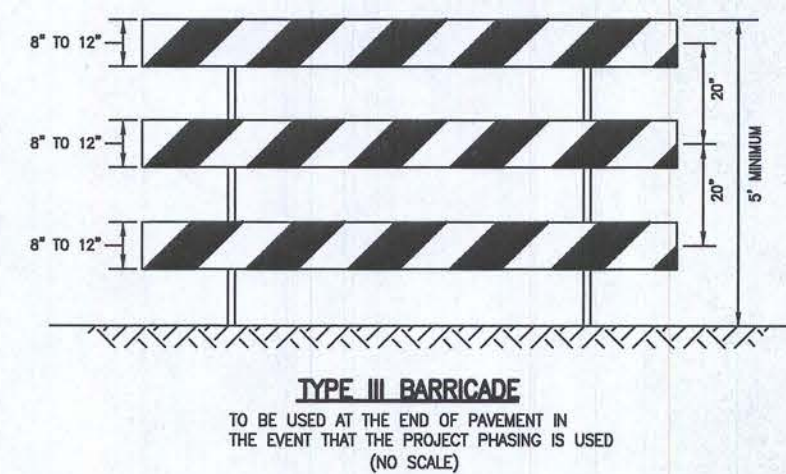
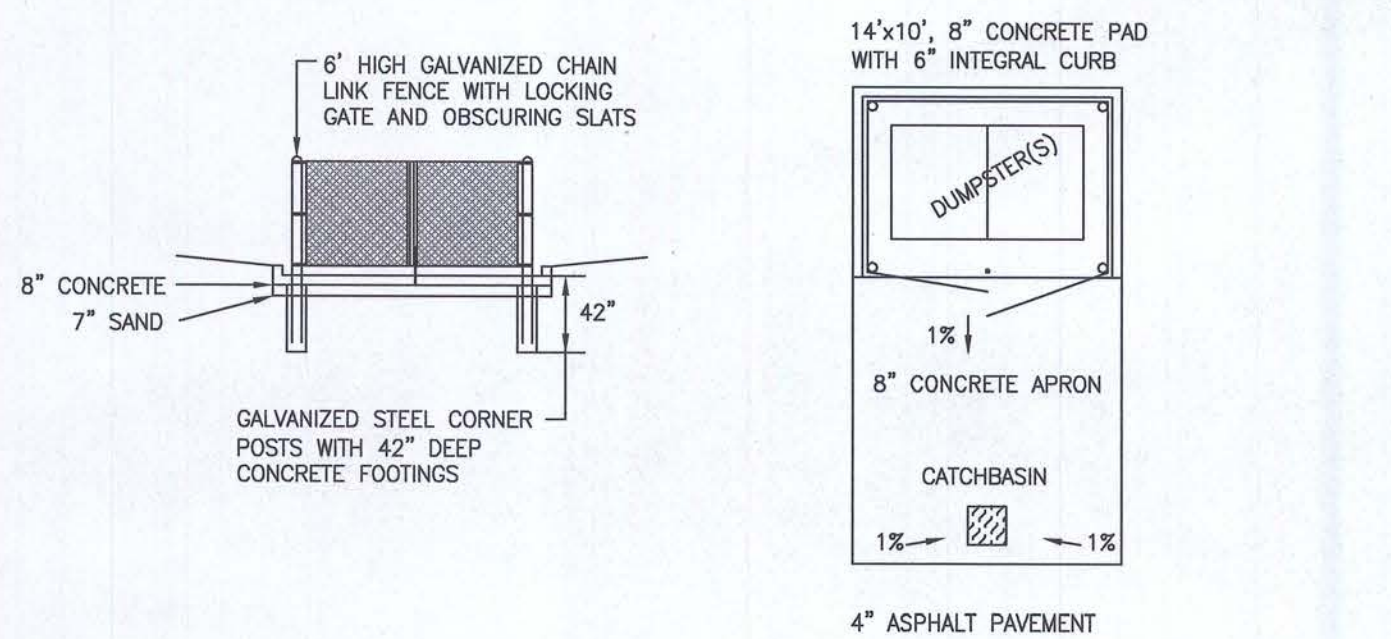
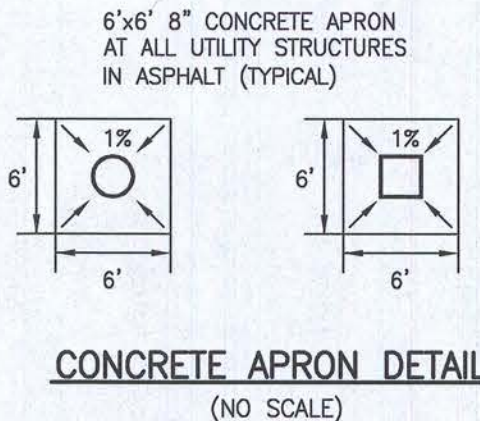
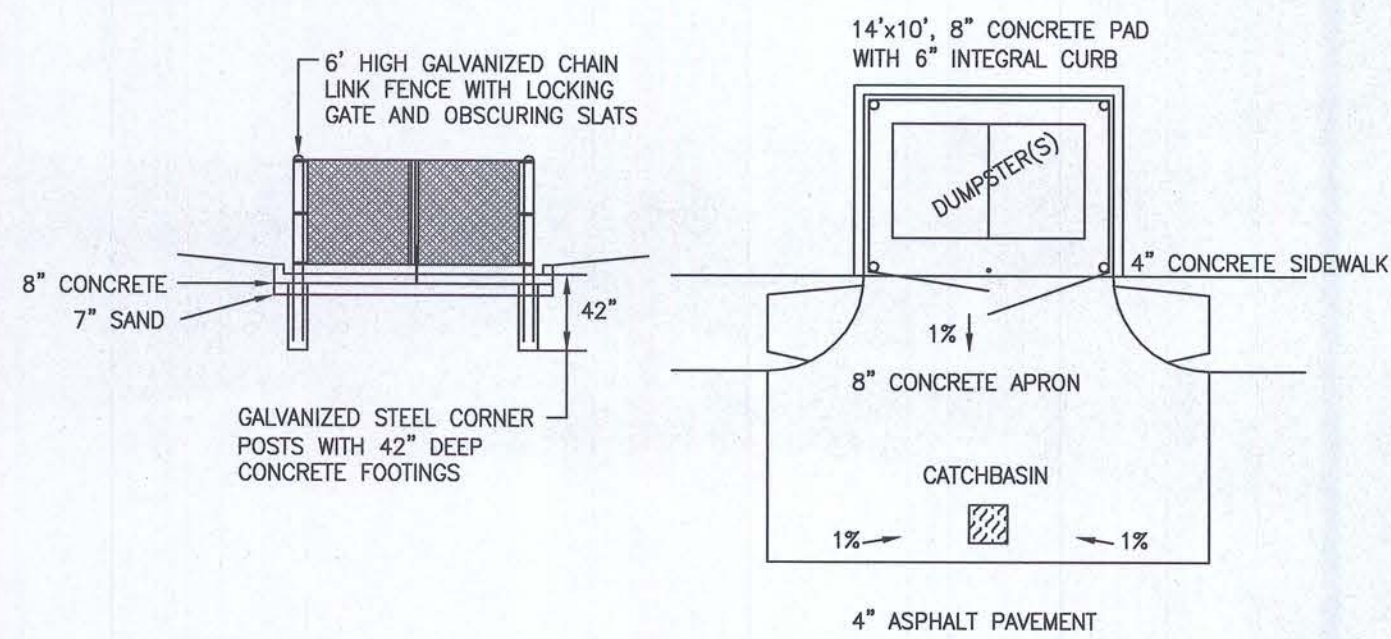
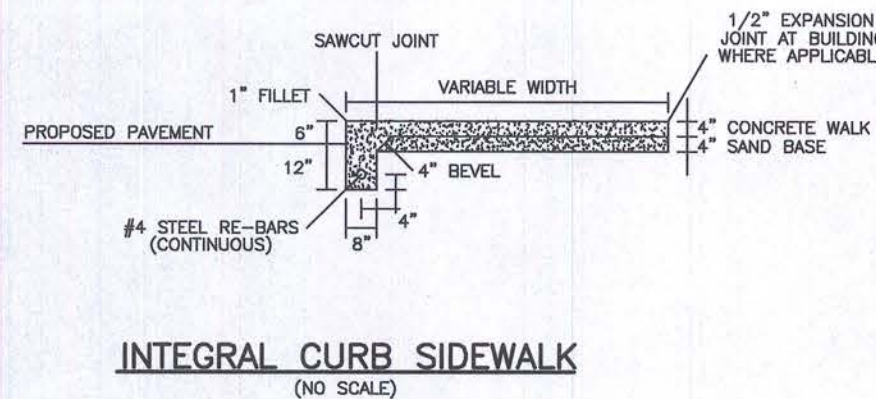
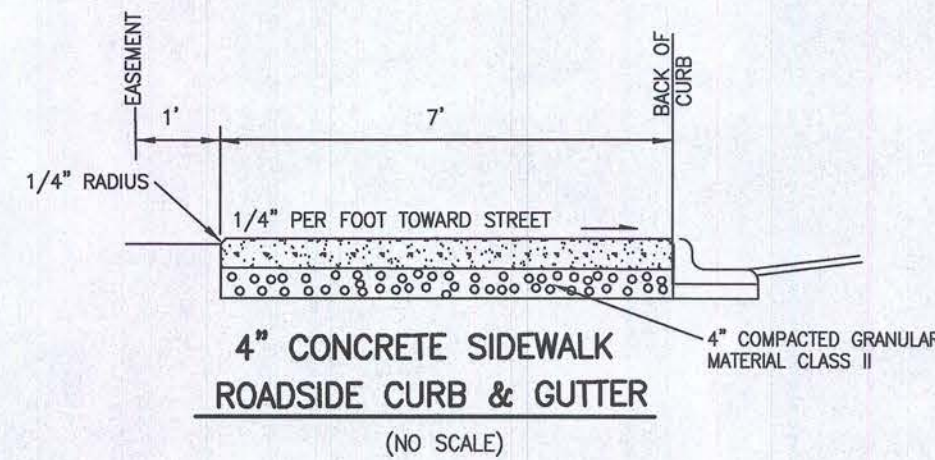
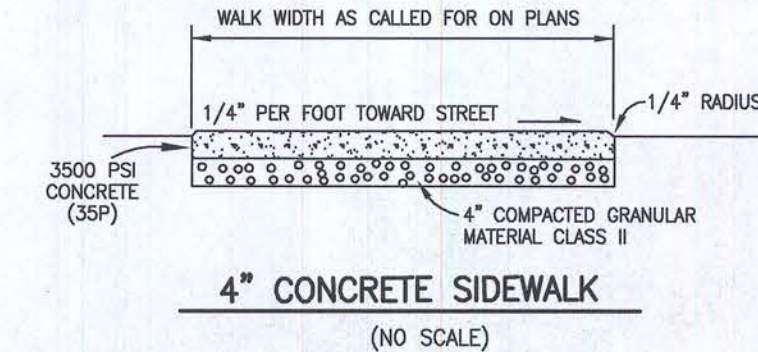
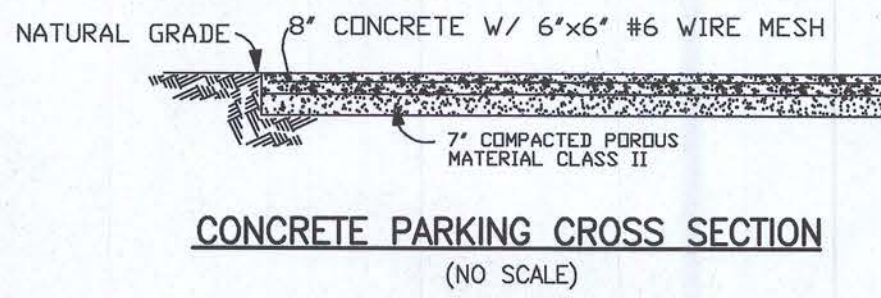
29. All unimproved disturbed areas shall be re-topsoiled, with a minimum of 3" of material, seeded, mulched and tacked within 15 days of the completion of the massive earth disruption. In the non-growing season straw matting will suffice. Hydroseding will be an acceptable alternate for mulching. Extreme care should be exercised in spring and fall periods as a frost will break the bind of the hydroseding, which will affect the effectiveness of this procedure. All banks steeper than 8% or 1 on 12 slope shall be provided with mulch blanket, type and installation per manufacturer specifications.
30. In the non-growing season, temporary stabilization of massively exposed areas for winter stabilization shall be done with straw matting.
31. Permit fees during the winter period of non-construction, (December 1 through March 31), shall not be imposed if the permit holder temporarily stabilizes the exposed areas with straw matting, and other approved controls and obtains a winter stabilization certificate from this office.
32. Periodic inspections will be made throughout the course of the project. It will be the responsibility of the managers of the project to contact this office for the final inspection at the end of the project.
33. This Commercial Permit is valid for the mass earth movement, the installation of roads, drains, and utilities and is not for any family residence. Residential builder will need to secure waivers and/or permits as necessary.
34. The issuing building department shall not issue the Certificate of Occupancy until the final inspection letter from the Ingham County Drain Commissioner's Office has been obtained.

STORM/SANITARY DRAIN TAPS.

35. Storm/sanitary Sewer Tap to the legally established County Sanitation Drain shall only be made after securing in writing clearance from the City of Leslie and a Sewer Tap Permit from the Ingham County Department of Building & Safety.
36. A tap permit will be needed by the owner/developer of this project to tap to the legally established County Storm Drain. The owner/developer shall make a written request to the Drain Commissioner to request the tap to the storm sewer. The fees for such tap are as follow:
 - a. Non refundable administrative fee of \$50.00, to be paid at the time of application.
 - b. Inspection fees are based on time and material basis from port to port for the on-site inspector. The Inspector's rate, vehicle mileage, and 0.5 hours of report preparation time will be charged, as well as any necessary materials. Time and material fees are paid at the completion of the tap installation.

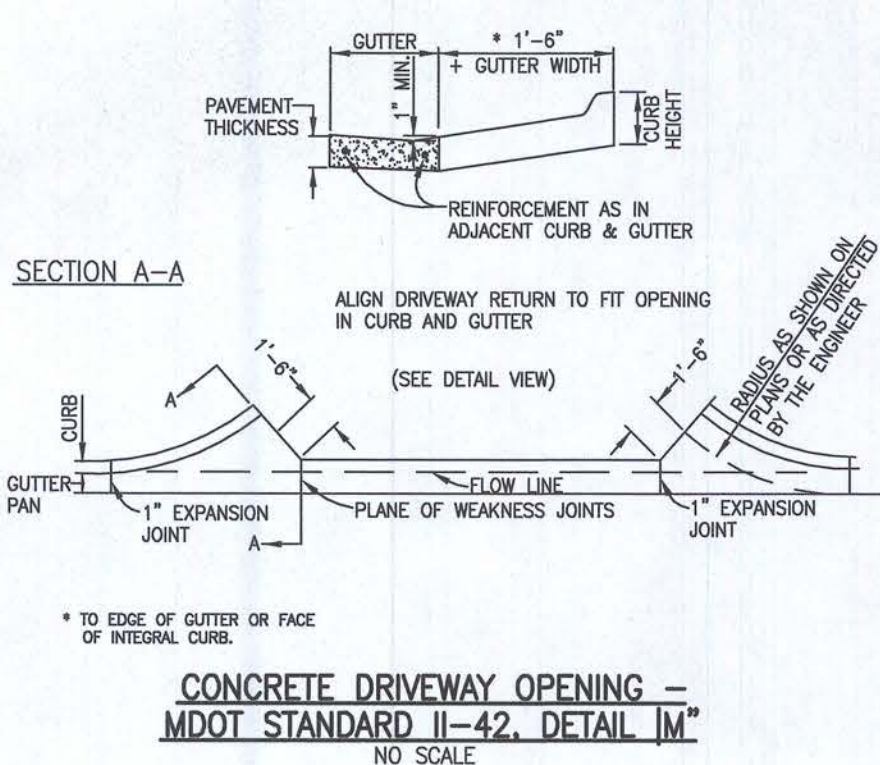
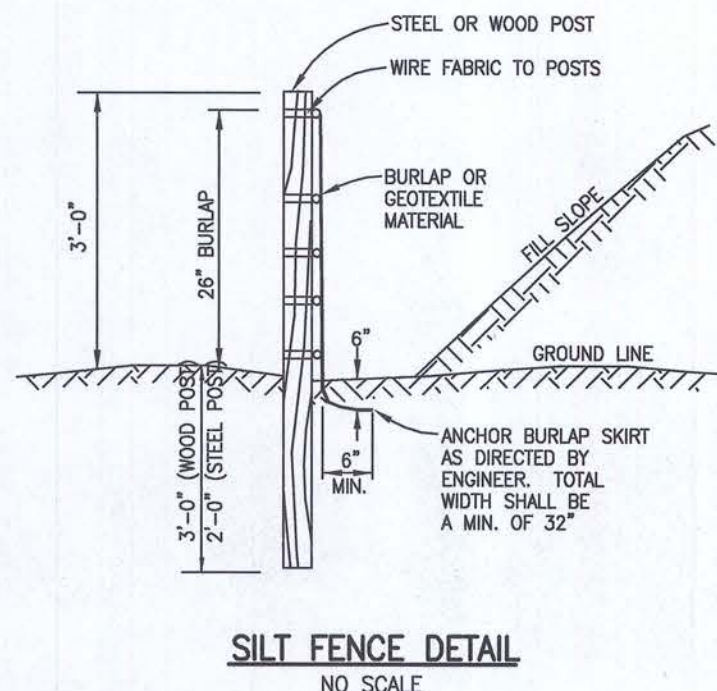
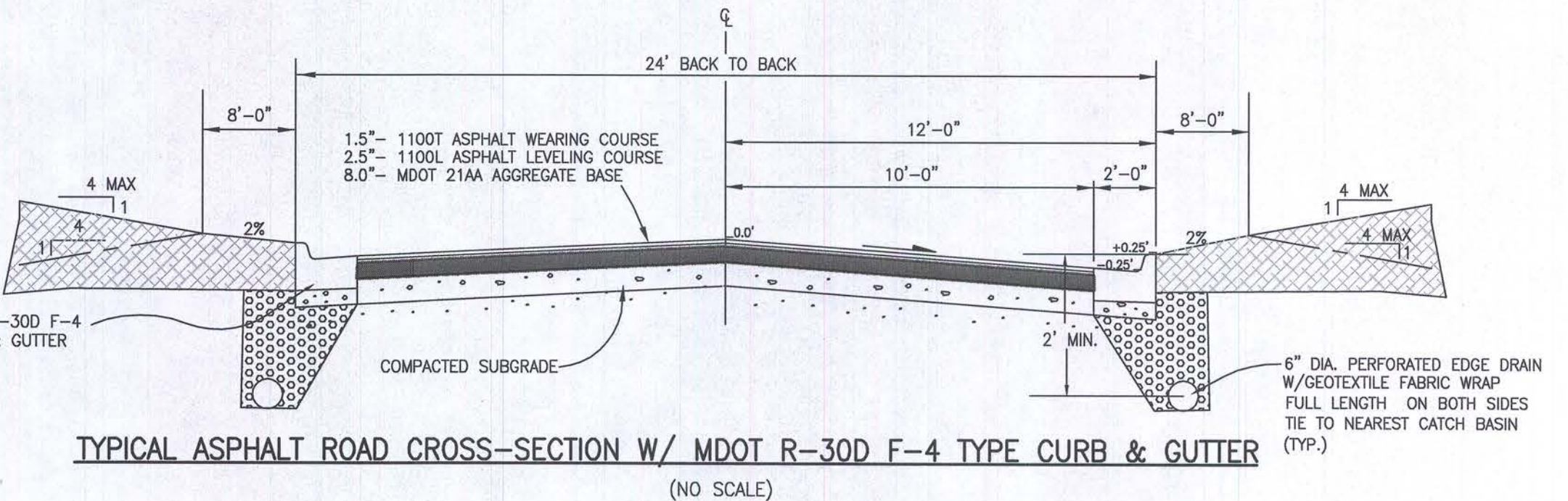
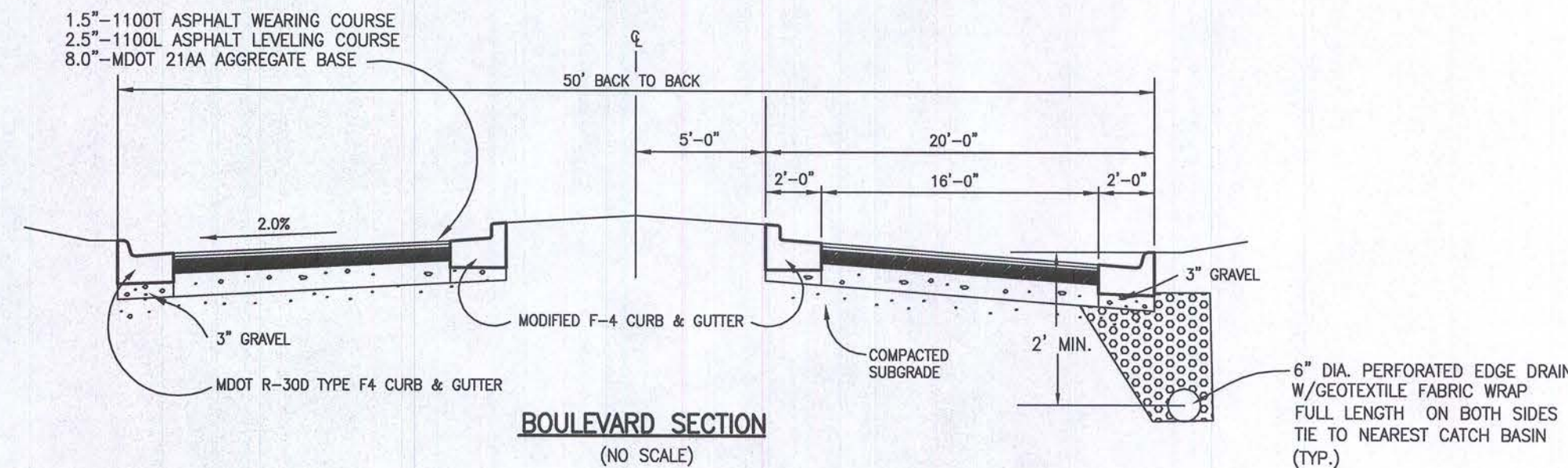
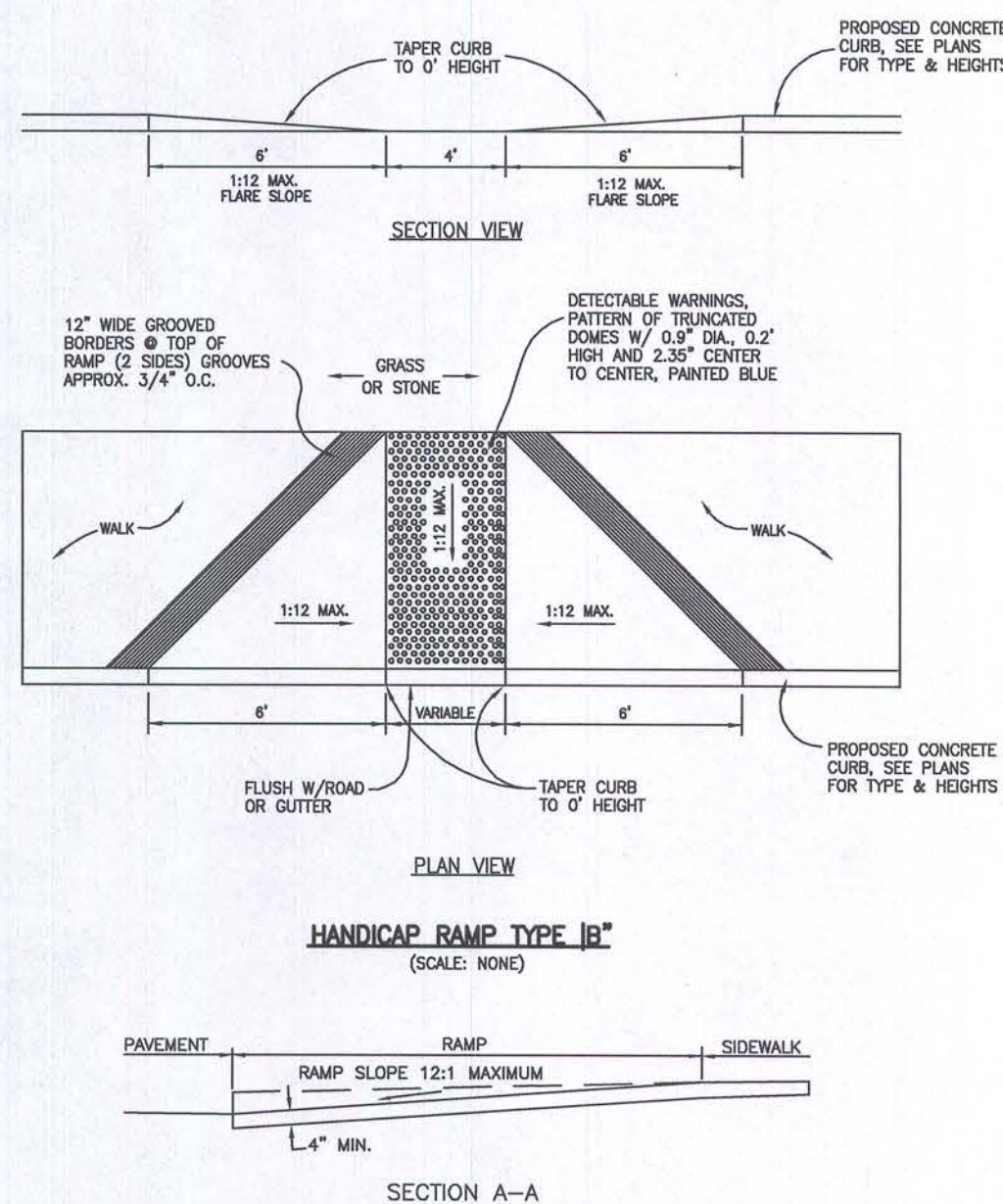
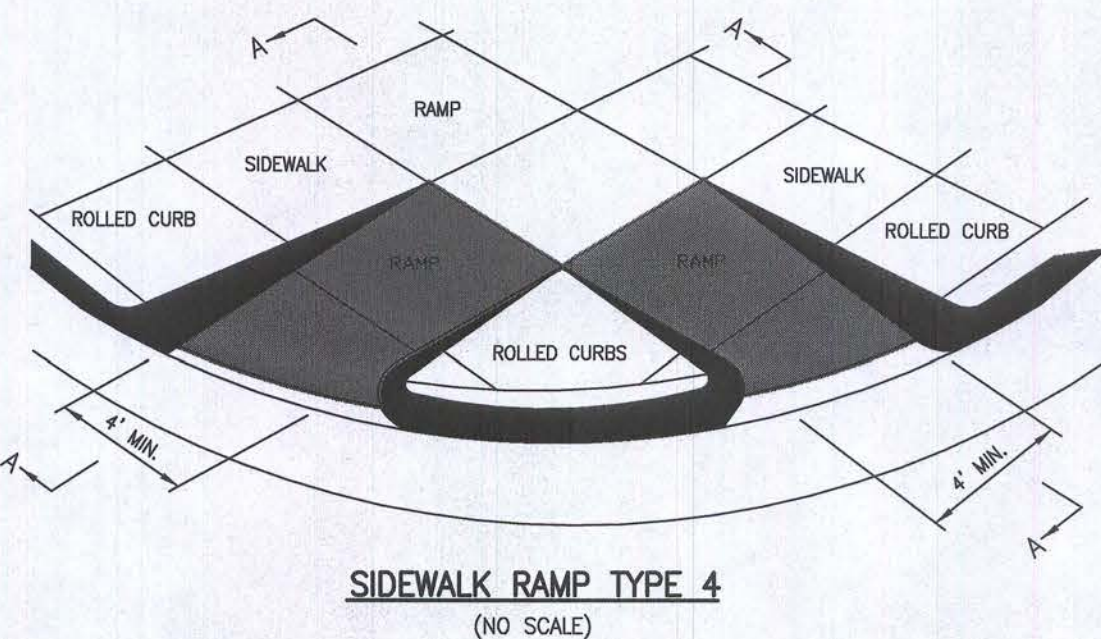
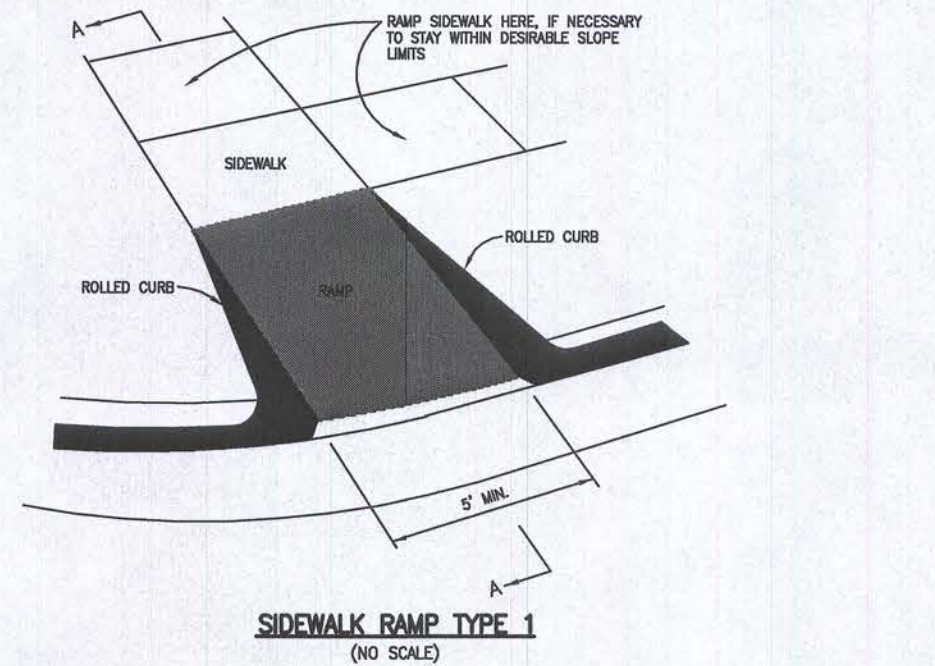
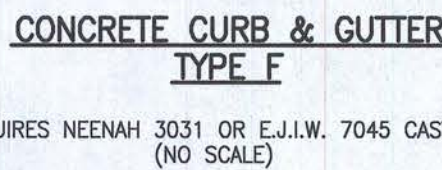
RESIDENCE CONSTRUCTION

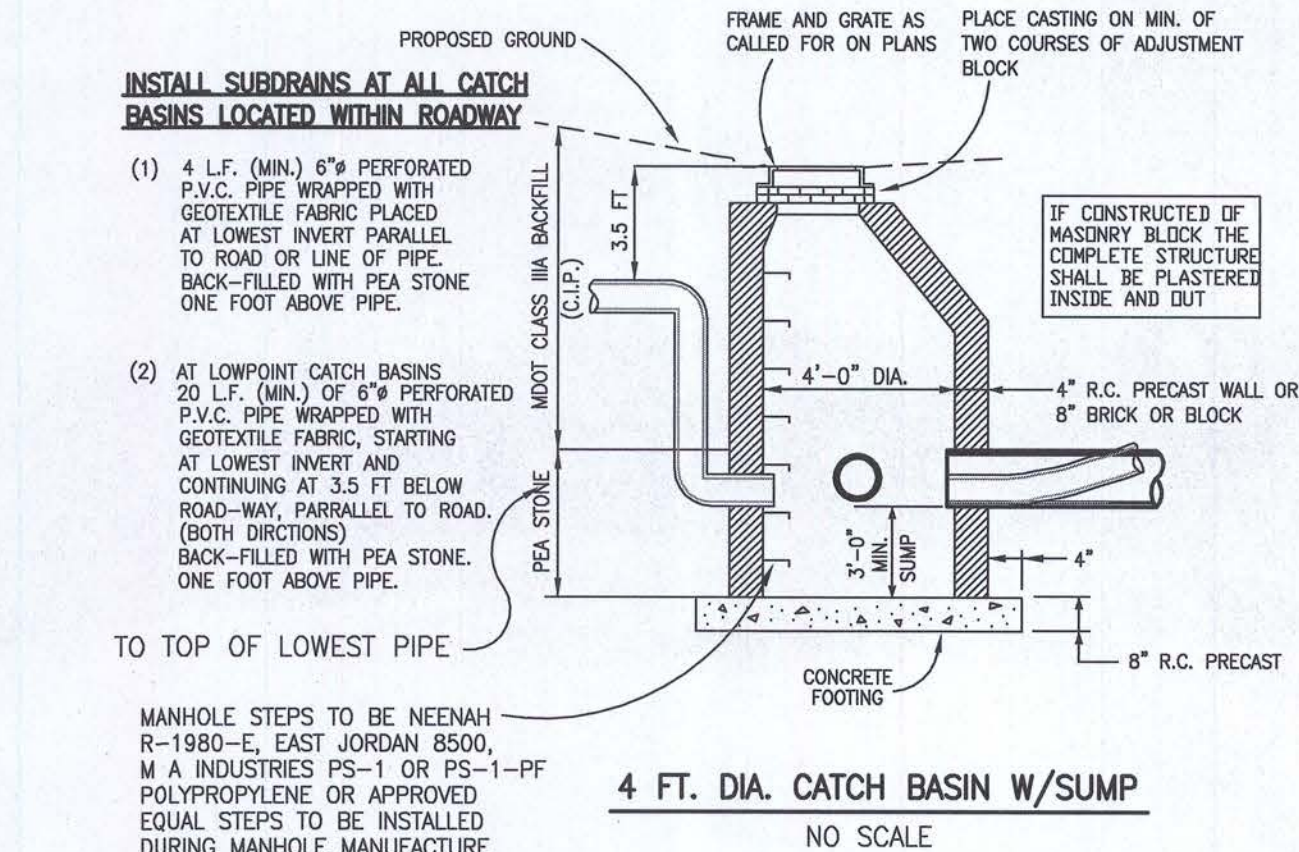
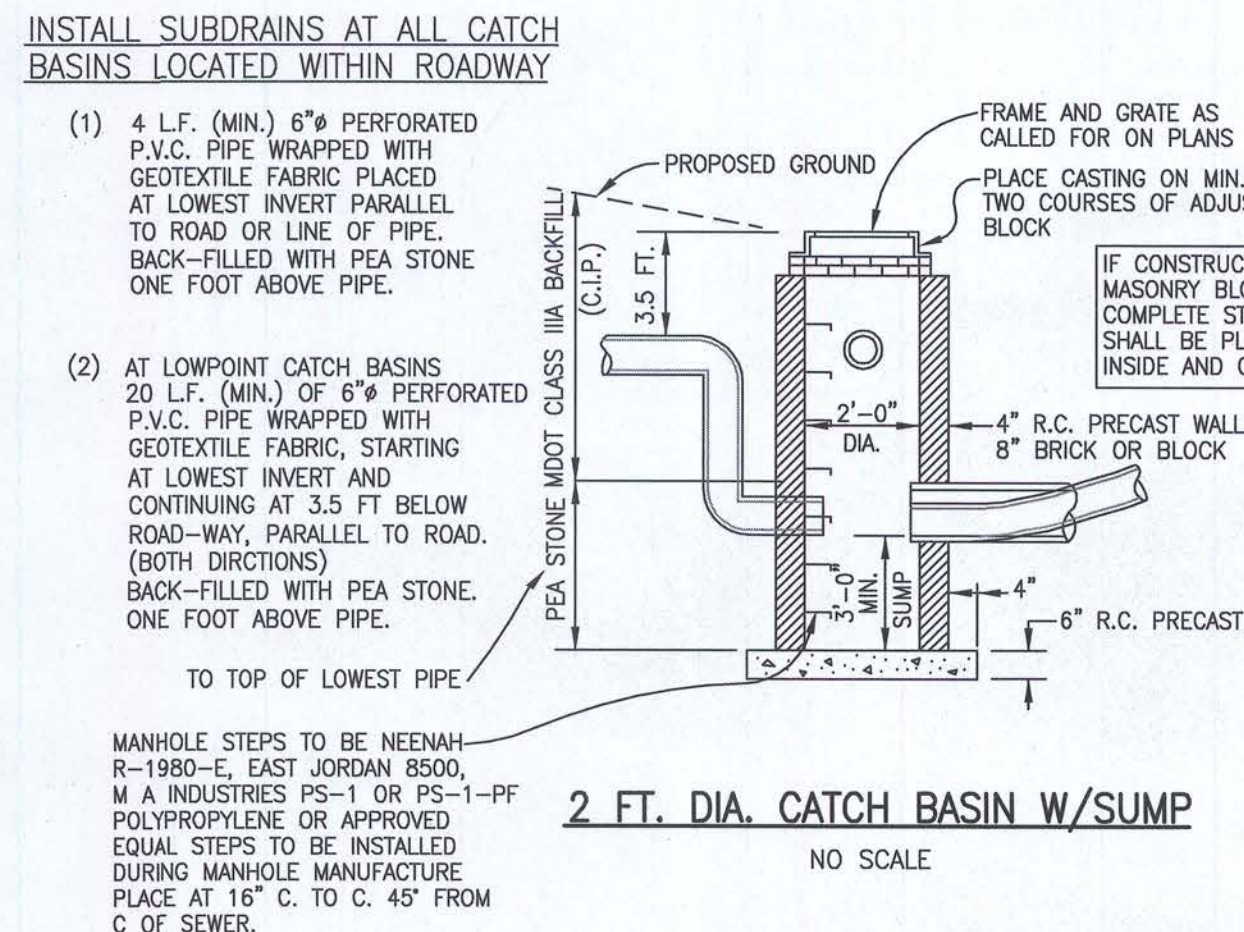
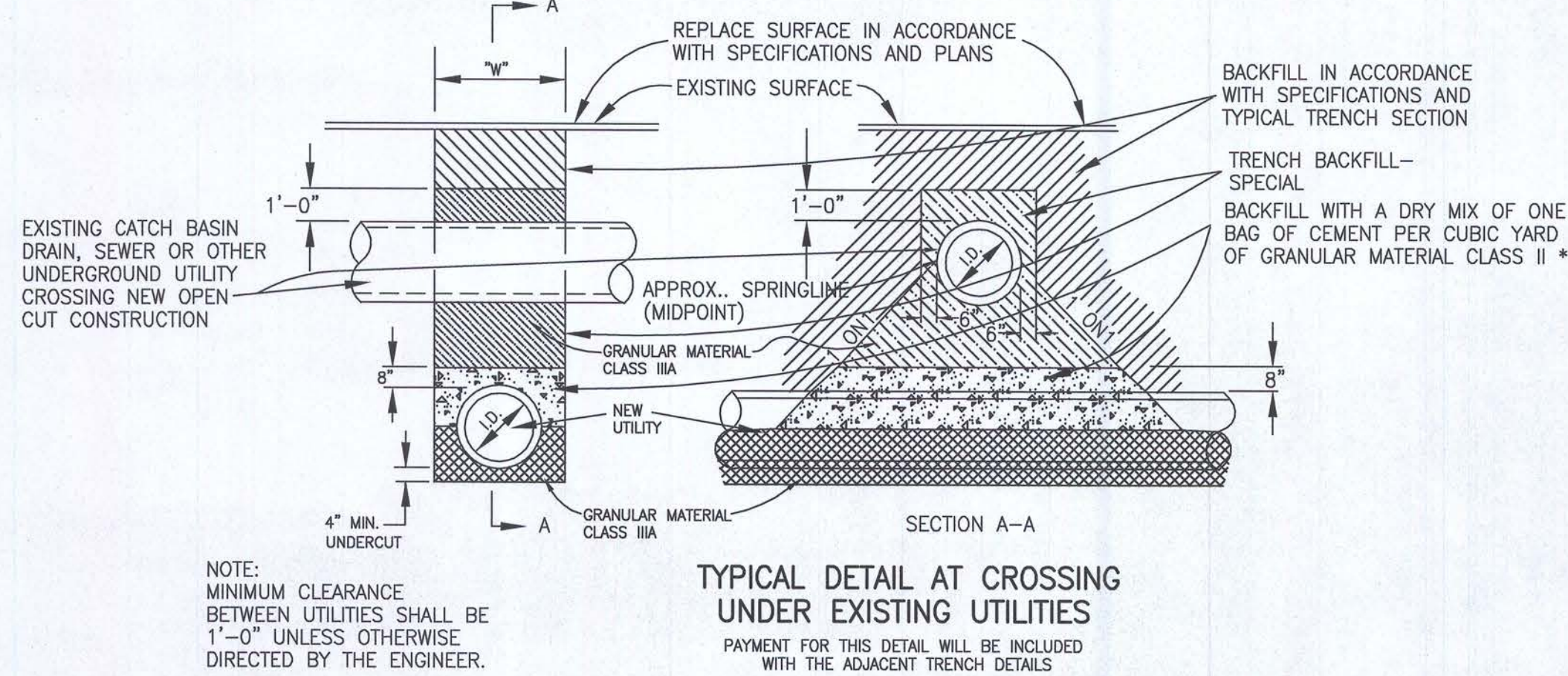
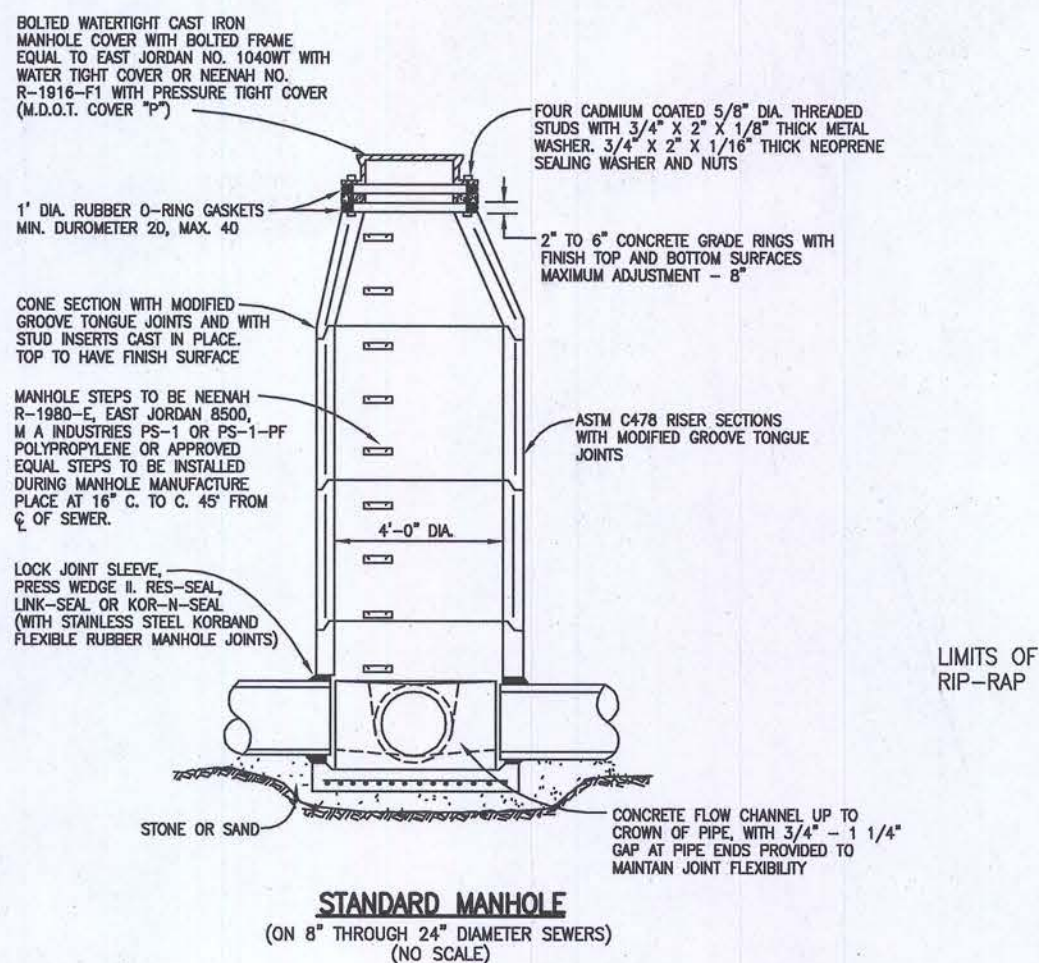
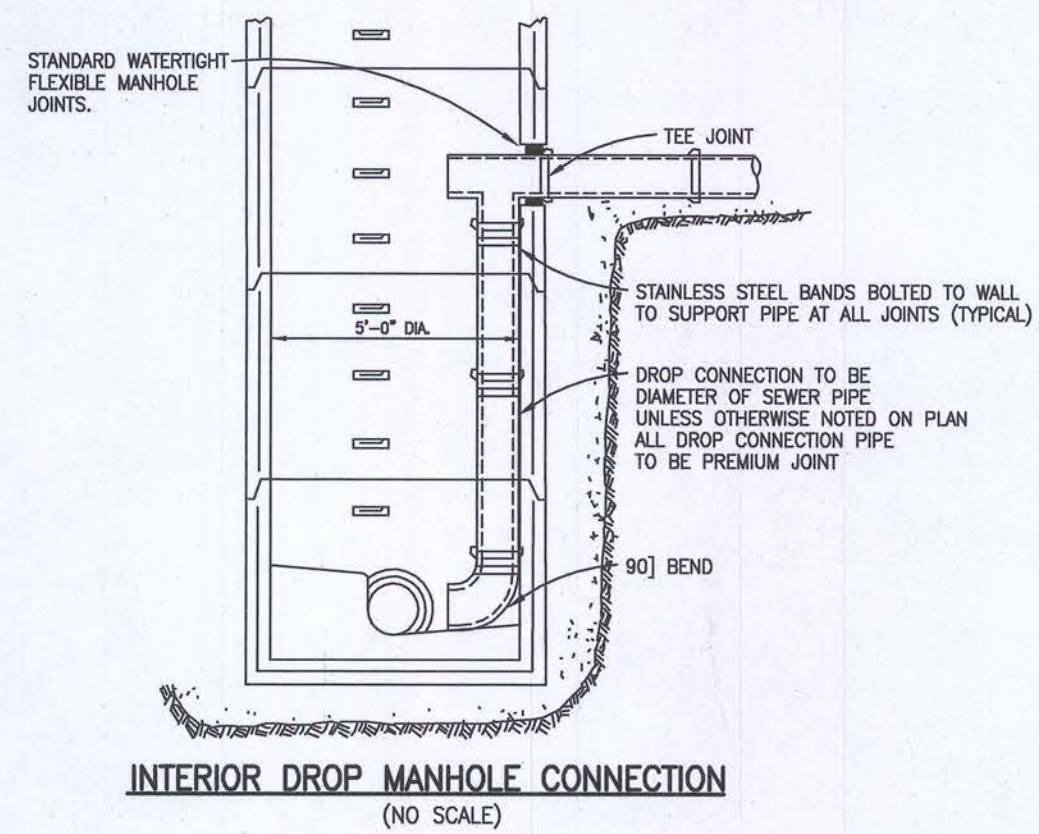
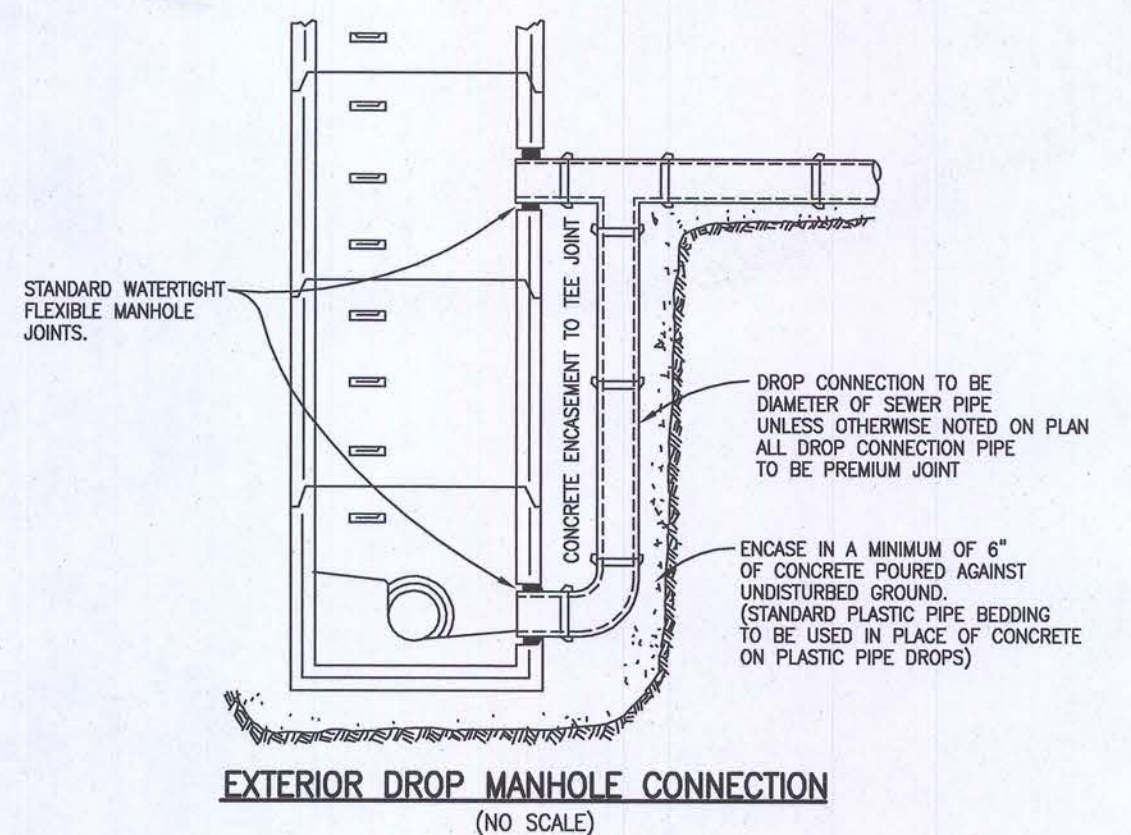
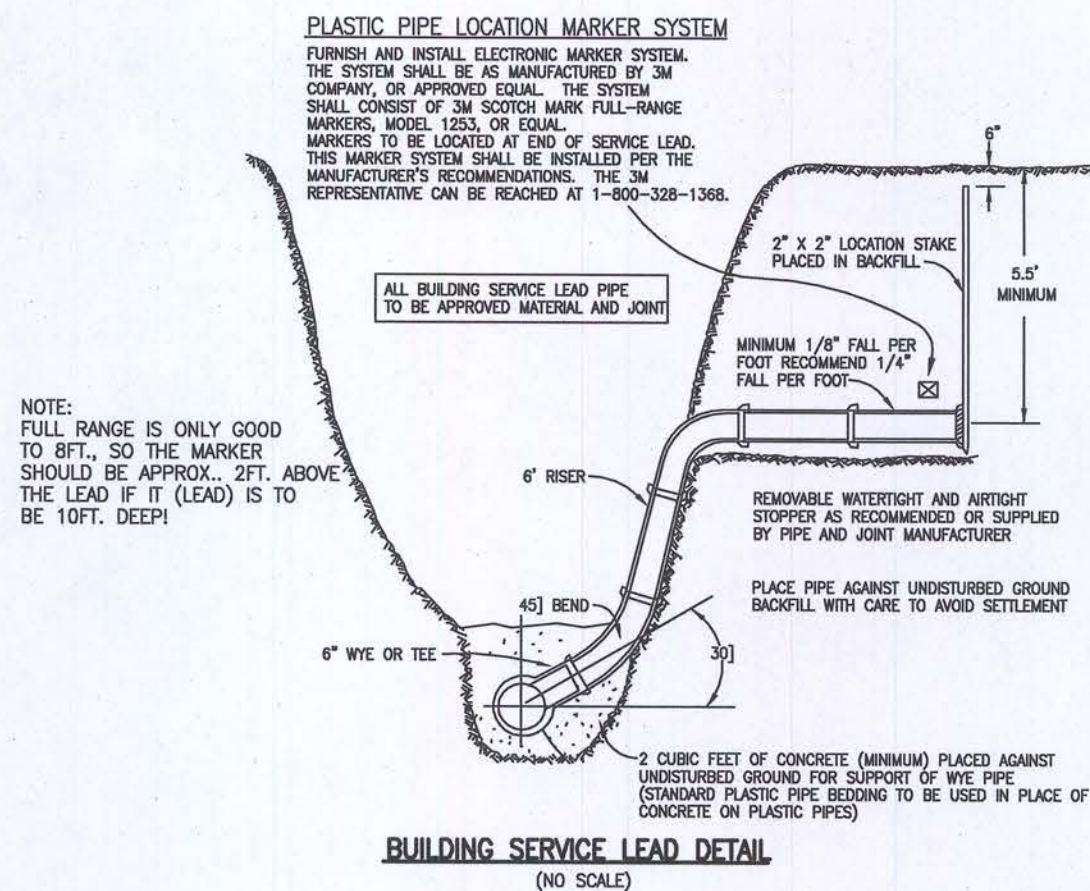
37. Prior to the start of residence construction, the builder shall install a straw bale barrier and/or silt fence behind the curb, or behind the crown of the road ditch back slope.
38. Drainage easements within the subdivision shall not be encroached upon. Open swales shall not be filled or encroached upon. Straw bale barriers or silt fences shall be installed between the construction and the open drain to prevent siltation of the system. Enclosed drains will have periodic catch basins or manholes, lot grades shall not be raised over the established structure tops.



DETAIL	M	N	LANE TIES	CONCRETE CU.YD./LIN.FT.
F4	2'-0"	1 3/8"	OMITTED	0.0632

DETAIL	M	N	LANE TIES	CONCRETE CU.YD./LIN.FT.
F1	1'-6"	7/8"	AS SHOWN	0.0484
F2	1'-6"	7/8"	OMITTED	0.0484
F3	2'-0"	1 3/8"	AS SHOWN	0.0610
F4	2'-0"	1 3/8"	OMITTED	0.0610
F5	2'-6"	1 7/8"	AS SHOWN	0.0737
F6	2'-6"	1 7/8"	OMITTED	0.0737





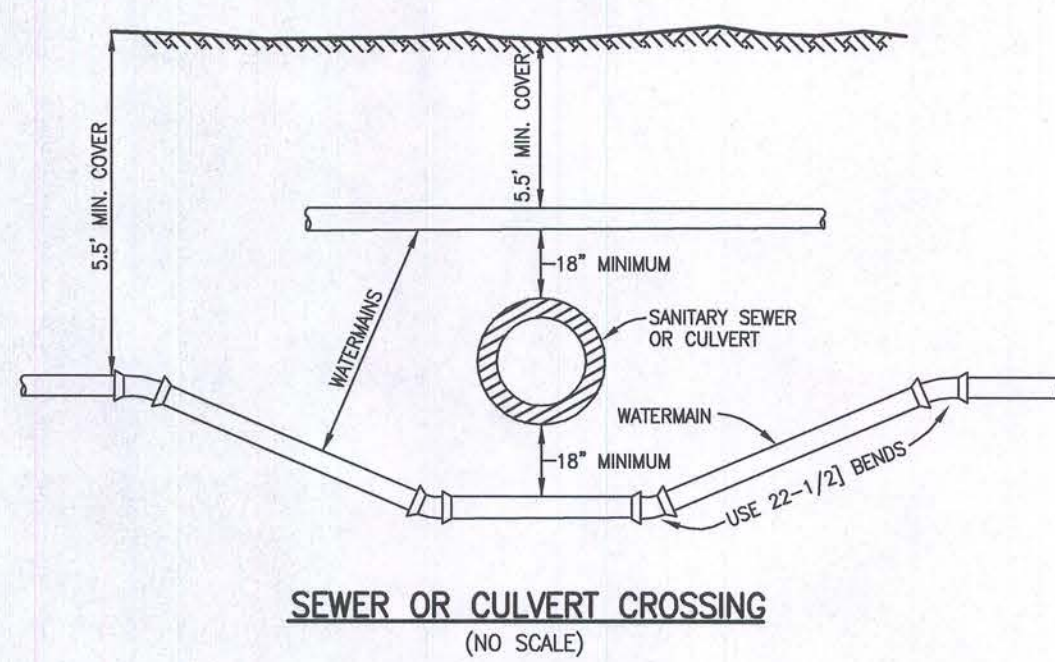
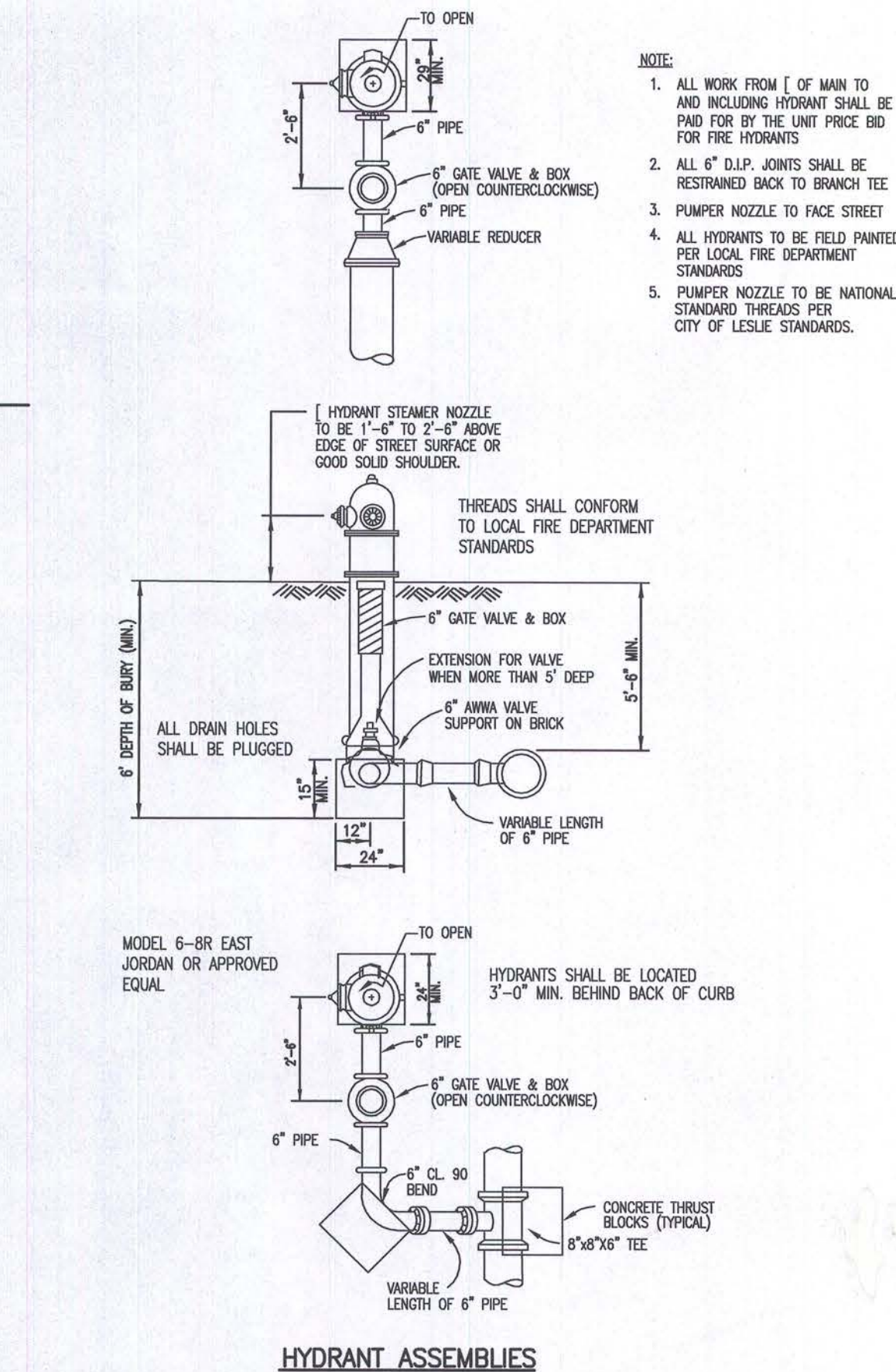
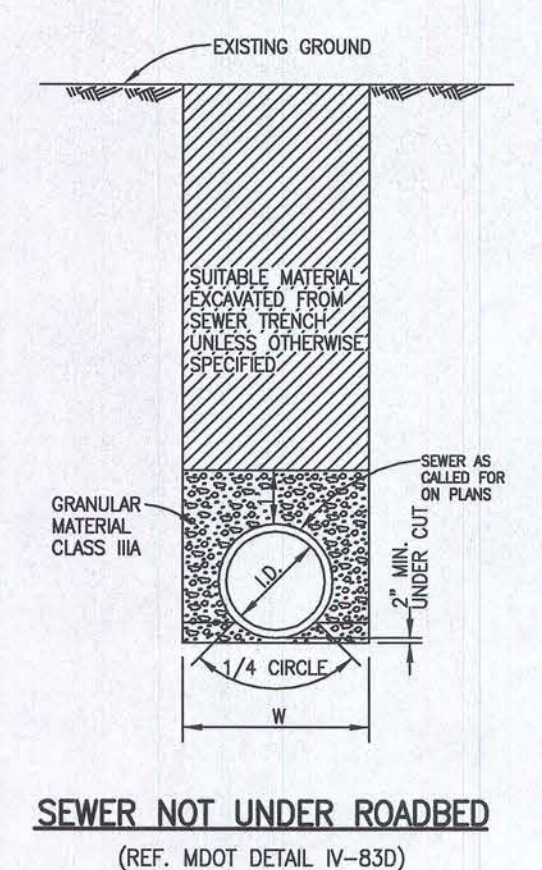
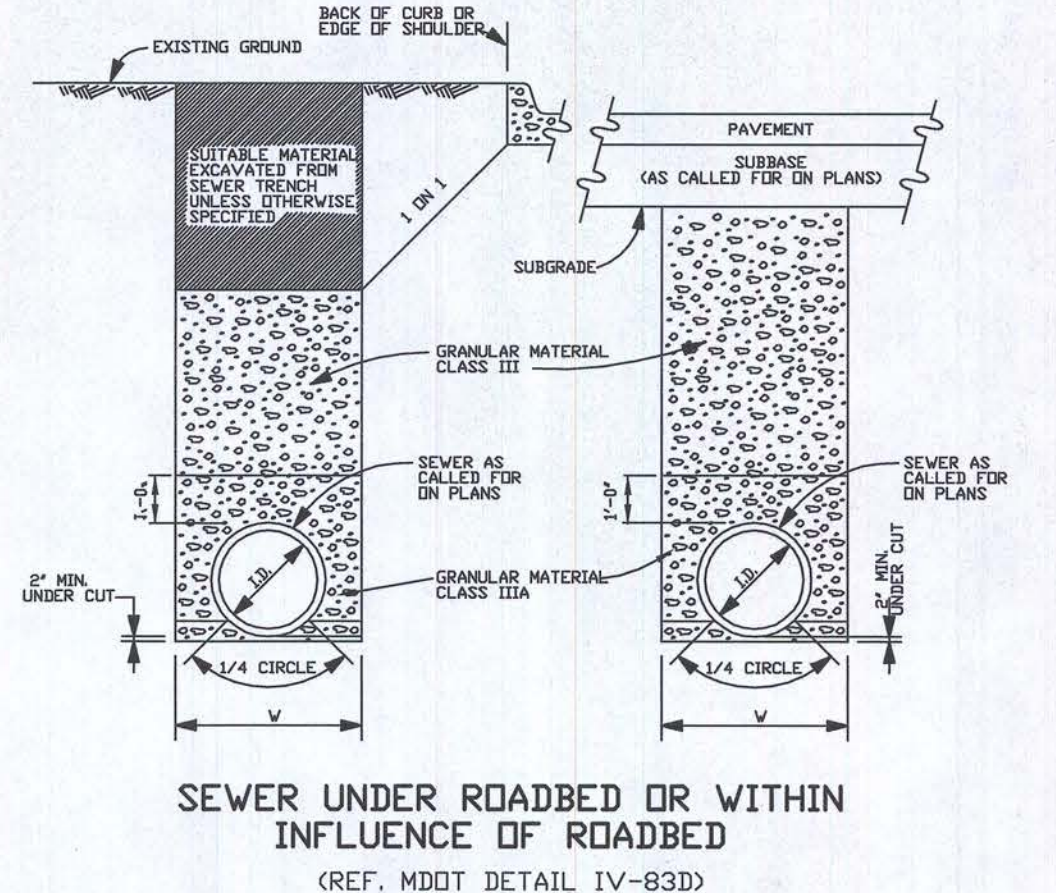
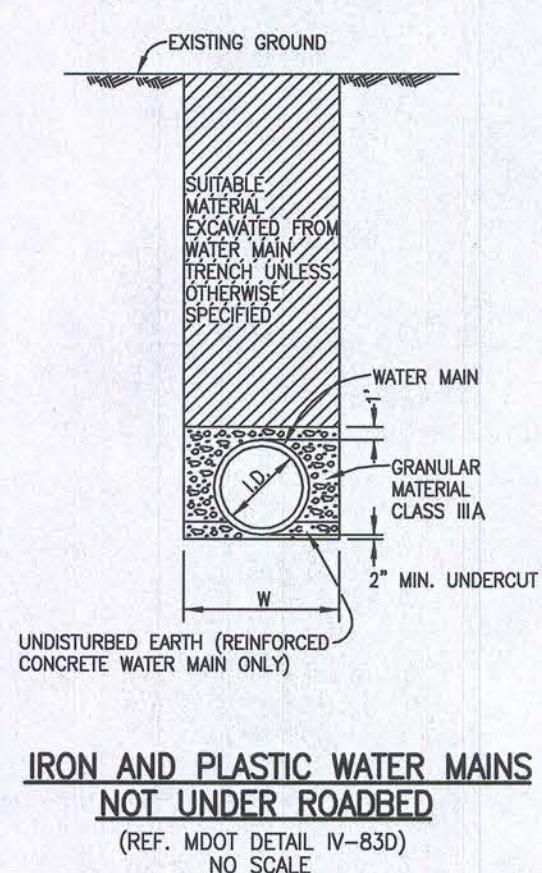
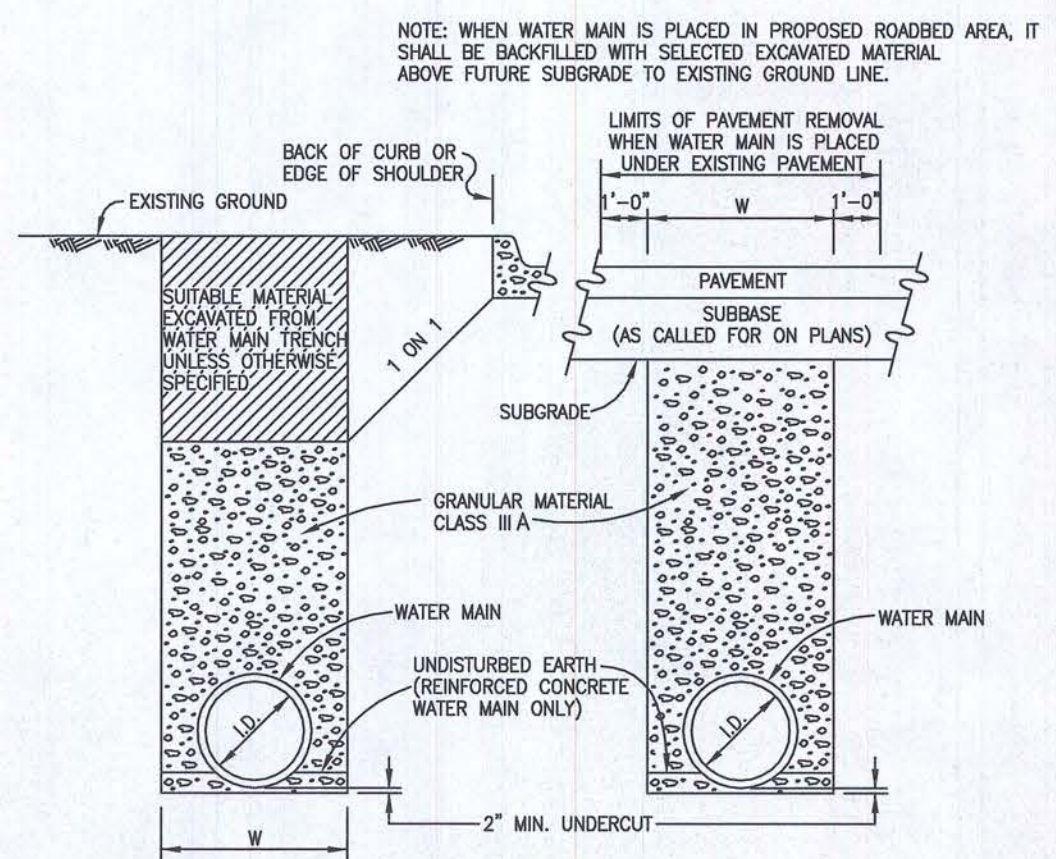
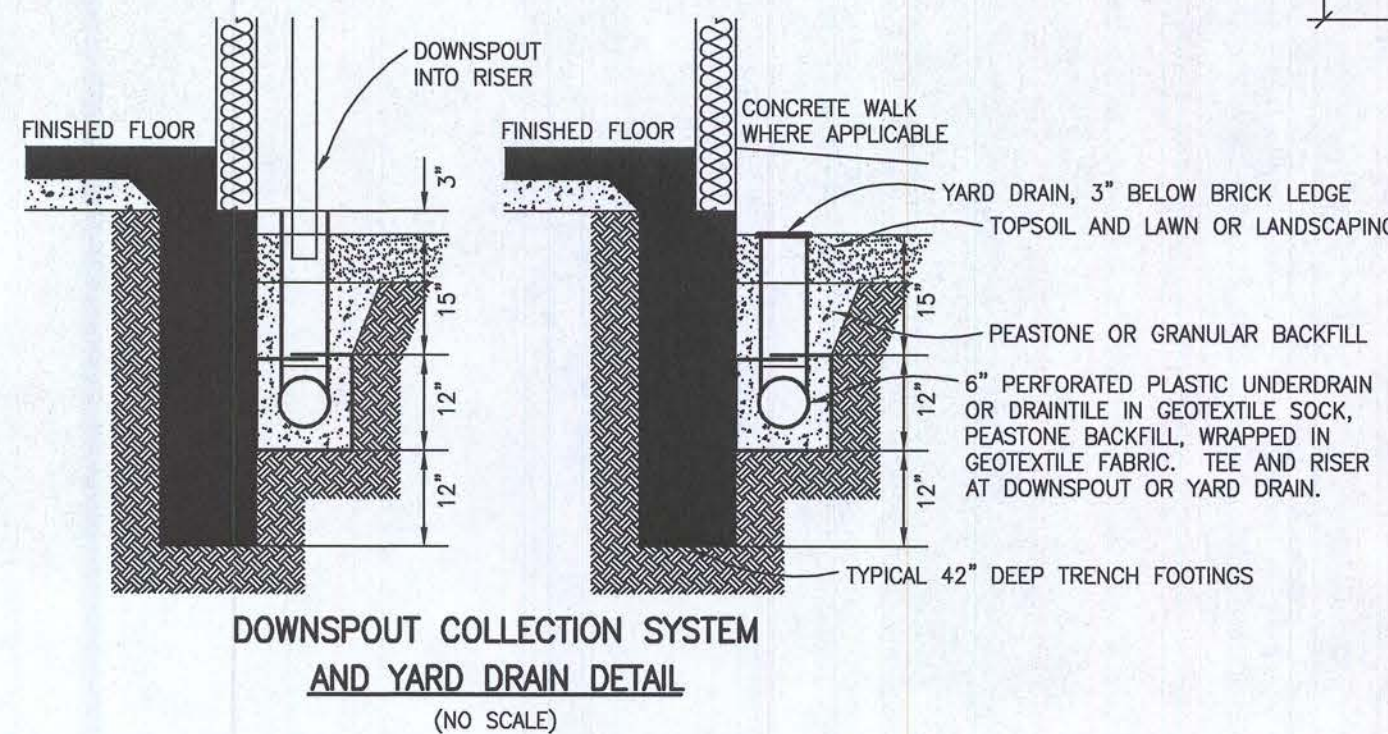
RIP-RAP SCHEDULE
PER MDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION

SIZE	CONC	END SECTION	90 S.F. 10 S.Y.	180 S.F. 20 S.Y.	270 S.F. 30 S.Y.	360 S.F. 40 S.Y.	IN-PLACE THICKNESS	LEAST DIMENSION	MAX. TO MIN. DIM. RATIO
12"	8	11	15	16	20	19	24	22	8"-16"
15"	8	11	15	16	20	19	24	22	8"-16"
18"	8	11	15	16	20	19	24	22	12" MIN.
21"	7	12	13	16	18	20	23	23	12" MIN.
24"	6	12	13	17	18	20	22	23	12" MIN.
27"	6	12	13	17	18	20	22	23	16" MIN.
30"	6	13	12	17	17	20	21	23	16" MIN.
36"	5	13	11	17	16	21	20	23	16" MIN.

LIMITS OF RIP-RAP

PLACE GEOTEXTILE FABRIC UNDER FES & RIP RAP

RIP-RAP DETAIL
NO SCALE



PIPE RESTRAINT SCHEDULE
GROUND BURIED PRESSURE PIPE - DUCTILE IRON AND PVC PIPE

PIPE DIAMETER	TEES, 90° BENDS	45° BENDS	22-1/2° BENDS	11-1/4° BENDS	DEAD ENDS	REDUCERS (ONE SIZE REDUCTION) *	REDUCERS (TWO SIZE REDUCTION) *
4	11	5	2	1	28	---	---
6	16	7	3	2	41	---	---
8	21	9	4	2	52	21	48
12	30	12	6	3	75	40	81
16	38	16	8	4	97	41	96
20	46	19	9	5	118	42	94
24	54	22	11	6	139	42	92
30	65	27	13	6	169	59	117
36	75	31	15	7	197	59	132

