GENERAL NOTES:

1. All work shall be done in accordance with the North Central Texas Council of Governments (NCTCOG 3rd Edition) Standard Specifications for Public Works Construction (Applicable Edition) and City of Rockwall Standards and Specifications.

3. The location, elevation, and size of existing utilities shown on the plans as obtained from the City of Rockwall and utility company records, are considered approximate. The engineer does not certify that all utilities are shown. The Contractor shall verify exact locations, sizes, and depths of existing utilities before beginning construction (including ordering of pre-cast manholes and concrete pipe if applicable.)

4. The Contractor shall contact Texas Safety System (800-DIG-TESS: 800-344-8377) and city of Rockwall (972-771-7730) and other utility companies 48 hours prior to locating existing utilities and or construction activities.

5. The Contractor shall preserve, protect and support all existing utilities at all times during construction. Any damage to utilities resulting from the contractor's operation shall be restored at his expense.

6. Saw cut, remove and replace pavements, sidewalks, curbs and gutters to confirm with City of Rockwall Public Works Pavement Cuts and Repair Standards Details.,

7. All disturbed pavement markings including, but not limited to, striping, traffic buttons, crosswalks shall be restored to same or improved condition as per City of Rockwall Specifications for Public Works Construction Details and all Addenda Thereto.

8. The Contractor shall provide for the diversion of pedestrians and vehicles during the progress of work in a manner satisfactory to the on-site City of Rockwall inspector and in accordance with the City of Rockwall Traffic Barricade Details.

9. The existing topography, public water, sanitary sewer, and storm sewer utility lines and appurtenances shown on these plans are based on survey provided by H.D. Fetty Land Surveying Company.

10. The contractor shall be responsible for determining the depth and location of existing underground utilities prior to trenching or excavation and is required to take any precautionary measures to protect all lines shown and/or any other underground utilities not of record or not shown on the plans. Contractor is responsible for contacting all the franchise utility companies, city utility departments and DIGTESS for locates prior to construction.

11. The contractor shall maintain daily contact with the city inspector during construction of improvements. No public sanitary sewer, water or storm sewer pipe shall be covered without approval of the city inspector. No subgrade material, stabilization or paving shall be applied without approval of the city inspector. The inspector may at any time cause any construction, installation, maintenance of improvements to cease when, in his judgment the City's Standard Construction Details have been violated and may require reconstruction or other work as may be necessary to correct the violation.

12. Construction plans without the City of Rockwall "Signature" stamp are not valid for construction and shall be removed from the construction site.

13. The contractor is responsible for obtaining all applicable city permits.

14. Erosion control and storm water management measures must be in place and comply with applicable city, state and federal regulations. Erosion and sedimentation control measures and practices shall be maintained at all times during construction, additional measures and practices shall be installed if deemed necessary by the city inspector.

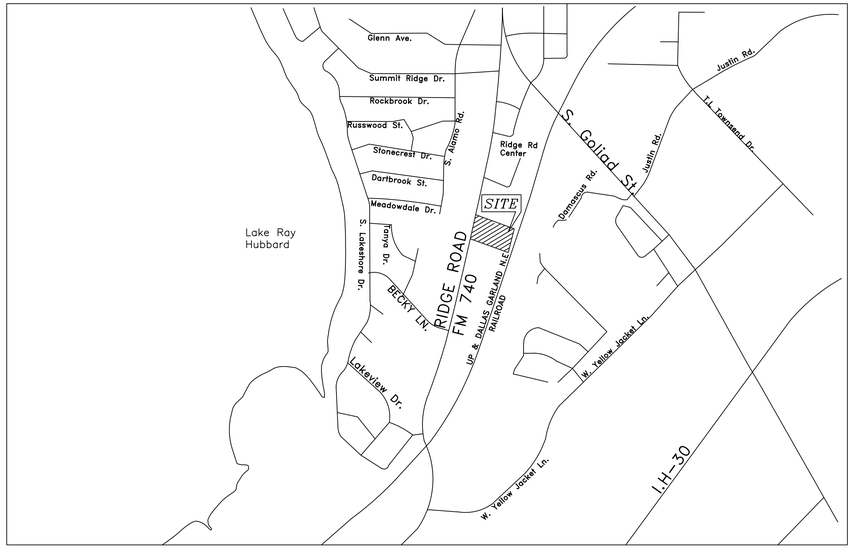
15. All excavations within the right of the way shall be filled and compacted within twenty-four (24) hours of completion of work and no excavation shall remain open for longer than 72 hours.

16. The contractor shall be responsible for providing "As-Builts", and/or "Record Drawings" to the Engineer of Record / Firm defining the location of improvements and any changes to the City approved drawings constructed in conjunction with the project including but not limited to public and private paving, grading, drainage, and utilities and appurtenances. Prior to final acceptance by the City, the Engineer of Record / FIRM shall provide the city inspector with a reproducible set of "As-Builts" and / or "Record Drawings" on 24" x 36" sheets and a digital copy of all files on compact disk (CD) in a City approved AutoCAD (.dwg) format of all drawings bearing the City's "Release for Construction" stamp.

CIVIL CONSTRUCTION PLANS FOR ROCKWALL COMMONS, PHASE-2

KEITH WHEELER, VOL. 1145, PG. 285
AN ADDITION TO THE CITY OF ROCKWALL, ROCKWALL COUNTY, TEXAS

ASBUILT



VICINITY MAP
MAPSCO: 20C-Y
NOT TO SCALE

INDEX OF SHEETS

SHEET NO.	TITLE
1	COVER SHEET.
2	FINAL PLAT (SHEET 1 OF 2).
3	FINAL PLAT (SHEET 2 OF 2).
4	SITE PLAN.
5	GRADING & PAVING NOTES.
6	GRADING & PAVING PLAN.
7	WATER LINE PLAN.
8	SANITARY SEWER LINES PLAN & PROFILES.
9	STORM SEWER PLAN.
10	STORM SEWER PROFILES (1 of 2).
11	STORM SEWER PROFILES (2 of 2).
12	DRAINAGE AREA MAP (PRE-DEVELOPMENT).
13	DRAINAGE AREA MAP (POST-DEVELOPMENT).
14	UNDERGROUND STORMWATER DETENTION COMPUTATIONS.
15	EROSION CONTROL PLAN.
16	EROSION CONTROL DETAILS.
17	LANDSCAPE PLAN.
18	CONCRETE RETAINING WALL DETAILS.
19	CONCRETE RETAINING WALL MISCELLANEOUS DETAILS.
20	60" HDPE PIPE DETAILS.

RECORD DRAWING
This Drawing Has Been Modified to Reflect Construction Records Provided To the Engineer.
5-31-2019

OWNER/ DEVELOPER: T ROCKWALL PHASE 2, LLC
16600 DALLAS PARKWAY, SUITE #300
DALLAS, TEXAS 75248
OWNER'S CONTACT: MUSHTAK KHATRI
E.MAIL: mkhatri@tabanigroup.com
TEL. (469) 726-3106

PLANS PREPARED BY:
JAHVANI CONSULTING ENGINEERS, INC.
2121 N. Josey Lane, Suite #100
Carrollton, Texas 75006
Tel. # (214) 718-9469
E.Mail jahvani@hotmail.com

STATE OF TEXAS
HOUSHANG JAHVANI
72242
REGISTERED
PROFESSIONAL ENGINEER
5-31-2019

FLOOD PLAN NOTE:
ACCORDING TO FEMA FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NUMBER 48397C0040L DATED SEP. 26, 2008, THIS PROPERTY LIES IN ZONE "X". THIS PROPERTY DOES NOT APPEAR TO LIE WHITHIN A 100-YEAR FLOOD PLAIN.

BENCHMARK
THE ON SITE BENCHMARK IS A TEX.DOT DISK MARKER FOUND AT THE NORTHWEST CORNER OF SITE.
(ELEVATION = 559.30)

ROCKWALL COMMONS, PHASE-2
JAHVANI CONSULTING ENGINEERS, INC.

Eastridge Center
Cab A, Sl 263
CAMERON LAND HOLDINGS, LLC
Volume 6489, Page 230

brass mon

S71°26'08"E 278.31'

3/8"irf

S71°14'00"E 231.77'

cirf

6893925.89' NORTH
2654125.72' EAST

15' ONCOR ELECTRIC DELIVERY CO ESMT
Inst No. 20160000021682

20' Utility Easement
Cab B, Slide 76

(approximate location)

B. J. T. LEWIS SURVEY, ABSTRACT NO. 255

D. ATKINS SURVEY, ABSTRACT NO. 1

DRAINAGE/DETENTION EASEMENT
Inst No. 20140000017541

15' ONCOR ELECTRIC DELIVERY CO ESMT
Inst No. 20160000021682

UTILITY EASEMENT
Inst No. 20140000017541

FIRE LANE & PUBLIC ACCESS EASEMENT
Inst No. 20140000017541

20' ROAD DEDICATION
Cab B, Slide 76

center line

RIDGE ROAD (F.M. 740)
(variable width public R.O.W.)

N12°20'00"E 150.68'

N07°59'24"E 114.43'

N12°32'48"E 77.99'

14' WATER ESMT
Vol 114, Pg 468

25' BUILDING LINE

Lot 6, Block A
Replat of Rockwall Commons
165,635 square feet
3.802 acres

T ROCKWALL PHASE 2, LLC
Inst. No. 20160000022646

LOT 5, BLOCK A
ROCKWALL COMMONS
Inst No. 20140000017541

UP & DALLAS N.E. R.R.
(100' R.O.W.)

S18°59'52"W 340.25'

S18°43'02"W 830.25'

6893585.64' NORTH
2653615.64' EAST

P.O.B.
1/2"irf

N12°16'15"E 21.10'

N17°58'53"E 100.50'

SWBT/AT&T ESMT
Vol 4991, Pg 96
CF# 2007-00374459

SWBT/AT&T ESMT
Vol 4811, Pg 167
CF# 2006-00365864

PORTION OF EX. FIRE LANE & ACCESS EASEMENT
Inst No. 20140000017541
to be abandoned
by this plat
(shaded)

UTILITY EASEMENT
(by this plat)

PROPOSED FIRE LANE & ACCESS EASEMENT
(by this plat)

UTILITY EASEMENT
Inst No. 20140000017541
to be abandoned
by this plat
(shaded)

N71°17'00"W 461.98'

WATER ESMT
Cab H, Slide 135

STORM ESMT
Cab H, Slide 135

20' BUILDING LINE
Cab H, Slide 135

FIRE LANE
Cab H, Slide 135

10' ELEC ESMT
Cab H, Slide 135

FIRE LANE & PUBLIC ACCESS EASEMENT

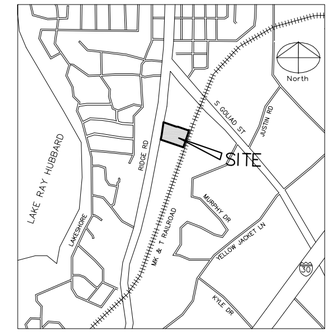
UTILITY EASEMENT

LOT 2, BLOCK A
REPLAT OF ROCKWALL COMMONS
Cabinet H, Slide 135
ROCKWALL COMMONS, LLC
Document No. 20140000018577

LOT 4, BLOCK A
REPLAT OF ROCKWALL COMMONS
Cabinet H, Slide 135
T ROCKWALL APARTMENTS TX, LLC
Volume 7271, Page 105

S18°43'02"W 130.90'

ELEC ESMT
Cab H, Slide 135



VICINITY MAP
nts

0 30 60 feet

SCALE: 1" = 30'

ASBUILT

NOTES:
brass mon = 3" TxDOT brass monument found for corner
cirf = 1/2" iron rod with orange plastic cap stamped "P&C 100871" found for corner
irf = iron rod found for corner

The property owner is responsible for the maintaining, repairing, and replacing of all drainage and detention systems

No portion of the subject property lies within any area of 100-year flood according to FEMA's Flood Insurance Rate Map No. 48397C0040L, dated September 26, 2008. Property is in Zone X (unshaded).

City Monuments:
1. COR-3 Aluminum disk stamped "City of Rockwall Survey Monument" on grass median in the CL of Summit Ridge Drive N=7023593.689 E=2594175.756
2. COR-11 Brass Disk stamped "City of Rockwall Survey MOnument" on the northeast side of Mims Road at teh southerly end of concrete headwall at the intersection of the northeast line of Mims Road with teh southeast line of I-30. N=7016792.505, E=2595405.639

BASIS OF BEARINGS:
Bearings are based upon the most northerly northeasterly line (South 71°26'08" East) of Lot 5, Block A as shown on plat of ROCKWALL COMMONS ADDITION, as recorded in Document No. 20140000017541 Plat Records, Rockwall County, Texas.

PROPOSED EASEMENT
LINE & CURVE TABLE

LINE	BEARING	DISTANCE
L3	N 71°17'00" W	15.38'
L4	N 18°43'00" E	38.25'
L5	S 71°17'00" E	10.00'
L6	S 18°43'00" W	10.00'
L7	N 71°17'00" W	10.00'
L8	N 18°43'00" E	10.00'

CURVE	DELTA	CHORD BEARING	RADIUS	ARC LENGTH	CD. LENGTH
C3	36°35'43"	N 01°08'17" W	25.04'	15.99'	15.72'
C4	37°45'50"	S 00°09'55" E	25.00'	16.48'	16.18'
C5	31°27'20"	S 03°19'10" E	49.00'	26.90'	26.56'
C6	33°02'39"	S 04°06'49" E	25.00'	14.42'	14.22'

EASEMENT TO BE ABANDONED
LINE & CURVE TABLE

LINE	BEARING	DISTANCE
L1	N 71°16'30" W	14.28'
L2	N 18°43'00" E	53.04'

CURVE	DELTA	CHORD BEARING	RADIUS	ARC LENGTH	CD. LENGTH
C1	37°45'50"	S 00°09'55" E	49.00'	32.30'	31.71'
C2	55°45'32"	S 08°49'56" W	25.00'	24.33'	23.38'

Final Plat

Rockwall Commons
Lot 6, Block A
Being a Replat of
Lot 5, Block A, Rockwall Commons
1 Lot, 3.802 Acres
in the B.J.T. Lewis Survey, Abstract No. 255
and the D. Atkins Survey, Abstract No. 1
City of Rockwall, Rockwall County, Texas
Case No. P2017-028

OWNER
T Rockwall Phase 2, LLC
16600 Dallas Parkway, Suite 300
Dallas, Texas 75248
(469) 726-3100

SURVEYOR
PIBURN & CARSON, LLC
801 E. Campbell Road, Suite 575
Richardson, Texas 75081
(214) 328-3500

Project #17026

OWNER'S CERTIFICATE

STATE OF TEXAS §
COUNTY OF ROCKWALL §

WHEREAS T Rockwall Phase 2, LLC, being the owner of a tract of land in the County of Rockwall, State of Texas, said tract being described as follows:

BEING a 3.802 acre tract of land situated in the D. Atkins Survey, Abstract No. 1 and the B. J. T. Lewis Survey, Abstract No. 255, and being all of Lot 5, Block A, Rockwall Commons, an addition to the City of Rockwall as recorded in Instrument Number 201400000017541 Official Public Records, Rockwall County, Texas (O.P.R.R.C.T.), same being a tract of land described in deed to T Rockwall Phase 2, LLC recorded in Instrument Number 201600000022646 O.P.R.R.C.T., all being more particularly described as follows:

BEGINNING at a 1/2 inch iron rod found for corner in the southeasterly line of Ridge Road (FM 740) (a variable width public right-of-way), said rod also being the north corner of Lot 2, Block A of ROCKWALL COMMONS, an addition to the City of Rockwall as recorded in Cabinet H, Slide 135 Plat Records, Rockwall County, Texas;

THENCE North 12°32'48" East, along said southeasterly line of Ridge Road for a distance of 77.99 feet to a 3 inch TxDOT brass monument found for corner;

THENCE North 07°59'24" East, continuing along said southeasterly line of Ridge Road for a distance of 114.43 feet to a 1/2 inch iron rod with orange cap stamped "P&C 100871" found for corner;

THENCE North 12°20'00" East, continuing along said southeasterly line of Ridge Road for a distance of 150.68 feet to a 3 inch TxDOT brass monument found for corner, said monument being the west corner of Eastridge Center, an addition to the City of Rockwall as recorded in Cabinet A, Slide 263 Plat Records, Rockwall County, Texas;

THENCE South 71°26'08" East, departing said southeasterly line of Ridge Road and traveling along the southwesterly line of said Eastridge Center for a distance of 278.31 feet to a 3/8 inch iron rod found for corner;

THENCE South 71°14'00" East, continuing along said Eastridge Center for a distance of 231.77 feet to a 1/2 inch iron rod with orange cap stamped "P&C 100871" found for corner, said rod being the south corner of said Eastridge Center, said rod also being in the northwesterly line of the UP & Dallas Northeast Railroad (a 100 foot right-of-way);

THENCE South 18°59'52" West, along said northwesterly line of the UP & Dallas Northeast Railroad for a distance of 340.25 feet to a 1/2 inch iron rod found for corner, said rod being the east corner of Lot 4, Block A of aforementioned ROCKWALL COMMONS;

THENCE North 71°17'00" West, departing said northwesterly line of the UP & Dallas Northeast Railroad, traveling along the northeasterly line of said Lot 4 and continuing along the northeasterly line of aforementioned Lot 2 for a total distance of 461.98 feet to the **POINT OF BEGINNING** and containing 3.802 acres, or 165,635 square feet of land, more or less.

We the undersigned owners of the land shown on this plat, and designated herein as **LOT 5A, BLOCK A, ROCKWALL COMMONS**, an addition to the City of Rockwall, Texas, and whose name is subscribed hereto, hereby dedicate to the use of the public forever all streets, alleys, parks, water courses, drains, easements and public places thereon shown on the purpose and consideration therein expressed. We further certify that all other parties who have a mortgage or lien interest in the **LOT 5A, BLOCK A, ROCKWALL COMMONS**, addition have been notified and signed this plat.

We understand and do hereby reserve the easement strips shown on this plat for the purposes stated and for the mutual use and accommodation of all utilities desiring to use or using same. We also understand the following;

1. No buildings shall be constructed or placed upon, over, or across the utility easements as described herein.

2. Any public utility shall have the right to remove and keep removed all or part of any buildings, fences, trees, shrubs, or other growths or improvements which in any way endanger or interfere with construction, maintenance or efficiency of their respective system on any of these easement strips; and any public utility shall at all times have the right of ingress or egress to, from and upon the said easement strips for purpose of construction, reconstruction, inspecting, patrolling, maintaining, and either adding to or removing all or part of their respective system without the necessity of, at any time, procuring the permission of anyone.

3. The City of Rockwall will not be responsible for any claims of any nature resulting from or occasioned by the establishment of grade of streets in the subdivision.

4. The developer and subdivision engineer shall bear total responsibility for storm drain improvements.

5. The developer shall be responsible for the necessary facilities to provide drainage patterns and drainage controls such that properties within the drainage area are not adversely affected by storm drainage from the development.

6. No house dwelling unit, or other structure shall be constructed on any lot in this addition by the owner or any other person until the developer and/or owner has complied with all requirements of the Subdivision Regulations of the City of Rockwall regarding improvements with respect to the entire block on the street or streets on which property abuts, including the actual installation of streets with the required base and paving, curb and gutter, water and sewer, drainage structures, storm structures, storm sewers, and alleys, all according to the specifications of the City of Rockwall; or

Until an escrow deposit, sufficient to pay for the cost of such improvements, as determined by the city's engineer and/or city administrator, computed on a private commercial rate basis, has been made with the city secretary, accompanied by an agreement signed by the developer and/or owner, authorizing the city to make such improvements at prevailing private commercial rates, or have the same made by a contractor and pay for the same out of the escrow deposit, should the developer and/or owner fail or refuse to install the required improvements within the time stated in such written agreement, but in no case shall the City be obligated to make such improvements itself. Such deposit may be used by the owner and/or developer as progress payments as the work progresses in making such improvements by making certified requisitions to the city secretary, supported by evidence of work done; or

Until the developer and/or owner files a corporate surety bond with the city secretary in a sum equal to the cost of such improvements for the designated area, guaranteeing the installation thereof within the time stated in the bond, which time shall be fixed by the city council of the City of Rockwall.

We further acknowledge that the dedications and/or exaction's made herein are proportional to the impact of the Subdivision upon the public services required in order that the development will comport with the present and future growth needs of the City; We, our successors and assigns hereby waive any claim, damage, or cause of action that We may have as a result of the dedication of exactions made herein.

_____
Owner

STATE OF TEXAS §
COUNTY OF DALLAS §

Before me, the undersigned authority, on this day personally appeared _____, known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he/she executed the same for the purpose and consideration therein stated.

Given upon my hand and seal of office, this _____ day of _____, 2017.

_____
Notary Public in and for the the State of Texas

_____
My Commission Expires:

_____
Signature of Party with Mortgage or Lien Interest

ASBUILT

SURVEYOR'S CERTIFICATION

NOW, THEREFORE KNOW ALL MEN BY THESE PRESENTS:

That I, **John R. Piburn, Jr.**, do hereby certify that I prepared this plat from an actual and accurate survey of the land, and that the corner monuments shown thereon were properly placed under my personal supervision.

STATE OF TEXAS · REGISTERED · JOHN R. PIBURN, JR. · 3689 · PROFESSIONAL LAND SURVEYOR

_____
John R. Piburn, Jr.
Registered Public Surveyor No. 3689

RECOMMENDED FOR FINAL APPROVAL

_____ _____
Planning and Zoning Commission Date

APPROVED

I hereby certify that the above and foregoing plat of an addition to the City of Rockwall, Texas, was approved by the City Council of the City of Rockwall on the _____ day of _____, 2017.

This approval shall be invalid unless the approved plat for such addition is recorded in the office of the County Clerk of Rockwall County, Texas, within one hundred eight (180) days from said date of final approval.

WITNESS OUR HANDS, this _____ day of _____, 2017.

_____ _____ _____
Mayor, City of Rockwall City Secretary City Engineer

Final Plat

Rockwall Commons
Lot 6, Block A
Being a Replat of
Lot 5, Block A, Rockwall Commons
1 Lot, 3.802 Acres
in the B.JT. Lewis Survey, Abstract No. 255
and the D. Atkins Survey, Abstract No. 1
City of Rockwall, Rockwall County, Texas

Case No. P2017-028

OWNER

T Rockwall Phase 2, LLC
16600 Dallas Parkway, Suite 300
Dallas, Texas 75248
(469) 726-3100

SURVEYOR

PIBURN & CARSON, LLC
801 E. Campbell Road, Suite 575
Richardson, Texas 75081
(214) 328-3500

Project #17026

NOTES:

1. NO CONSTRUCTION WORK TO BE DONE INSIDE THE RAIL ROAD RIGHT OF WAY WITHOUT LETTER OF PERMISSION FROM RAIL ROAD AUTHORITIES.
2. METAL SELF-LATCHING GATE SHALL BE USED ON THE DUMPSTER
3. FIRE LANE TO BE 6" MIN, 3600 PSI, 6.5 SACK.

SITE TABULATION:

APARTMENT BUILDING - 5 STORY OVER ONE LEVEL GARAGE

AVERAGE AREA = 1,059 S.F./ UNIT
ONE (1) BEDROOMS = 36,423 S.F. = 25% (49 UNITS)
TWO (2) BEDROOMS = 73,676 S.F. = 50% (67 INITS)
THREE (3) BEDROOMS = 38,105 SF = 25% (24 UNITS)

TOTAL APARTMENTS: 148,204 S.F , 140 UNITS

RETAIL BUILDING = 12,000 S.F

TOTAL PARKING SPACES REQUIRED = 284

1 BEDROOMS = 49 X 1.5 = 73.5
2 BEDROOMS = 67 X 2 = 134
3 BEDROOMS = 24 X 2.5 = 60
RETAIL = 12000 S.F X 4/1000 = 48
10% MIXED USE REDUCTION = -32

TOTAL PARKING SPACES PROVIDED = 288
139 SPACES - GARAGE
149 SPACES - OUTDOOR

HANDICAP PARKING SPACES REQUIRES = 8
HANDICAP PARKING SPACES PROVIDED = 9

0 30 60
GRAPHIC SCALE
1" = 30'

ASBUILT

RECORD DRAWING
This Drawing Has Been Modified to Reflect Construction Records Provided To the Engineer.
5-31-2019

01 TRASH ENCLOSURE ELEVATION
SCALE: NONE

02 TRASH ENCLOSURE PLAN
SCALE: NONE

03 MASONRY ENDWALL DETAIL
SCALE: NONE

DUMPSTER DETAIL
(NTS)

LEGEND:
FC-FC = FACE OF THE CURB TO FACE OF THE CURB
BC-BC = BACK OF THE CURB TO BACK OF THE CURB

PROJECT NO. SP2012-032

MJR Engineering LLC
New Construction • Engineering • Environmental Services
7953 PINKERTON COURT
PLANO, TEXAS 75025
PH: (469) 544-8150 FAX: (972) 767-3003
EMAIL: mkamal67@gmail.com
FIRM # F - 9928

Rockwall Commons, Phase-2
1301 Ridge Road
Rockwall, Texas

JAHVANI CONSULTING ENGINEERS, INC.
TBPE REGISTRATION NO. F-10198
2121 N. JOSEY LANE, #100
CARROLLTON, TEXAS 75006
TEL: (214) 718-9469
jahvani@hotmail.com

REVISIONS	DATE
SOUTHWEST ACCESS CONFIGURATION,NUMBER OF PARKING SPACES, AND LOCATION OF F.H	3-8-2017.

SEAL
STATE OF TEXAS
HOUSHANG JAHVANI
72242
REGISTERED
PROFESSIONAL ENGINEER
5-31-2019

DWG. TITLE:
SITE PLAN

PROJECT #:
DRAWN BY: HJ
SCALE: 1" = 30'
FILE NO:

DATE 5-31-2019

4 OF 20
SHEET NUMBER

GRADING NOTES:

2. EROSION CONTROL WILL BE REQUIRED DURING ALL PHASES OF CONSTRUCTION. EROSION CONTROL MEASURES PER CITY OF ROCKWALL, TEXAS, STANDARD REQUIREMENTS.

3. SUBGRADE PREPARATION: SURFACE VEGETATION AND ANY FOREIGN MATERIALS SHOULD BE STRIPPED AND REMOVED PRIOR TO CONSTRUCTION OF THE BUILDING PAD AND PAVEMENTS. IS ESTIMATED THAT THIS MAY CONSIST OF STRIPPING BETWEEN 3 TO 6 INCHES OF EXISTING SOILS AT THE SITE.

4. DRAINAGE: THE UPPER PORTION OF UTILITY EXCAVATIONS SHOULD BE BACKFILLED WITH PROPERLY COMPACTED CLAYEY SOILS TO MINIMIZE INFILTRATION OF SURFACE WATER. A CLAY "PLUG" SHOULD BE PROVIDED ON THE EXTERIOR OF THE BUILDING TO PREVENT WATER FROM GAINING ACCESS TO THE SUBGRADE BENEATH THE STRUCTURE. ALL GRADES MUST BE ADJUSTED TO PROVIDE POSITIVE DRAINAGE AWAY FROM THE STRUCTURE WHERE PAVING ABUTS THE STRUCTURE, CARE SHOULD BE TAKEN THAT THE JOINT IS PROPERLY SEALED AND MAINTAINED. ROOF DRAINS SHOULD DISCHARGE ON PAVEMENT OR BE EXTENDED AWAY FROM THE STRUCTURE IDEALLY.

5. WASTE CUT ON UNUSED PORTION OF LOT. LEAVE SMOOTH IN MOWABLE CONDITION.

6. CUT PAD AS REQUIRED FOR 2.0' OF SELECT FILL MATERIAL. CONSTRUCTION PAD SHOULD EXTEND AT LEAST 5 FEET OUTSIDE THE PERIMETER BEAMS.

7. THE EXPOSED SUBGRADE SHOULD BE SCARIFIED TO A MINIMUM DEPTH OF EIGHT INCHES, THE MOISTURE ADDED OR ALLOWED TO DRY AND RE-COMPACTED TO NOT LESS THAN 95 PERCENT STANDARD PROCTOR (ASTM D698). THE MOISTURE CONTENT AT THE TIME OF COMPACTION SHOULD WITHIN +2% OF THE OPTIMUM PROCTOR VALUE.

8. IN ALL FILL SECTIONS, THE FILL AND SUBGRADE SHOULD BE COMPACTED. THE FILL AND SUBGRADE SHOULD BE COMPACTED TO A MINIMUM DENSITY OF NINETY-FIVE (95) PERCENT OF ASTM D-698 TO LIMIT SETELMENT, ANY CLAY FILL MATERIALS BELOW PAVEMENTS OR FLATWORK SHOULD NOT BE COMPACTED OVER ONE HUNDRED (100) PERCENT DENSITY. FILLS SHOULD BE COMPACTED IN MAXIMUM 8-INCH ALL FILL TO BE COMPACTED USING A SHEEP'S FOOT ROLLER.

9. SELECT FILL: THE MATERIAL USED AS SELECT FILL CONSIST OF A NON ACTIVE SANDY CLAY OR CLAYEY SAND, HAVING A LIQUID LIMIT OF 40 OR LESS AND PLASTICITY INDEX (P.I.) VARYING FROM 4 TO 15 A MINIMUM OF 15 TO 45 PERCENT OF THE SOIL SHOULD PASS THE NO. 200 SIEVE. THE MATERIAL SHOULD BE SPREAD IN LOOSE HORIZONTAL LIFTS, LESS THAN 9 INCHES THICK, AND BE UNIFORMLY COMPACTED TO A MINIMUM OF 95 PERCENT OF THE MAXIMUM STANDARD PROCTOR DENSITY BETWEEN -3 TO +3 PERCENTAGE POINTS OF IT'S OPTIMUM MOISTURE CONTENT AS DETERMINED BY ASTM D-698. IT IS RECOMMENDED THE SELECT FILL PLACEMENT BEGIN IMMEDIATELY AFTER THE SUBGRADE HAS BEEN PREPARED.

10. PERFORM FIELD DENSITY TESTS TO VERIFY COMPACTION AT A FREQUENCY OF ONE TEST PER ONE FOOT OF FILL FOR EVERY 2000 SQ. FT. OF COMPACTED AREA.

11. MAINTAIN THE MOISTURE CONTENT OF BOTH FILL AND NATURAL SOIL UNTIL IT IS PERMANENTLY SEALED WITH THE FLOOR SLAB OR PAVEMENT.
12. SAND SHOULD NOT BE USED AS A LEVELING COURSE UNDER FLOOR SLAB AND PAVEMENT, SINCE IT PROVIDES READY PATH FOR MOISTURE TO GET IN.

13. POSITIVE DRAINAGE MUST BE PROVIDED AWAY FROM THE STRUCTURE TO PREVENT THE PONDING OF WATER IN THE SELECT FILL.

14. CARE MUST BE TAKEN THAT BACKFILL AGAINST THE EXTERIOR FACE OF GRADE BEAMS IS PROPERLY COMPACTED ON-SITE CLAY. THE SELECT FILL SHOULD NOT EXTEND OUTSIDE THE LIMITS OF THE STRUCTURE.

15. THE NEED TO LIME STABILIZE WILL BE DETERMINED BY TESTING FOLLOWING SUBGRADE EXCAVATION. DEPENDING ON SOIL TYPE AND WEATHER CONDITION TO BE DETERMINED BY G.C. OWNER AND OWNER'S ENGINEER, A COPY OF GEOTECH REPORT MUST BE SUBMITTED TO THE CITY..

PAVING NOTES

1. ALL CONSTRUCTION SHALL CONFORM TO CITY AND NCTCOG 3RD EDITION STANDARDS AND SPECIFICATIONS. CONTRACTOR IS RESPONSIBLE FOR OBTAINING A CURRENT COPY OF THE CITY STANDARD DETAILS AND SPECIFICATIONS.
2. CONTRACTOR MUST MATCH GRADE AT PROPERTY LINE AND NOT OBSTRUCT EXISTING DRAINAGE PATTERNS PRESENTLY DIRECTED ONTO THE PROPERTY.
3. ALL DIMENSIONS SHOWN ARE TO FACE OF CURB UNLESS OTHERWISE NOTED.
4. ALL CURB SHALL BE INTEGRAL WITH CONCRETE PAVEMENT. ALL JOINTS SHALL CONTINUE THROUGH CURB.
5. REINFORCEMENT SHALL NOT BE CONTINUOUS THROUGH EXPANSION JOINTS.
6. CONTRACTOR SHALL SAW-CUT EXISTING PAVEMENT AND CURBS TO PROVIDE A SMOOTH CONNECTION AND INSURE POSITIVE DRAINAGE. ALL SAWCUTS OF EXISTING PAVEMENT SHALL BE FULL DEPTH OF PAVEMENT.
7. CONTRACTOR SHALL COORDINATE INSTALLATION OF ALL SIGNS, PAVEMENT MARKINGS AND OTHER TRAFFIC CONTROL DEVICES WITH OTHER CONTRACTORS ON SITE.
8. DRIVEWAY CONSTRUCTION MUST BE COMPLETED WITHIN 72 HOURS AFTER CURB CUT HAS BEGUN.
9. ALL CONSTRUCTION SHALL ADHERE TO RECOMMENDATIONS IN THE GEOTECHNICAL REPORT ISSUED FOR THIS SITE.
10. PAVEMENT SHALL BE 6-INCH THICK CONCRETE PAVEMENT.
11. CONCRETE STRENGTH SHALL BE A MINIMUM OF 3600 psi AT 28 DAYS (MIN 6.5 SACK MIX.
12. PAVEMENT REINFORCEMENT SHALL BE NO. 3 BARS AT 18" O.C.E.W.
13. CONTRACTION JOINTS SHALL BE SPACED ACCORDING TO CITY OF ROCKWALL REQUIREMENTS.
14. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROTECT ALL PUBLIC UTILITIES IN THE CONSTRUCTION OF THIS PROJECT. ALL MANHOLES, CLEANOUTS, VALVE BOXES, FIRE HYDRANTS, etc. MUST BE ADJUSTED TO PROPER LINE AND GRADE BY THE CONTRACTOR PRIOR TO AND AFTER THE PLACING OF PERMANENT PAVING.
15. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL VERIFY THE LOCATION OF VALVES, MANHOLES, FIRE HYDRANTS, GAS/TELEPHONE/ELECTRICAL LINES THAT ARE AFFECTED BY THE CONSTRUCTION.
16. SAW CUTTING SHALL BE DONE WITHIN 8 HOURS OF POUR OR AS SOON AS CONCRETE CAN SUPPORT WEIGHT AND CAN PROVIDE A NEAT CUT WHICH IS TRUE IN ALIGNMENT.
17. RADIAL JOINTS SHALL BE NO SHORTER THAN 1.5 FEET.
18. CONTRACTOR SHALL USE A THICKENED EDGE EXPANSION JOINT AROUND THE PERIMETER OF ANY BLOCKOUT IN THE CONCRETE PAVING.
19. ALL CONSTRUCTION JOINTS SHALL BE SAWN, CLEANED OF DEBRIS, BLOWN DRY AND IMMEDIATELY SEALED PER N.C.T.C.O.G. SPECIFICATIONS.
20. ANCHOR JOINTS ARE REQUIRED AT ALL CONNECTIONS TO EXISTING PAVEMENT.
21. SUBGRADES OF PAVING AREAS SHALL BE MAINTAINED IN A MOIST CONDITION UNTIL THE PAVEMENT/CONCRETE IS PLACED.
22. THE CONTRACTOR SHALL PROVIDE AS-BUILT PLANS TO THE ENGINEER SO THAT THE ENGINEERING PLANS MAY BE REVISED TO REFLECT AS-BUILT CONDITIONS.
23. TRAFFIC BARRICADES WILL BE REQUIRED AT ALL PROPOSED DRIVE CONNECTIONS AND CONSTRUCTION IN PUBLIC RIGHT-OF-WAY. BARRICADES AND TRAFFIC CONTROL SHALL ADHERE TO THE APPLICABLE INSTALLATION.
24. WATER MAY NOT BE APPLIED TO THE SURFACE OF CONCRETE PAVING TO IMPROVE THE WORKABILITY.

ASBUILT

PROJECT NO. SP2012-032

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REVISIONS DATE

SEAL

DWG. TITLE:
GRADING & PAVING NOTES

PROJECT #:
DRAWN BY: HJ
SCALE: 1" = 30'
FILE NO:

DATE 5-31-2019

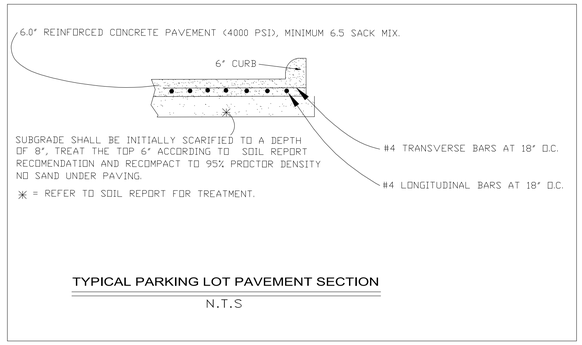
5 OF 20
SHEET NUMBER

ASBUILT

NOTES:

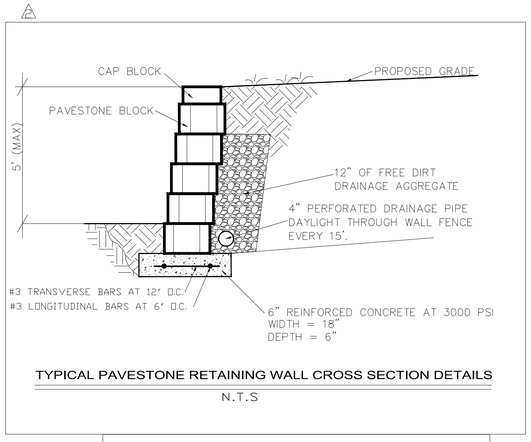
1. NO CONSTRUCTION WORK TO BE DONE INSIDE THE RAIL ROAD RIGHT OF WAY WITHOUT LETTER OF PERMISSION FROM RAIL ROAD AUTHORITIES.

2. FIRE LANE TO BE 6" MIN, 3600 PSI, 6.5 SACK MIX.



TYPICAL PARKING LOT PAVEMENT SECTION

N.T.S



TYPICAL PAVESTONE RETAINING WALL CROSS SECTION DETAILS

N.T.S

RECORD DRAWING

This Drawing Has Been Modified to Reflect Construction Records Provided To the Engineer.

5-31-2019

LEGEND:

TC = TOP OF THE CURB ELEVATION.
BC = BACK OF THE CURB.
TW = TOP OF THE RETAINING WALL ELEVATION.
BW = BOTTOM OF THE RETAINING WALL ELEVATION.

GRADING AND PAVING NOTES:

1. MAXIMUM SLOPES ALLOWED BY THE CITY OF ROCKWALL SHALL BE 3:1 SLOPE. ALL SLOPE AREAS WHICH EXCEED THE ABOVE NOTED SLOPE REQUIREMENTS ARE TO BE RE-GRADED OR RETAINED UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER. ALL SLOPES ARE TO BE GRADED SO AS TO ACHIEVE THE MOST GRADUAL SLOPE POSSIBLE. UNLESS OTHERWISE NOTED ON THE APPROVED CONSTRUCTION PLANS.

2. FINAL GRADING - RE-STABLISH ALL DRAINAGE SWALES, AS NECESSARY, TO ACHIEVE CONFORMANCE TO THE DRAINAGE PATTERS SHOWN ON THE APPROVED GRADING PLANS. GRADE TO DRAIN ANY LOCATIONS WHICH MAY HOLD WATER OR OBSTRUCT APPROVED DRAINAGE FLOW PATTERNS. ALL GRADED AREA, INCLUDING SLOPES, ARE TO BE BROUGHT TO A FINAL GRADE SURFACE THAT IS SMOOTH AND UNIFORM, BEING RELATIVELY FREE OF EROSION WASHOUTS, TIRE RUTS, DIRT CLODS, SILT DEPOSITS, ETC., CARE SHOULD BE TAKEN TO RE-GRADE ANY ROUGH SURFACE AREAS PRIOR TO THE APPLICATION OF EROSION MATTING, GRASS SEEDING, OR SOD.

3. INTERIOR EROSION PROTECTION (ONLY NECESSARY IF GRASS IS NOT ESTABLISHED AT THE SITE) - THE FIRE LANE AND INTERIOR PAVING SECTIONS OF THE PROJECT SHALL HAVE SUFFICIENT ERDSION PROTECTION. SILT FENCING, ERDSION MATTING, OR OTHER APPROVED EROSION BMP'S ARE TO BE IN PLACE AND MAINTAINED TO CONTAIN SILT AND STABILIZE THE SOIL WERE NECESSARY.

4. GRASS IS TO BE ESTABLISHED IN ALL DISTURBED AREAS. GRASS SHALL BE AT LEAST 1-INCH IN HEIGHT WITH A 75% TO 80% COVERAGE OF ALL DISTURBED AREAS PRIOR TO ENGINEERING ACCEPTANCE..

5. INSTALL AND MAINTAIN A 10-FOOT CLEAR PATH AROUND THE BUILDING WITH A MAXIMUM SLOPE OF 5%.

6. ENGINEERED RETAINING WALL INSPECTION - THE CITY REQUIRES THAT THE DESIGN ENGINEER FOR ANY RETAINING WALL WHICH IS FOUR-FEET IN HEIGHT OR TALLER, SHALL PERIODICALLY INSPECT, OR MAKE ARRANGEMENT FOR HIS DESIGNATED REPRESENTATIVE TO PERIODICALLY INSPECT, THE RETAINING WALL CONSTRUCTION TO VERIFY THAT WALL IS COMPLIANT WITH DESIGN AND CONSTRUCTION METHODS. THE LETTER SHALL CONTAIN THE SEAL AND SIGNATURE OF THE DESIGN ENGINEER.

7. ALL PAVING TO BE INSTALLED.

8. ALL PAVEMENT CURBS SHALL BE BACKFILLED.

9. CONTRACTOR TO ADDRESS ANY MISCELLANEOUS WATER POCKETS IN THE PARKING AREA OR FIRE LANES. THE PARKING AREAS AND FIRE LANES SHOULD BE RELATIVELY FREE OF ANY "BIRD BATHS" OR STANDING WATER.

10. THE FIRE LANE IS TO RE-PAINTED, WHERE NECESSARY, IF THERE ARE LOCATIONS WHERE THE FIRE LANE IS SCUFFED OR IS FLAKING. THE LOCATIONS REQUIRING RE-PAINTING SHALL BE SANDBLASTED, PRIOR TO RE-PAINTING.

11. ALL FIRE LANES ARE TO BE SAWN AND CRACK SEALED. ALL MISCELLANEOUS RANDOM CRACKS ARE TO BE ROUTED AND SEALED. ALL EXPANSION JOINTS ARE TO BE SEALED IN THE FIRE LANE.

12. ALL PARKING LOT AND HANDICAP STRIPING ALONG WITH ALL ASSOCIATED SIGNS, MUST BE INSTALLED.

13. REPAIR ALL "NICKS" AND "GOUGES" IN THE FIRE LANE CURBS.

14. REMOVE ALL CONSTRUCTION RELATED TRASH, MATERIAL, BRUSH, CONCRETE, AND ASPHALT DEBRIS, ETC., FROM THE SITE AND PROPERLY DISPOSED.

15. COMPLETE CONSTRUCTION OF THE DUMPSTER ENCLOSURE.

16. STORMWATER DETENTION SYSTEM SHALL BE INSTALLED AND FULLY FUNCTIONING PRIOR TO ANY PAVING CONSTRUCTION, INCLUDING SLAB WORK.

PROJECT NO. SP2012-032

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REVISIONS	DATE
1 Grading on driveway east side of the building.	
2 Retaining Wall Details	2-15-2015
3 Monument sign with retaining wall location	11-15-2017

SEAL

STATE OF TEXAS
HOUSHANG JAHVAN
REGISTERED
PROFESSIONAL ENGINEER
5-31-2019

DWG. TITLE:
GRADING AND PAVING PLAN.

PROJECT #:
DRAWN BY: HJ
SCALE: 1" = 30'
FILE NO:

DATE 5-31-2019

6 OF 20

SHEET NUMBER

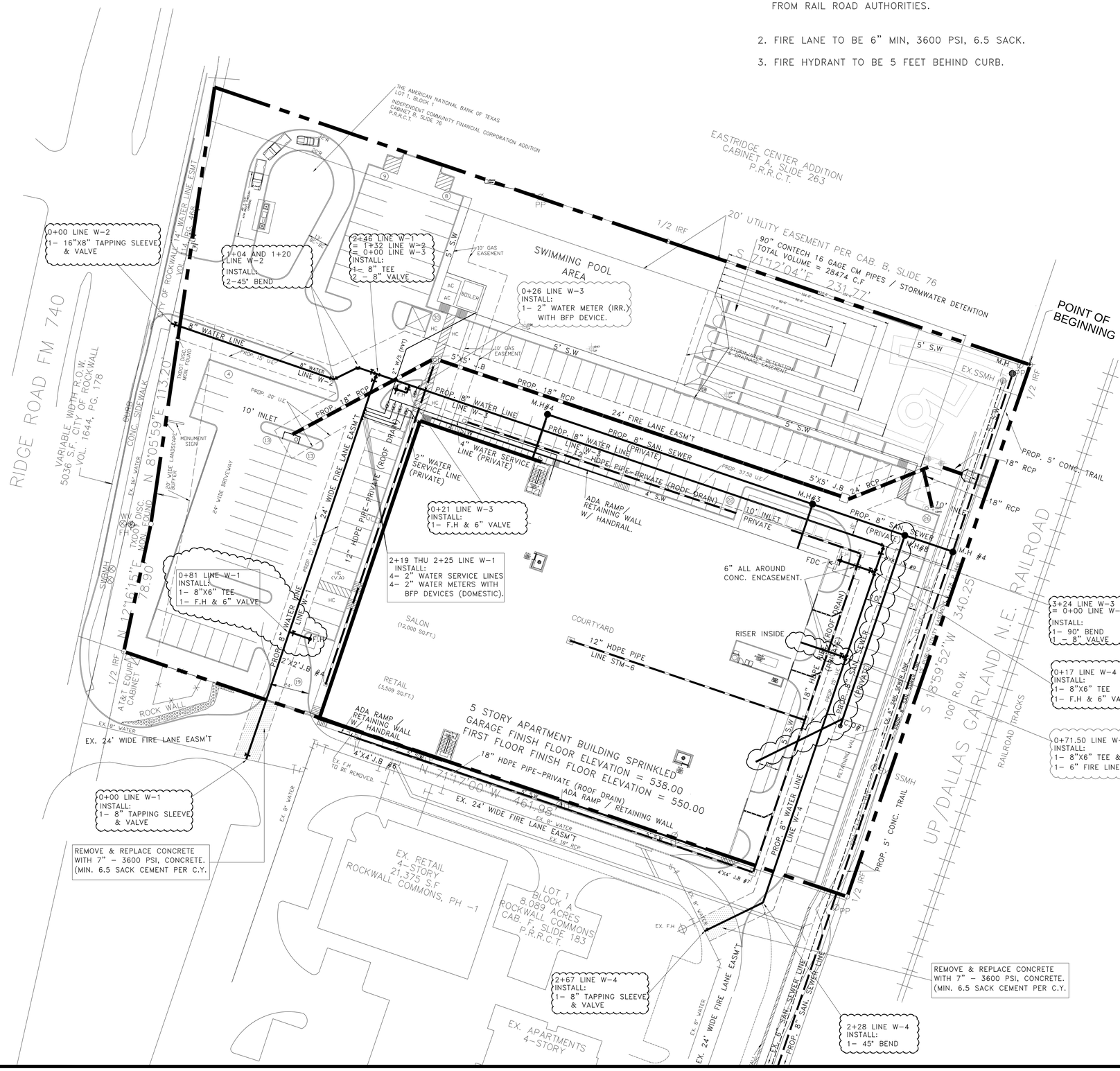
NOTES:

1. NO CONSTRUCTION WORK TO BE DONE INSIDE THE RAIL ROAD RIGHT OF WAY WITHOUT LETTER OF PERMISSION FROM RAIL ROAD AUTHORITIES.

2. FIRE LANE TO BE 6" MIN, 3600 PSI, 6.5 SACK.

3. FIRE HYDRANT TO BE 5 FEET BEHIND CURB.

ASBUILT



GENERAL NOTES:

1. ALL WORK SHALL BE IN ACCORDANCE WITH CITY OF ROCKWALL STANDARDS AND SPECIFICATIONS AND NCTCOG 3RD EDITION.
2. ENGINEERING DEPARTMENT IS TO BE NOTIFIED 48 HOURS PRIOR TO ANY CONSTRUCTION.
3. ALL WATER LINES TO HAVE 42 INCH TYPICAL COVER OR AS REQUIRED TO CLEAR OTHER UTILITIES.
4. 8" WATER MAINS SHALL BE PVC AWAA C900 (DR 14) CLASS 200.
5. 8" SANITARY SEWER LINE SHALL BE PVC ASTM D2034 (SDR 35).
6. TRENCH EXCAVATION FOR TRENCHES 5 FEET OR MORE IN DEPTH SHALL BE IN ACCORDANCE WITH ALL PROVISIONS OF PART 1926, SUBPART P-EXCAVATIONS, TRENCHING AND SHORING OF THE OCCUPATIONAL SAFETY AND HEALTH'S STANDARDS AND INTERPRETATIONS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CONFORM TO THE ABOVE STATED PROVISIONS AND TO SUPPLY TRENCH SAFETY PLANS IF REQUIRED BY THE CITY.
7. THE LOCATION OF ALL UTILITIES INDICATED ON THE PLANS ARE TAKEN FROM AVAILABLE PUBLIC RECORDS. THE EXACT LOCATION AND DEPTH OF ALL UTILITIES INDICATED MUST BE DETERMINED BY THE CONTRACTOR. IT SHALL BE THE DUTY OF THE CONTRACTOR TO ASCERTAIN WHETHER ANY ADDITIONAL FACILITIES OTHERS THAN THOSE SHOWN ON THE PLANS MAY BE PRESENT.
8. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROTECT ALL EXISTING UTILITIES IN THE CONSTRUCTION OF THIS PROJECT. ANY UTILITIES DAMAGE DURING THE CONSTRUCTION OF THIS PROJECT SHALL BE REPAIR AT THE CONTRACTOR'S EXPENSE.
9. ALL SANITARY SEWER MANHOLES SHALL BE PRECAST UNLESS OTHERWISE NOTED. MANHOLES TO BE RAVEN LINED OR APPROVED EQUAL TO BE PRESSURE AND SPARK TESTED.
10. ALL MANHOLES AND RIMS AND VALVE STACKS TO BE ADJUSTED TO FINAL PAVING GRADE. ALL MANHOLES IN PAVING OR SWALES TO BE SEALED.
11. CONTRACTOR SHALL STAKE OUT CURB LINE TO ENSURE NO SANITARY SEWER MH OR WATER VALVES FALL ON A CURB. CONTRACTOR SHALL ENSURE NO FIRE HYDRANT OBSTRUCTS ANY PORTION OF A SIDEWALK.
12. CONTRACTOR SHALL CONSTRUCT A 12"X12" CONCRETE PAD AROUND ALL WATER VALVES LOCATED IN A GRASS AREA.
13. IRRIGATION METER REQUIRES A REDUCED PRESSURE ZONE BACKFLOW PREVENTION DEVICE (RPZ). SEE LANDSCAPE PLANS.
14. CONTRACTOR SHALL COMPLETE ALL FILL OPERATIONS PRIOR TO INSTALLING ANY UTILITIES (i.e., WATER, SANITARY, SEWER, STORM, SEWER). AFTER FILL OPERATIONS ARE COMPLETED, CONTRACTOR SHALL EXCAVATE UTILITY TRENCH, INSTALL UTILITIES, COMPACT TRENCH AND ENSURE ALL PUBLIC WORKS INSPECTIONS ARE PROPERLY PERFORMED.
15. FOR FRANCHISE UTILITY LOCATOR SERVICES, TEXAS ONE CALL AT 1-800-344-8377, OR UTILITY LOCATOR AT 1-800-DIG-TESS.
16. FOR SOLID WASTE SERVICE INFORMATION AND CONTAINER DELIVERY, PLEASE CONTACT: ALLIED WASTE SERVICES INC., DISTRICT MANAGER, 1450 E. CLEVELAND, HUTCHINS, TEXAS, 75141-9317, TELEPHONE 972-225-4207.
17. CONTRACTOR SHALL ENSURE THERE ARE NO OBSTRUCTION OR OVERHANGS TO THE SIDEWALKS (i.e., FIRE HYDRANTS, POWER POLES, ETC.).
18. FIRE LANES, WATER MAINS, AND FIRE HYDRANTS SHALL BE INSTALLED, OPERATIONAL, CONSTRUCTION AND C.O. ISSUED PRIOR TO ANY CONSTRUCTION ABOVE THE FOUNDATION.
19. ENGINEERING PLANS MUST SHOW THE FIRE DEPARTMENT CONNECTION AND FIRE SPRINKLES LEAD INTO THE FACILITY. FIRE SPRINKLER LINE SHALL BE CLASS 200 AND SHALL BE INSTALLED BY A LICENSED CONTRACTOR. THE CONTRACTOR SHALL TEST AND THE FIRE DEPARTMENT INSPECTOR SHALL INSPECT THE FIRE SPRINKLER LINE INSIDE THE FIRE CLOSET AT THE FLANGE. FIRE LINE LEAD TO BUILDING TO BE INSPECTED BY FIRE DEPARTMENT.
20. IF THE WATER MAIN IS DEEPER THAN 5 FEET AT THE FIRE HYDRANT CONNECTION, CONTRACTOR SHALL INSTALL GRADE LOCK.
21. NO METER BOXES ALL ALLOWED IN SIDEWALK OR OTHER PAVING.
22. ALL DOMESTIC AND IRRIGATION SERVICE REQUIRED DOUBLE CHECK AND BACK FLOW PREVENTION DEVICES.
23. BLUE EMS DISKS TO BE INSTALLED ON THE WATER LINE AT EVERY CHANGE IN DIRECTION, VALVE, FIRE HYDRANT, AND SERVICES.
24. GREEN EMS DISKS TO BE INSTALLED ON THE SANITARY SEWER AT EVERY CHANGE IN DIRECTION, MANHOLE, CLEANOUT, AND SERVICES.
25. ALL PRIVATE SEWER TO BE MAINTAINED BY PROPERTY OWNER.

RECORD DRAWING
This Drawing Has Been Modified to Reflect Construction Records Provided To the Engineer.
5-31-2019

PROJECT NO. SP2012-032

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CONSULTING ENGINEERS

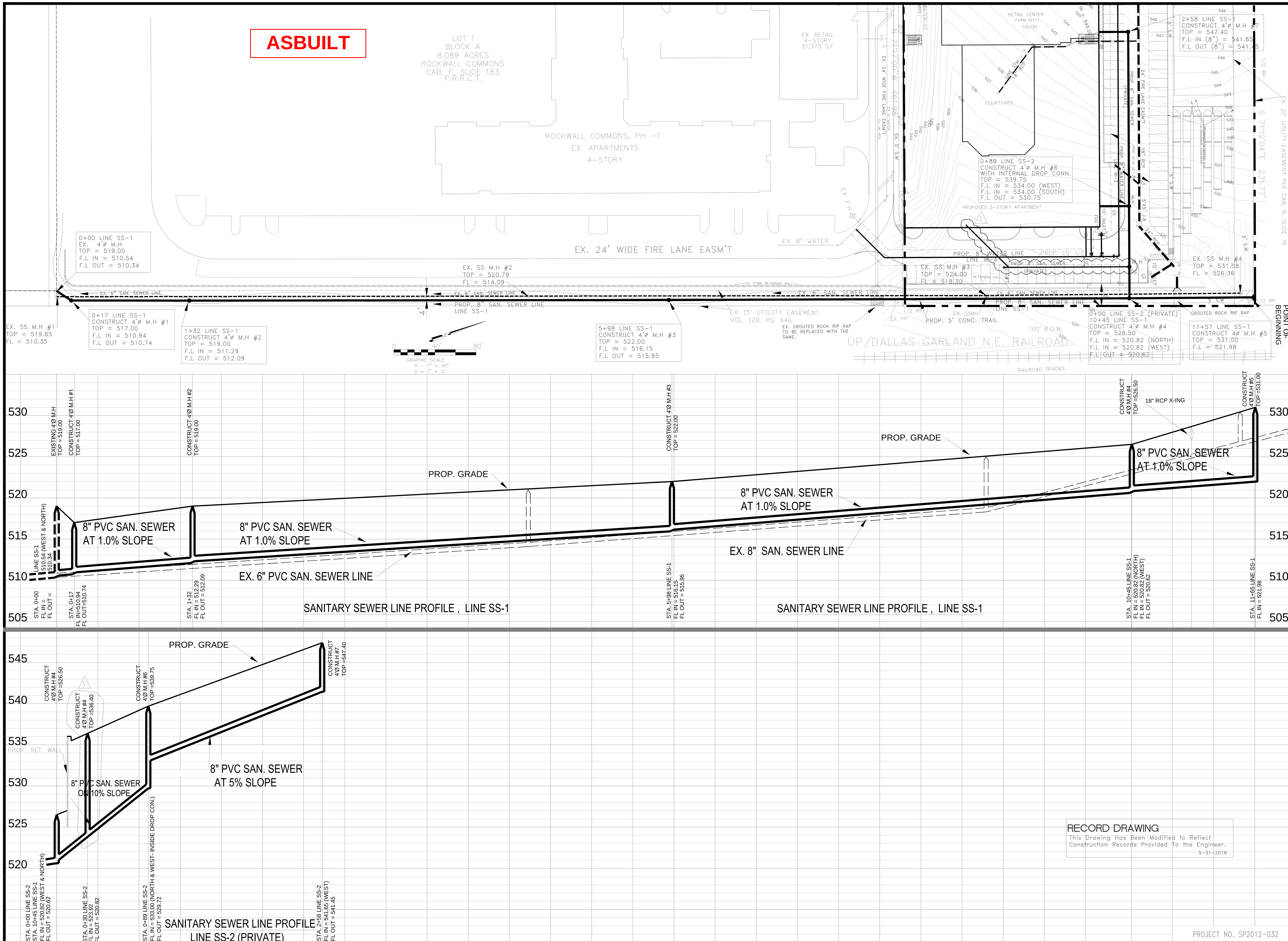
REVISIONS
1- REVISED 8" FIRE LINE TO 6" FIRE LINE AND MOVED IT FROM STA. 0+27 TO STA. 0+71.50 LINE W-4 DATE ON 5-31-2017.
2- ADDED 8" SAN. SEWER LINE SS-3 WITH A M.H. AND CLEANOUT ON 5-31-2017
3- MOVED F.H FROM STA. 0+45 TO 0+81 LINE W-1 6-15-2017
3- ADDED GAS LINE EASM'T. 9-20-2017

SEAL
STATE OF TEXAS
HOUSHANG JAHVANI
103742
LICENSED PROFESSIONAL ENGINEER
9-20-2017

DWG. TITLE:
WATER LINE PLAN

DRAWN BY: HJ
SCALE: 1" = 30'
FILE NO:
DATE 9-20-2017

7 OF 20
SHEET NUMBER



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REVISIONS DATE
1 8" SANITARY SEWER WITH M.H AND C.O (PRIVATE). 5-31-2019

SEAL
STATE OF TEXAS
HOUSHANG JAHVANI

DWG. TITLE:
SANITARY SEWER LINES PLAN & PROFILES

PROJECT #:
DRAWN BY: HJ
SCALE: H- 1" = 40' V- 1" = 5'
FILE NO:
DATE 5-31-2019

NOTES:

1. NO CONSTRUCTION WORK TO BE DONE INSIDE THE RAIL ROAD RIGHT OF WAY WITHOUT LETTER OF PERMISSION FROM RAIL ROAD AUTHORITIES.

2. FIRE LANE TO BE 6" MIN, 3600 PSI, 6.5 SACK.

ON-SITE DRAINAGE AREA DATA

DRAINAGE AREA (D.A. #)	AREA (ACRE)	T_c (MIN)	"C"	I_{100} (IN/HR)	Q_{100} (CFS)
D.A.#1	0.96	10	0.90	9.80	8.47
D.A.#2	0.57	10	0.90	9.80	5.00
D.A.#3	0.42	10	0.90	9.80	3.70
D.A.#4	0.20	10	0.90	9.80	1.76
D.A.#5	0.08	10	0.90	9.80	0.70
D.A.#6	0.05	10	0.90	9.80	0.44
D.A.#7	0.08	10	0.90	9.80	0.70
D.A.#8	0.05	10	0.90	9.80	0.44
D.A.#9	0.11	10	0.90	9.80	0.97
D.A.#10	0.11	10	0.90	9.80	0.97
D.A.#11	0.14	10	0.90	9.80	1.23
D.A.#12	0.10	10	0.90	9.80	0.88
D.A.#13	0.14	10	0.90	9.80	1.23
D.A.#14	0.10	10	0.90	9.80	0.88
D.A.#15	0.76	10	0.90	9.80	6.70

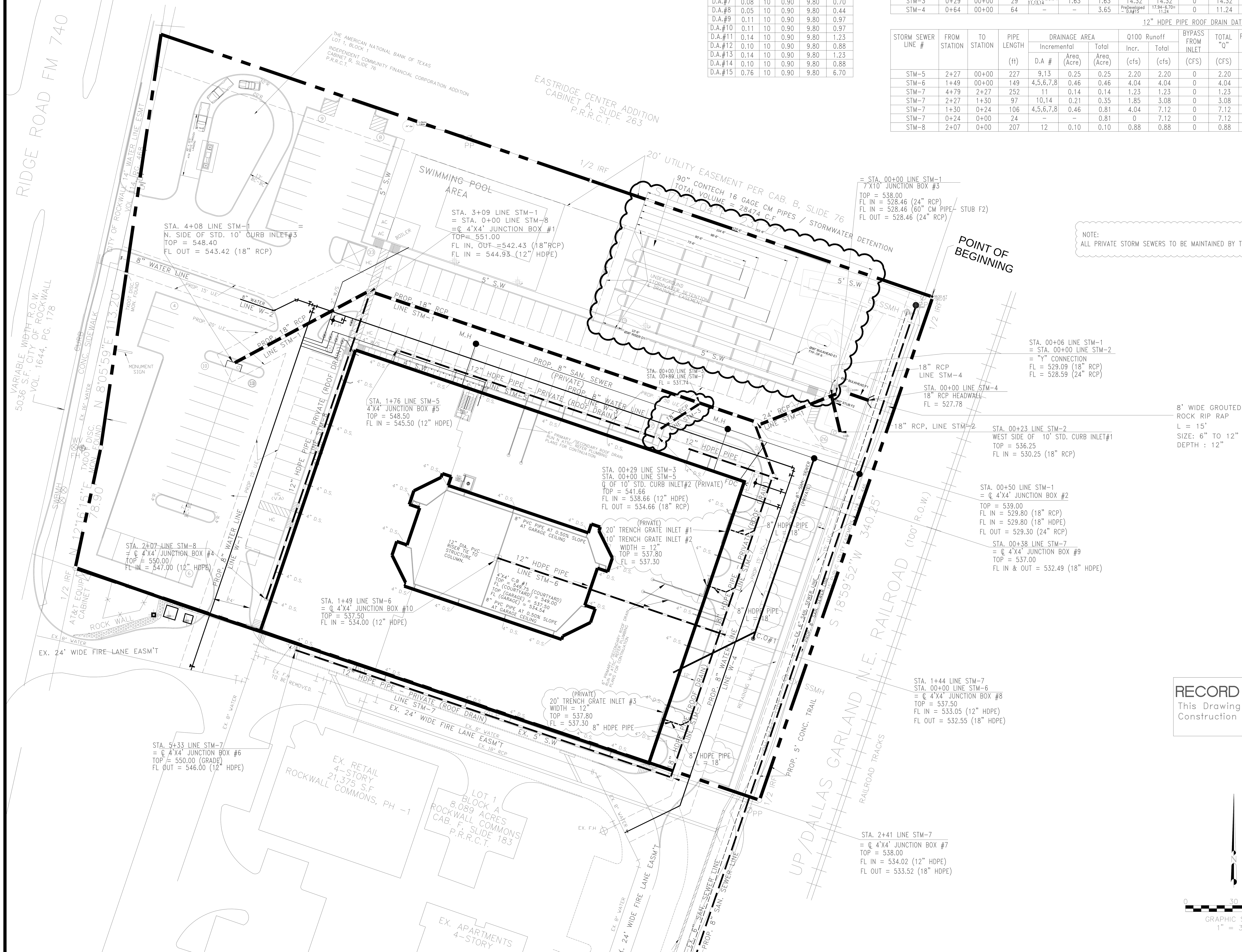
18" STORM SEWER PIPE DATA

STORM SEWER LINE #	FROM STATION	TO STATION	PIPE LENGTH	DRAINAGE AREA			Q100 Runoff		BYPASS FROM INLET	TOTAL "Q"	Pipe Size	n	Sf	Pipe Slope	V (in)	V (out)	Comments
				Incremental		Total	Incr.	Total									
			(ft)	D.A #	Area (Acre)	Area (Acre)	(cfs)	(cfs)	(CFS)	(CFS)	(inch)		ft/ft	ft/ft	ft/sec	ft/sec	
STM-1	4+00	3+03	97	1	0.96	0.96	8.47	8.47	0	8.47	18	0.013	0.0065	0.01	6	6	–
STM-1	3+03	0+42	261	12	0.10	1.06	0.88	9.35	0	9.35	18	0.013	0.0077	0.04	6	6.5	–
STM-1	0+42	00+04	38	2,4,5,6,7,8,9 10,11,13,14	1.63	2.69	14.32	23.67	0	23.67	24	0.013	0.0200	0.01	0	0	–
STM-1	0+04	00+00	4	3	0.42	0.42	3.70	27.37	0	27.37	24	0.013	0.0200	0.01	0	0	–
STM-2	0+43	00+00	43	3	0.42	0.42	3.70	3.70	0	3.70	18	0.013	0.0200	0.01	0	0	–
STM-3	0+29	00+00	29	2,4,5,6,7,8,9,10 11,13,14	1.63	1.63	14.32	14.32	0	14.32	18	0.013	0.0200	0.01	0	0	–
STM-4	0+64	00+00	64	–	–	3.65	PreDeveloped – D.A#15	17.94–6.70= 11.24	0	11.24	18	0.013	0.0200	0.01	0	0	–

12" HDPE PIPE ROOF DRAIN DATA

STORM SEWER LINE #	FROM STATION	TO STATION	PIPE LENGTH	DRAINAGE AREA			Q100 Runoff		BYPASS FROM INLET	TOTAL "Q"	Pipe Size	n	Sf	Pipe Slope	V (in)	V (out)	Comments
				Incremental		Total	Incr.	Total									
			(ft)	D.A #	Area (Acre)	Area (Acre)	(cfs)	(cfs)	(CFS)	(CFS)	(inch)		ft/ft	ft/ft	ft/sec	ft/sec	
STM-5	2+27	00+00	227	9,13	0.25	0.25	2.20	2.20	0	2.20	12	0.013	0.0065	0.01	6	6	–
STM-6	1+49	00+00	149	4,5,6,7,8	0.46	0.46	4.04	4.04	0	4.04	12						
STM-7	4+79	2+27	252	11	0.14	0.14	1.23	1.23	0	1.23	12	0.013	0.0077	0.04	6	6.5	–
STM-7	2+27	1+30	97	10,14	0.21	0.35	1.85	3.08	0	3.08	12	0.013	0.0200	0.01	0	0	–
STM-7	1+30	0+24	106	4,5,6,7,8	0.46	0.81	4.04	7.12	0	7.12	12	0.013	0.0200	0.01	0	0	–
STM-7	0+24	0+00	24	–	–	0.81	0	7.12	0	7.12	12	0.013	0.0200	0.01	0	0	–
STM-8	2+07	0+00	207	12	0.10	0.10	0.88	0.88	0	0.88	12	0.013	0.0200	0.01	0	0	–

NOTE:
ALL PRIVATE STORM SEWERS TO BE MAINTAINED BY THE PROPERTY OWNER.



ASBUILT

RECORD DRAWING
This Drawing Has Been Modified to Reflect Construction Records Provided To the Engineer.
5-31-2019

ABBREVIATIONS:
C.B = CATCH BASIN
J.B = JUNCTION BOX
D.S = ROOF DRAIN DOWN SPOT
D.A = DRAINAGE AREA
AC= ACRE

PROJECT NO. SP2012-032

MJR Engineering inc.
New Construction • Engineering • Environmental Services
7953 PINKERTON COURT
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PH: (469) 544-8150 FAX: (972) 767-3003
EMAIL: mkamal67@gmail.com
FIRM # F - 9928

Rockwall Commons, Phase-2
1301 Ridge Road
Rockwall, Texas

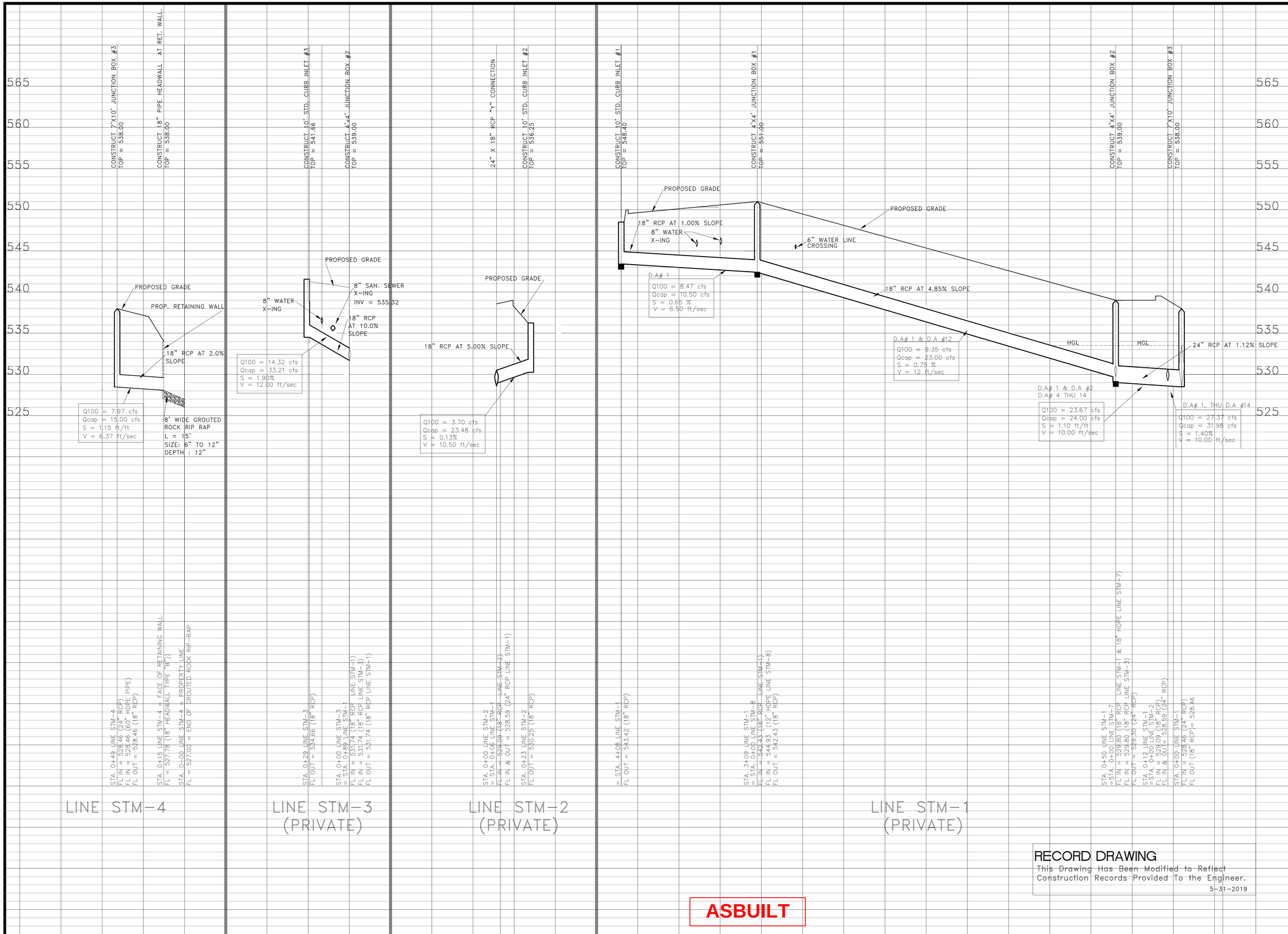
JAHVANI CONSULTING ENGINEERS, INC.
TBPE REGISTRATION NO. F-10198
2121 N. JOSEY LANE, #100
CARROLLTON, TEXAS 75006
TEL. (214) 718-9469
jahvani@hotmail.com
CONSULTING J ENGINEERS

REVISIONS	DATE
ADDED 3 TRENCH GRATE INLETS AT GARAGE ENTRANCES	2-15-2015
REVISED 60" HDPE PIPES TO 90" CORRUGATED PIPE BY CONTECH.	1-23-2017
REVISED INLET #2 AND STM-3 LOCATION	3-13-2017

SEAL
STATE OF TEXAS
HOUSHANG JAHVANI
72242
REGISTERED PROFESSIONAL ENGINEER
5-31-2019

DWG. TITLE:
STORM SEWER PLAN

PROJECT #:
DRAWN BY: HJ
SCALE: 1" = 30'
FILE NO:
DATE 5-31-2019



RECORD DRAWING
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5-31-2019

ASBUILT

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REVISIONS	DATE
REVISED LINE STM-3	
PROFILE - 3-13-2017	

SEAL
STATE OF TEXAS
HOUSHANG JAHVANI
72242
REGISTERED PROFESSIONAL ENGINEER
5-31-19

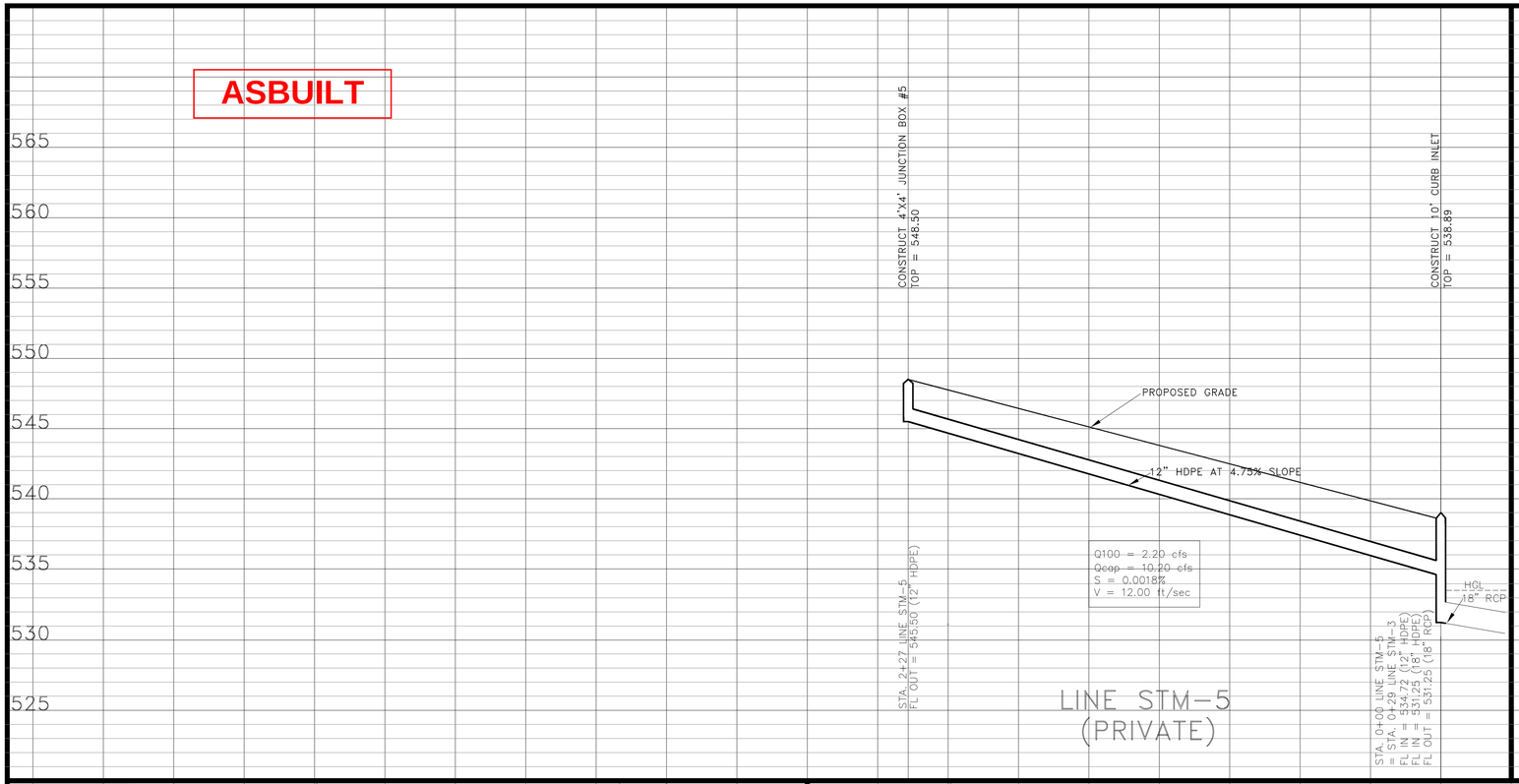
DWG. TITLE:
STORM SEWER LINE PROFILES (1 of 2).

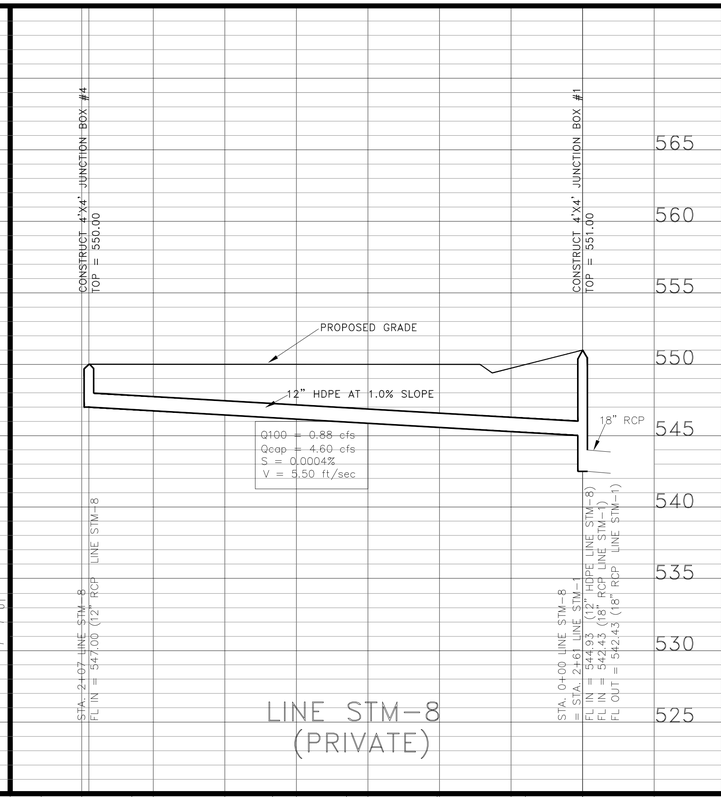
PROJECT #:
DRAWN BY: HJ
SCALE: 1" = 30'
FILE NO:

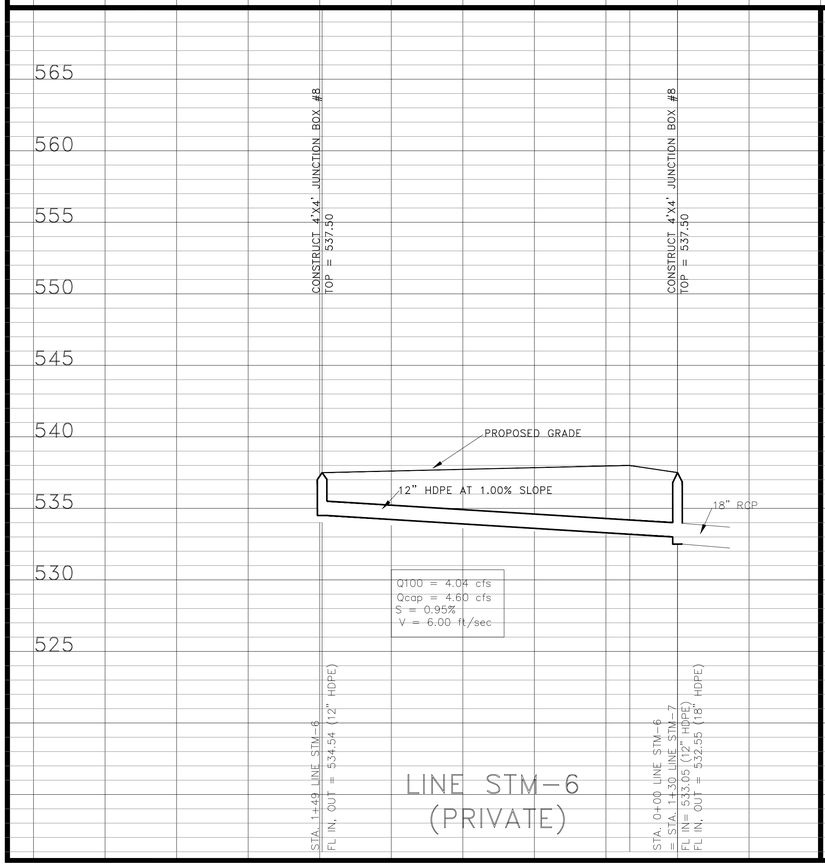
DATE 5-31-2019

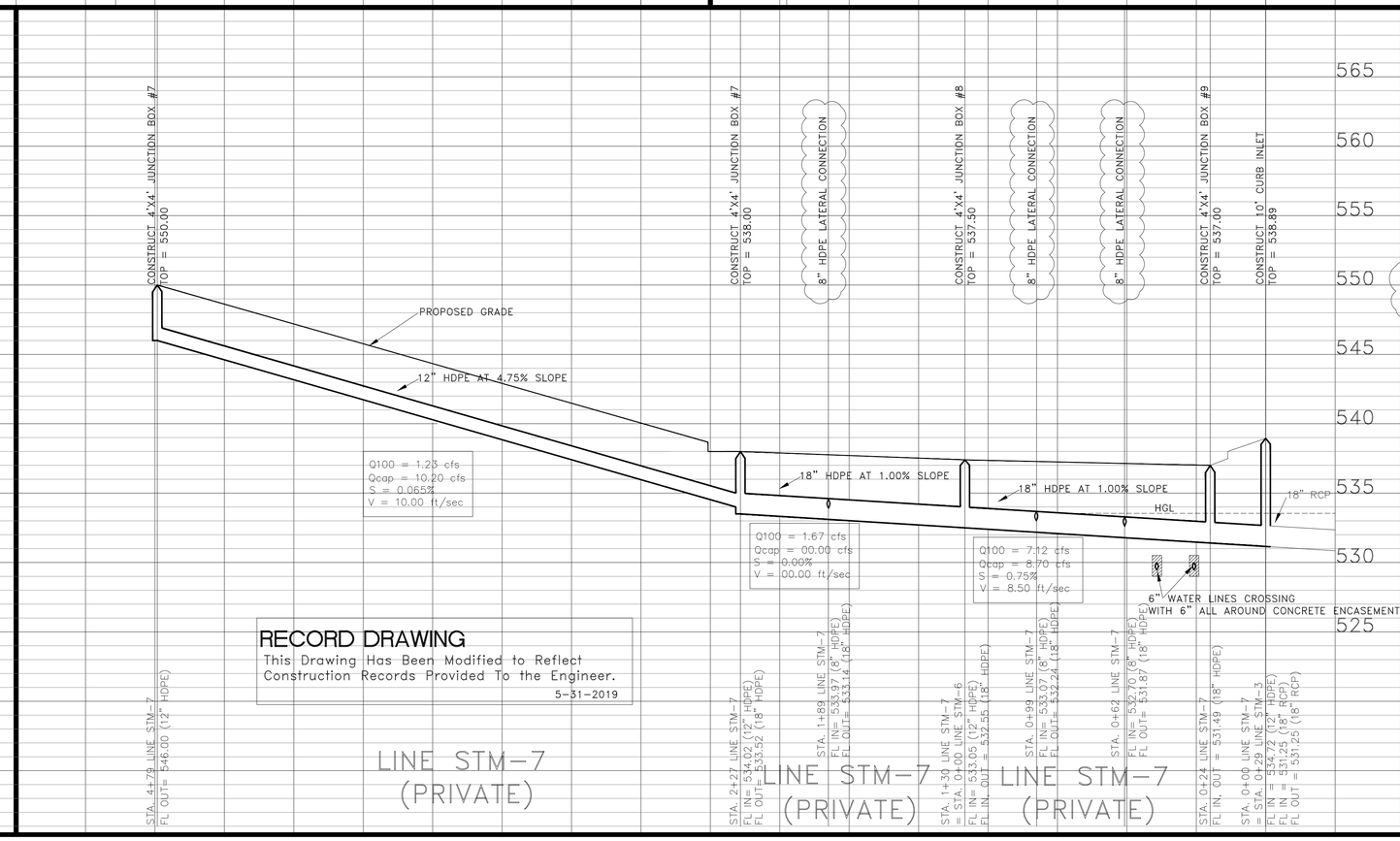
10 OF 20
SHEET NUMBER

ASBUILT









RECORD DRAWING
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5-31-2019

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REVISIONS	DATE
ADDED 3 – 8" HDPE PIPE LATERALS TO LINE STM-7	2-15-2015

SEAL
STATE OF TEXAS
HOUSHANG JAHVANI
72242
PROFESSIONAL ENGINEER
5-31-2019

DWG. TITLE:
STORM SEWER LINE PROFILES (2 of 2).

PROJECT #:
DRAWN BY: HJ
SCALE: 1" = 30'
FILE NO:

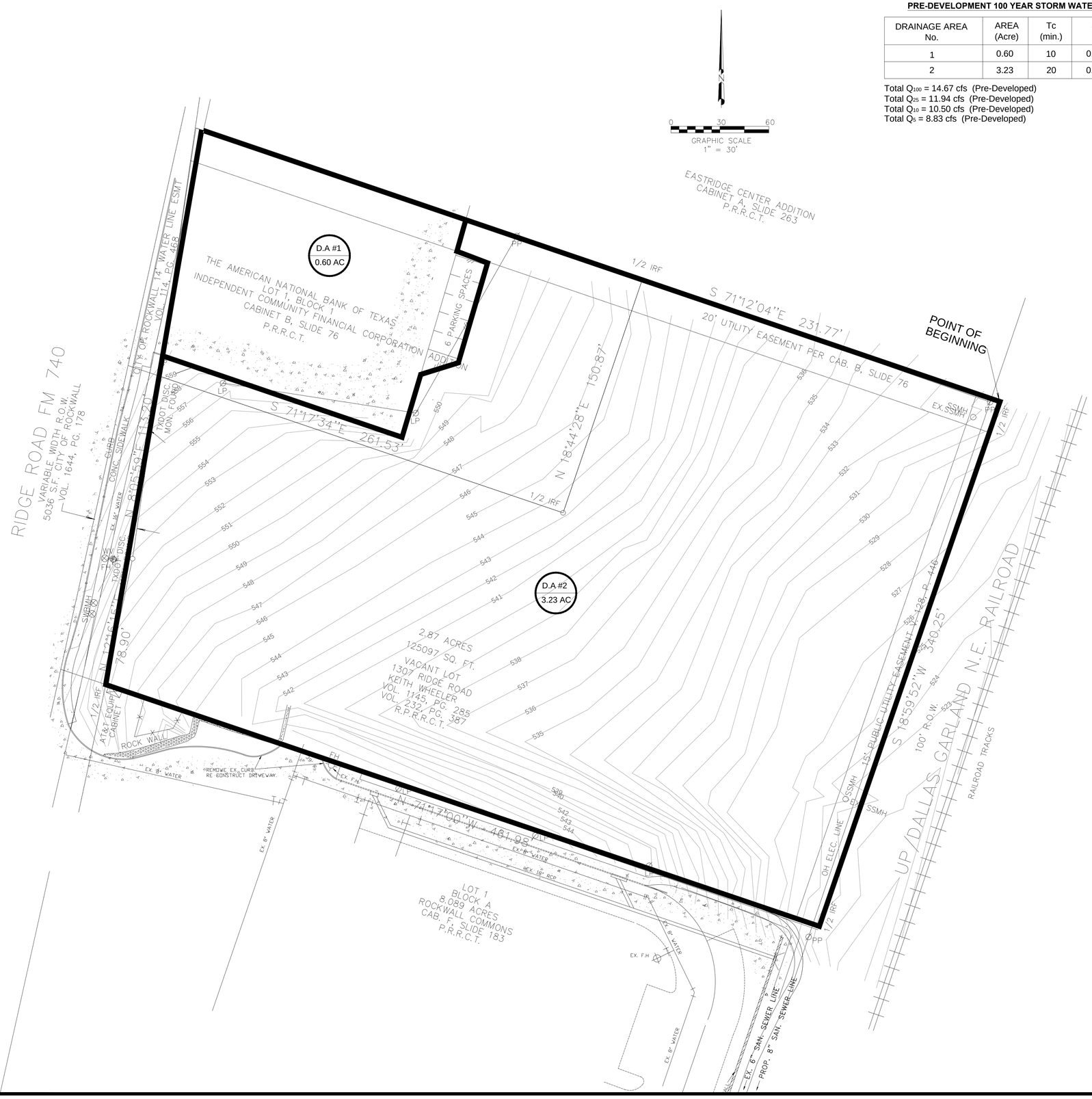
DATE 5-31-2019

11 OF 20
SHEET NUMBER

PRE-DEVELOPMENT 100 YEAR STORM WATER RUN-OFF TABLE

DRAINAGE AREA No.	AREA (Acre)	Tc (min.)	C	I_5 (in/hr)	I_{10} (in/hr)	I_{25} (in/hr)	I_{100} (in/hr)	Q_5 (cfs)	Q_{10} (cfs)	Q_{25} (cfs)	Q_{100} (cfs)
1	0.60	10	0.90	6.10	7.10	8.30	9.80	3.29	3.83	4.48	5.29
2	3.23	20	0.35	4.90	5.90	6.60	8.30	5.54	6.67	7.46	9.38

Total Q_{100} = 14.67 cfs (Pre-Developed)
Total Q_{25} = 11.94 cfs (Pre-Developed)
Total Q_{10} = 10.50 cfs (Pre-Developed)
Total Q_5 = 8.83 cfs (Pre-Developed)



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5-31-2019

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Rockwall Commons, Phase-2
1301 Ridge Road
Rockwall, Texas

REVISIONS DATE

SEAL
STATE OF TEXAS
HOUSHANG JAHVANI
72247
REGISTERED PROFESSIONAL ENGINEER
5-31-2019

DWG. TITLE:
PRE-DEVELOPMENT
DRAINAGE AREA MAP

PROJECT #:
DRAWN BY: HJ
SCALE: 1" = 30'
FILE NO:

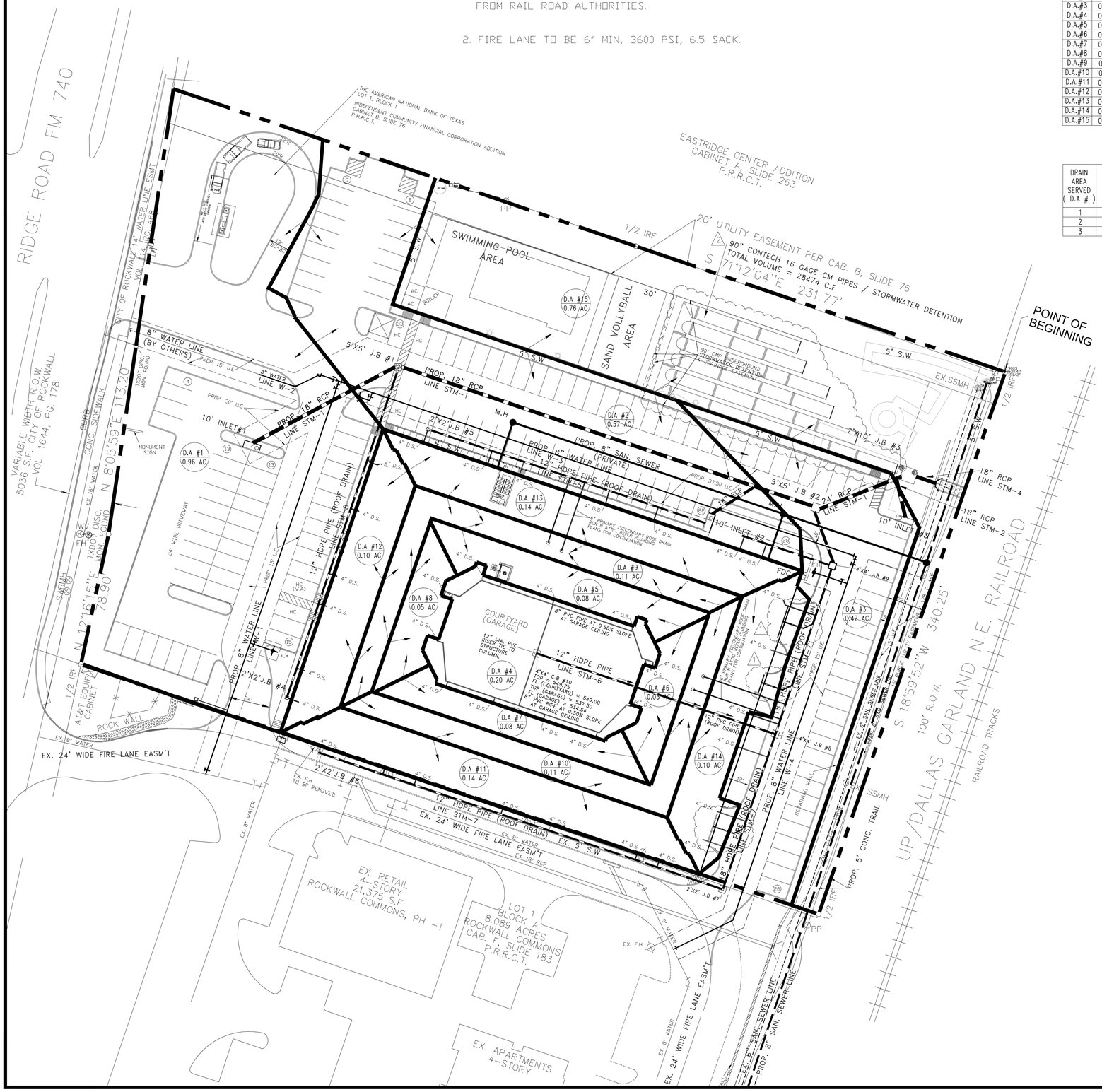
DATE 5-31-2019

12 OF 20
SHEET NUMBER

NOTES:

1. NO CONSTRUCTION WORK TO BE DONE INSIDE THE RAIL ROAD RIGHT OF WAY WITHOUT LETTER OF PERMISSION FROM RAIL ROAD AUTHORITIES.

2. FIRE LANE TO BE 6" MIN, 3600 PSI, 6.5 SACK.



ON-SITE DRAINAGE AREA DATA

DRAINAGE AREA (D.A. #)	AREA (ACRE)	T_c (MIN)	"C"	I_5 (IN/HR)	I_{10} (IN/HR)	I_{25} (IN/HR)	I_{100} (IN/HR)	Q_5 (CFS)	Q_{10} (CFS)	Q_{25} (CFS)	Q_{100} (CFS)
D.A.#1	0.96	10	0.90	6.10	7.10	8.30	9.80	5.27	6.13	7.17	8.47
D.A.#2	0.57	10	0.90	6.10	7.10	8.30	9.80	3.13	3.64	4.25	5.00
D.A.#3	0.42	10	0.90	6.10	7.10	8.30	9.80	2.30	2.68	3.13	3.70
D.A.#4	0.20	10	0.90	6.10	7.10	8.30	9.80	1.10	1.28	1.49	1.76
D.A.#5	0.08	10	0.90	6.10	7.10	8.30	9.80	0.44	0.51	0.60	0.70
D.A.#6	0.05	10	0.90	6.10	7.10	8.30	9.80	0.27	0.32	0.37	0.44
D.A.#7	0.08	10	0.90	6.10	7.10	8.30	9.80	0.44	0.51	0.60	0.70
D.A.#8	0.05	10	0.90	6.10	7.10	8.30	9.80	0.27	0.32	0.37	0.44
D.A.#9	0.11	10	0.90	6.10	7.10	8.30	9.80	0.60	0.70	0.82	0.97
D.A.#10	0.11	10	0.90	6.10	7.10	8.30	9.80	0.60	0.70	0.82	0.97
D.A.#11	0.14	10	0.90	6.10	7.10	8.30	9.80	0.77	0.89	1.04	1.23
D.A.#12	0.10	10	0.90	6.10	7.10	8.30	9.80	0.55	0.64	0.75	0.88
D.A.#13	0.14	10	0.90	6.10	7.10	8.30	9.80	0.77	0.89	1.04	1.23
D.A.#14	0.10	10	0.90	6.10	7.10	8.30	9.80	0.55	0.64	0.75	0.88
D.A.#15	0.76	10	0.90	6.10	7.10	8.30	9.80	4.17	4.85	5.68	6.70

ON-SITE INLET DATA

DRAIN AREA SERVED (D.A #)	INLET LOCATION	DESIGN FREQ. (YEARS)	TIME "TC" (MIN)	INTEN. "I" (IN/HR)	DEV. RUNOFF COEFF. "C"	DRAIN AREA (ACRES)	DEV. "Q" (CFS)	BYPASS FROM INLET (CFS)	TOTAL "Q" (CFS)	LENGTH OF INLET (FEET)	OPENNING OF INLET (FEET)	CAP. OF INLET (CFS)	BYPASS TO NEXT INLET (CFS)	BYPASS TO INLET NUMBER
1	LOW POINT	100	10	9.80	0.90	0.96	8.47	0	8.47	10	0.5	21	0	-
2	LOW POINT	100	10	9.80	0.90	0.57	5.00	0	5.00	10	0.5	21	0	-
3	LOW POINT	100	10	9.80	0.90	0.42	3.70	0	3.70	10	0.5	21	0	-

12" HDPE PIPE (ROOF DRAIN) DATA

PIPE #	DRAINAGE AREA # SERVED	DESIGN FREQ. (YEARS)	DEV. "Q" (CFS)	TOTAL "Q" (CFS)
STM-5	9,13	100	2.20	2.20
STM-6	4,5,6,7,8	100	3.60	4.04
STM-7	4,5,6,7,8,10,11,14	100	0.88	7.12
STM-8	12	100	1.23	0.88

0 30 60
GRAPHIC SCALE
1" = 30'

ASBUILT

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5-31-2019

ABBREVIATIONS:
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D.S = ROOF DRAIN DOWN SPOT
D.A = DRAINAGE AREA
AC= ACRE

PROJECT NO. SP2012-032

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REVISIONS	DATE
1 ADDED 3 TRENCH GRATE AT GARAGE ENTRANCES.	2-15-2015.
2 90" CM PIPE HAS BEEN INSTALLED INSTEAD OF 60" HDPE UNDERGROUND DETENTION PIPE.	2-15-2015.

SEAL
STATE OF TEXAS
HOUSHANG JAHVANI
72242
REGISTERED PROFESSIONAL ENGINEER
5-31-2019

DWG. TITLE:
DRAINAGE AREA MAP & COMPUTATIONS. (POST-DEVELOPMENT)

PROJECT #:
DRAWN BY: HJ
SCALE: 1" = 30'
FILE NO:
DATE 5-31-2019

13 OF 20
SHEET NUMBER

DETENTION BASIN CALCULATIONS.

TOTAL DETENTION REQUIRED-BASED ON 100 YEAR PEAK RUNOFF RATE
DETENTION CALCULATED USING MODIFIED RATIONAL METHOD.

PRE-DEVELOPED AND POST-DEVELOPED 5 YEAR STORM RUN-OFF

PRE-DEVELOPED CONDITION

DRAINAGE AREA No.	AREA (Acre)	Tc (min.)	C	I_5 (in/hr)	Q_5 (cfs)
1	0.60	10	0.90	6.10	3.29
2	3.23	20	0.35	4.90	5.54

Total Q_{100} = 8.83 cfs (Pre-Developed)

POST-DEVELOPED CONDITION

DRAINAGE AREA No.	AREA (Acre)	Tc (min.)	C	I_5 (in/hr)	Q_{25} (cfs)
16	0.76	10	0.90	6.10	4.85

Total Q_5 Run-Off allowed from site = 8.83 cfs (Pre-Developed) - 4.85 (Post-Developed Bypass) = 3.98 cfs

POST-DEVELOPED CONDITION - ADJUSTED AREA
A1 = D.A #1 pre-developed = 0.60 Acres
A1 = D.A #2 pre-developed = 3.23 Acres
A3 = Bypass Area (D.A #16 post-developed) = 0.76 Acre
A (adjusted) = A1 + A2 - A3 = 0.60 + 3.23 - 0.76 = 3.07 Acres

POST-DEVELOPMENT 5 YEAR STORM - VARIOUS DURATION (COMMERTCIAL CONDITION)

5-YEAR STORM

DURATION (MIN.)	YEAR (YR)	INTENSITY (IN./HR.)	C	A (Acre)	Q = C.I.A (cfs)
10	5	6.10	0.90	3.07	16.8543
15	5	5.50	0.90	3.07	15.1965
20	5	4.90	0.90	3.07	13.5387
30	5	4.10	0.90	3.07	11.3283
40	5	3.40	0.90	3.07	9.3942
50	5	2.80	0.90	3.07	7.7364
60	5	2.60	0.90	3.07	7.1838
70	5	2.40	0.90	3.07	6.6312
80	5	2.30	0.90	3.07	6.3549
90	5	2.10	0.90	3.07	5.8023
100	5	1.90	0.90	3.07	5.2497
110	5	1.80	0.90	3.07	4.9734

Maximum Detention Storage is determined by deducting the volume of run-off released during the time of inflow from the total inflow for each storm duration:

10 minute storm
Inflow = (10 min)(16.8543 cfs)(60 sec/min) = 10,112.58 C.F
Outflow = (0.50)(20 min)(3.98 cfs)(60sec/min) = 2,388.00 C.F
Storage = Inflow - Outflow = 10,112.58 - 2,388.00 = 7,724.58 Cubic Feet

15 minute storm
Inflow = 13,676.85 C.F
Outflow = 2,985.00 C.F
Storage =10,691.85 Cubic Feet

20 minute storm
Inflow = 16,246.44 C.F
Outflow = 3,582.00 C.F
Storage =12,664.44 Cubic Feet

30 minute storm
Inflow = 20,390.94 C.F
Outflow = 4,776.00 C.F
Storage = 15,614.94 Cubic Feet

40 minute storm
Inflow = 22,546.08 C.F
Outflow = 5,970.00 C.F
Storage =16,576.08 Cubic Feet

50 minute storm
Inflow = 23,209.20 C.F
Outflow = 7,164.00 C.F
Storage = 16,045.20 Cubic Feet

60 minute storm
Inflow = 25,861.68 C.F
Outflow = 8,358.00 C.F
Storage =17,503.63 Cubic Feet

70 minute storm
Inflow = 27,851.04 C.F
Outflow = 9,552.00 C.F
Storage = 18,299.04 Cubic Feet

80 minute storm
Inflow = 30,503.52 C.F
Outflow = 10,746.00 C.F
Storage =19,757.52 Cubic Feet

90 minute storm
Inflow = 31,332.42 C.F
Outflow = 11,940.00 C.F
Storage = 19,392.42 Cubic Feet

100 minute storm
Inflow = 31,498.20 C.F
Outflow = 13,134.00 C.F
Storage =18,364.20 Cubic Feet

110 minute storm
Inflow = 32,824.44 C.F
Outflow = 14,328.00 C.F
Storage = 18,496.44 Cubic Feet

Required detention storage is 18,496.44 cubic feet at the 100 minute storm duration.

Stormwater Detention Provided = 1448 feet of 60" diameter HDPE pipe = 28,431.41 cubic feet

PRE-DEVELOPMENT DISCHARGE = 8.83 CFS
POST-DEVELOPMENT DISCHARGE FROM DRAINAGE AREA #15 (NOT DETAINED) = 4.17 CFS
TOTAL DISCHARGE ALLOWED FROM STORMWATER DETENTION SYSTEM = 8.83- 4.17 = 4.66 CFS

V - NOTCH WEIR

$Q = 2.5 \text{ Tan } (Ø/2)(H)^{2.5} = (2.5 \text{ X Tan } 3.10)(2.77)^{2.5} = 1.73$ CFS
Ø= 6.20° , H = 2.77'
TOTAL WEIR DISCHARGE AT 2.77' DEPTH WATER = 1.73 CFS
TOTAL WEIR DISCHARGE AT 2.77' DEPTH ALLOWED = 4.66 CFS

18" RCP AT 2.0% SLOPE, Q(CAPACITY) = 15.00 CFS

ASBUILT

DETENTION BASIN CALCULATIONS.

TOTAL DETENTION REQUIRED-BASED ON 100 YEAR PEAK RUNOFF RATE
DETENTION CALCULATED USING MODIFIED RATIONAL METHOD.

PRE-DEVELOPED AND POST-DEVELOPED 10 YEAR STORM RUN-OFF

PRE-DEVELOPED CONDITION

DRAINAGE AREA No.	AREA (Acre)	Tc (min.)	C	I_{10} (in/hr)	Q_{10} (cfs)
1	0.60	10	0.90	7.10	3.83
2	3.23	20	0.35	5.90	6.67

Total Q_{10} = 10.50 cfs (Pre-Developed)

POST-DEVELOPED CONDITION

DRAINAGE AREA No.	AREA (Acre)	Tc (min.)	C	I_{10} (in/hr)	Q_{25} (cfs)
16	0.76	10	0.90	7.10	4.85

Total Q_{10} Run-Off allowed from site = 10.50 cfs (Pre-Developed) - 4.85 (Post-Developed Bypass) = 5.65 cfs

POST-DEVELOPED CONDITION - ADJUSTED AREA
A1 = D.A #1 pre-developed = 0.60 Acres
A1 = D.A #2 pre-developed = 3.23 Acres
A3 = Bypass Area (D.A #16 post-developed) = 0.76 Acre
A (adjusted) = A1 + A2 - A3 = 0.60 + 3.23 - 0.76 = 3.07 Acres

POST-DEVELOPMENT 25 YEAR STORM - VARIOUS DURATION (COMMERTCIAL CONDITION)

10-YEAR STORM

DURATION (MIN.)	YEAR (YR)	INTENSITY (IN./HR.)	C	A (Acre)	Q = C.I.A (cfs)
10	25	7.10	0.90	3.07	19.6173
15	25	6.50	0.90	3.07	17.9595
20	25	5.90	0.90	3.07	16.3017
30	25	4.80	0.90	3.07	13.2624
40	25	4.00	0.90	3.07	11.0520
50	25	3.50	0.90	3.07	9.6705
60	25	3.00	0.90	3.07	8.2890
70	25	2.80	0.90	3.07	7.7364
80	25	2.60	0.90	3.07	7.1838
90	25	2.50	0.90	3.07	6.9075
100	25	2.40	0.90	3.07	6.6312
110	25	2.30	0.90	3.07	6.3549

Maximum Detention Storage is determined by deducting the volume of run-off released during the time of inflow from the total inflow for each storm duration:

10 minute storm
Inflow = (10 min)(19.6173 cfs)(60 sec/min) = 11,770.38 C.F
Outflow = (0.50)(20 min)(5.65 cfs)(60sec/min) = 3,390.00 C.F
Storage = Inflow - Outflow = 13,759.74 - 3,390.00 = 8,380.38 Cubic Feet

15 minute storm
Inflow = 16,163.55 C.F
Outflow = 4,237.50 C.F
Storage =11,926.05 Cubic Feet

20 minute storm
Inflow = 19,562.04 C.F
Outflow = 5,085.00 C.F
Storage =14,477.04 Cubic Feet

30 minute storm
Inflow = 23,872.32 C.F
Outflow = 6,780.00 C.F
Storage = 17,092.32 Cubic Feet

40 minute storm
Inflow = 26,524.80 C.F
Outflow = 8,475.00 C.F
Storage =18,049.80 Cubic Feet

50 minute storm
Inflow = 29,011.50 C.F
Outflow = 10,170.00 C.F
Storage = 18,841.50 Cubic Feet

60 minute storm
Inflow = 29,840.40 C.F
Outflow = 11,865.00 C.F
Storage =17,975.40 Cubic Feet

70 minute storm
Inflow = 32,492.88 C.F
Outflow = 13,560.00 C.F
Storage = 18,932.88 Cubic Feet

80 minute storm
Inflow = 34,482.24 C.F
Outflow = 15,255.00 C.F
Storage =19,227.24 Cubic Feet

90 minute storm
Inflow = 37,300.50 C.F
Outflow = 16,950.00 C.F
Storage = 20,350.50 Cubic Feet

100 minute storm
Inflow = 39,787.20 C.F
Outflow = 18,645.00 C.F
Storage =21,142.20 Cubic Feet

110 minute storm
Inflow = 41,942.34 C.F
Outflow = 20,340.00 C.F
Storage = 21,602.34 Cubic Feet

Required detention storage is 21,602.34 cubic feet at the 100 minute storm duration.

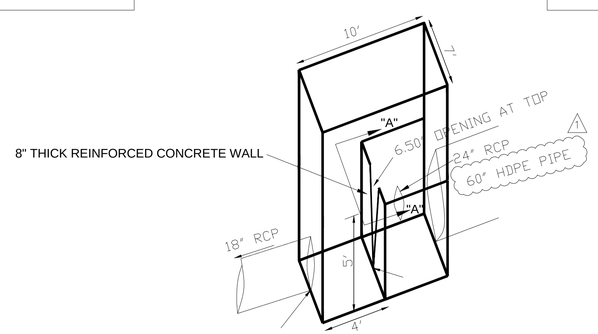
Stormwater Detention Provided = 1448 feet of 60" diameter HDPE pipe = 28,431.41 cubic feet

PRE-DEVELOPMENT DISCHARGE = 10.50 CFS
POST-DEVELOPMENT DISCHARGE FROM DRAINAGE AREA #15 (NOT DETAINED) = 4.85 CFS
TOTAL DISCHARGE ALLOWED FROM STORMWATER DETENTION SYSTEM = 10.50- 4.85 = 5.65 CFS

V - NOTCH WEIR

$Q = 2.5 \text{ Tan } (Ø/2)(H)^{2.5} = (2.5 \text{ X Tan } 3.10)(3.15)^{2.5} = 2.38$ CFS
Ø= 6.20° , H = 3.15'
TOTAL WEIR DISCHARGE AT 3.15' DEPTH WATER = 2.38 CFS
TOTAL WEIR DISCHARGE AT 3.15' DEPTH ALLOWED = 5.65 CFS

18" RCP AT 2.0% SLOPE, Q(CAPACITY) = 15.00 CFS



7' X 10' JUNCTION BOX #3 / WEIR DETAIL
NTS

DETENTION BASIN CALCULATIONS.

TOTAL DETENTION REQUIRED-BASED ON 100 YEAR PEAK RUNOFF RATE
DETENTION CALCULATED USING MODIFIED RATIONAL METHOD.

PRE-DEVELOPED AND POST-DEVELOPED 25 YEAR STORM RUN-OFF

PRE-DEVELOPED CONDITION

DRAINAGE AREA No.	AREA (Acre)	Tc (min.)	C	I_{25} (in/hr)	Q_{25} (cfs)
1	0.60	10	0.90	8.3	4.48
2	3.23	20	0.35	6.6	7.46

Total Q_{25} = 11.94 cfs (Pre-Developed)

POST-DEVELOPED CONDITION

DRAINAGE AREA No.	AREA (Acre)	Tc (min.)	C	I_{25} (in/hr)	Q_{25} (cfs)
16	0.76	10	0.90	8.3	5.68

Total Q_{25} Run-Off allowed from site = 11.94 cfs (Pre-Developed) - 5.68 (Post-Developed Bypass) = 6.26 cfs

POST-DEVELOPED CONDITION - ADJUSTED AREA
A1 = D.A #1 pre-developed = 0.60 Acres
A1 = D.A #2 pre-developed = 3.23 Acres
A3 = Bypass Area (D.A #16 post-developed) = 0.76 Acre
A (adjusted) = A1 + A2 - A3 = 0.60 + 3.23 - 0.76 = 3.07 Acres

POST-DEVELOPMENT 25 YEAR STORM - VARIOUS DURATION (COMMERTCIAL CONDITION)

25-YEAR STORM

DURATION (MIN.)	YEAR (YR)	INTENSITY (IN./HR.)	C	A (Acre)	Q = C.I.A (cfs)
10	25	8.30	0.90	3.07	22.9329
15	25	7.50	0.90	3.07	20.7225
20	25	6.60	0.90	3.07	18.2358
30	25	5.50	0.90	3.07	15.1965
40	25	4.60	0.90	3.07	12.7098
50	25	4.00	0.90	3.07	11.0520
60	25	3.50	0.90	3.07	9.6705
70	25	3.30	0.90	3.07	9.1179
80	25	3.10	0.90	3.07	8.5653
90	25	2.90	0.90	3.07	8.0127
100	25	2.70	0.90	3.07	7.4601
110	25	2.50	0.90	3.07	6.9075

Maximum Detention Storage is determined by deducting the volume of run-off released during the time of inflow from the total inflow for each storm duration:

10 minute storm
Inflow = (10 min)(22.9329 cfs)(60 sec/min) = 13,759.74 C.F
Outflow = (0.50)(20 min)(6.26 cfs)(60sec/min) = 3,756.00 C.F
Storage = Inflow - Outflow = 13,759.74 - 3,756.00 = 10,003.74 Cubic Feet

15 minute storm
Inflow = 18,650.25 C.F
Outflow = 4,695.00 C.F
Storage =13,955.25 Cubic Feet

20 minute storm
Inflow = 21,882.96 C.F
Outflow = 5,634.00 C.F
Storage =16,248.96 Cubic Feet

30 minute storm
Inflow = 27,353.70 C.F
Outflow = 7,512.00 C.F
Storage = 19,841.70 Cubic Feet

40 minute storm
Inflow = 30,503.52 C.F
Outflow = 9,390.00 C.F
Storage =21,113.52 Cubic Feet

50 minute storm
Inflow = 33,156.00 C.F
Outflow = 11,268.00 C.F
Storage = 21,888.00 Cubic Feet

60 minute storm
Inflow = 34,813.80 C.F
Outflow = 13,146.00 C.F
Storage =21,667.80 Cubic Feet

70 minute storm
Inflow = 38,295.18 C.F
Outflow = 15,024.00 C.F
Storage = 23,271.18 Cubic Feet

80 minute storm
Inflow = 41,113.44 C.F
Outflow = 16,902.00 C.F
Storage =24,211.44 Cubic Feet

90 minute storm
Inflow = 43,268.58 C.F
Outflow = 18,780.00 C.F
Storage = 24,488.58 Cubic Feet

100 minute storm
Inflow = 44,760.60 C.F
Outflow = 20,658.00 C.F
Storage =24,102.60 Cubic Feet

110 minute storm
Inflow = 45,589.50 C.F
Outflow = 22,536.00 C.F
Storage = 23,053.50 Cubic Feet

Required detention storage is 24,488.58 cubic feet at the 110 minute storm duration.

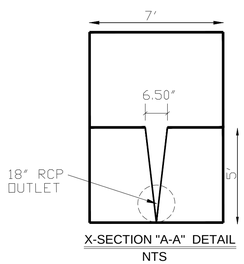
Stormwater Detention Provided = 1448 feet of 60" diameter HDPE pipe = 28,431.41 cubic feet

PRE-DEVELOPMENT DISCHARGE = 11.94 CFS
POST-DEVELOPMENT DISCHARGE FROM DRAINAGE AREA #15 (NOT DETAINED) = 5.68 CFS
TOTAL DISCHARGE ALLOWED FROM STORMWATER DETENTION SYSTEM = 11.94- 5.68 = 6.26 CFS

V - NOTCH WEIR

$Q = 2.5 \text{ Tan } (Ø/2)(H)^{2.5} = (2.5 \text{ X Tan } 3.10)(3.59)^{2.5} = 3.30$ CFS
Ø= 6.20° , H = 3.59'
TOTAL WEIR DISCHARGE AT 3.59' DEPTH WATER = 3.30 CFS
TOTAL WEIR DISCHARGE AT 3.15' DEPTH ALLOWED = 6.26 CFS

18" RCP AT 2.0% SLOPE, Q(CAPACITY) = 15.00 CFS



X-SECTION "A-A" DETAIL
NTS

RECORD DRAWING
This Drawing Has Been Modified to Reflect Construction Records Provided To the Engineer.
5-31-2019

DETENTION BASIN CALCULATIONS.

TOTAL DETENTION REQUIRED-BASED ON 100 YEAR PEAK RUNOFF RATE
DETENTION CALCULATED USING MODIFIED RATIONAL METHOD.

PRE-DEVELOPED AND POST-DEVELOPED 100 YEAR STORM RUN-OFF

PRE-DEVELOPED CONDITION

DRAINAGE AREA No.	AREA (Acre)	Tc (min.)	C	I_{100} (in/hr)	Q_{100} (cfs)
1	0.60	10	0.90	9.80	5.2920
2	3.23	20	0.35	8.30	9.3832

Total Q_{100} = 14.6752 cfs (Pre-Developed)

POST-DEVELOPED CONDITION - BYPASS AREA

DRAINAGE AREA No.	AREA (Acre)	Tc (min.)	C	I_{100} (in/hr)	Q_{100} (cfs)
16	0.76	10	0.90	9.80	6.7032

Total Q_{100} Run-Off allowed from site = 14.6752 cfs (Pre-Developed) - 6.7032 (Post-Developed Bypass) = 7.9720 cfs

POST-DEVELOPED CONDITION - ADJUSTED AREA
A1 = D.A #1 pre-developed = 0.60 Acres
A1 = D.A #2 pre-developed = 3.23 Acres
A3 = Bypass Area (D.A #16 post-developed) = 0.76 Acre
A (adjusted) = A1 + A2 - A3 = 0.60 + 3.23 - 0.76 = 3.07 Acres

POST-DEVELOPMENT 100 YEAR STORM - VARIOUS DURATION (COMMERTCIAL CONDITION)

100-YEAR STORM

DURATION (MIN.)	YEAR (YR)	INTENSITY (IN./HR.)	C	A (Acre)	Q = C.I.A (cfs)
10	100	9.80	0.90	3.07	27.0774
15	100	9.00	0.90	3.07	24.8670
20	100	8.30	0.90	3.07	22.9329
30	100	6.90	0.90	3.07	19.0647
40	100	5.80	0.90	3.07	16.0254
50	100	5.00	0.90	3.07	13.8150
60	100	4.50	0.90	3.07	12.4335
70	100	4.00	0.90	3.07	11.0520
80	100	3.70	0.90	3.07	10.2231
90	100	3.50	0.90	3.07	9.6705
100	100	3.40	0.90	3.07	9.3942
110	100	3.20	0.90	3.07	8.8416

Maximum Detention Storage is determined by deducting the volume of run-off released during the time of inflow from the total inflow for each storm duration:

10 minute storm
Inflow = (10 min)(27.0774 cfs)(60 sec/min) = 16,246.44 C.F
Outflow = (0.50)(20 min)(7.9720 cfs)(60sec/min) = 4,783.20 C.F
Storage = Inflow - Outflow = 16,246.44 - 4,783.20 = 11,463.24 Cubic Feet

15 minute storm
Inflow = 16,246.44 C.F
Outflow = 4,783.17 C.F
Storage =11,463.27 Cubic Feet

20 minute storm
Inflow = 27,519.48 C.F
Outflow = 7,174.755 C.F
Storage =20,344.73 Cubic Feet

30 minute storm
Inflow = 34,316.46 C.F
Outflow = 9,566.34 C.F
Storage = 24,750.12 Cubic Feet

40 minute storm
Inflow = 38,460.96 C.F
Outflow = 11,957.93 C.F
Storage =26,503.04 Cubic Feet

50 minute storm
Inflow = 41,445.00 C.F
Outflow = 14,349.51 C.F
Storage = 27,095.49 Cubic Feet

60 minute storm
Inflow = 44,760.60 C.F
Outflow = 16,741.10 C.F
Storage =28,019.51 Cubic Feet

70 minute storm
Inflow = 46,418.40 C.F
Outflow = 19,132.68 C.F
Storage = 27,285.72 Cubic Feet

80 minute storm
Inflow = 49070.88 C.F
Outflow = 21524.27 C.F
Storage =27,546.62 Cubic Feet

90 minute storm
Inflow = 52220.70 C.F
Outflow = 23,915.85 C.F
Storage = 28,304.85 Cubic Feet

100 minute storm
Inflow = 54,707.40 C.F
Outflow = 26,307.44 C.F
Storage =28,399.97 Cubic Feet

110 minute storm
Inflow = 52883.82 C.F
Outflow = 26,307.60 C.F
Storage = 26,576.22 Cubic Feet

Required detention storage is 28,399.97 cubic feet at the 100 minute storm duration.

Stormwater Detention Provided = 1441 feet of 60" diameter HDPE pipe plus 210 cubic feet of weir structure = 28,503.96 cubic feet

PRE-DEVELOPMENT DISCHARGE = 14.67 CFS
POST-DEVELOPMENT DISCHARGE FROM DRAINAGE AREA #15 (NOT DETAINED) = 6.70 CFS
TOTAL DISCHARGE ALLOWED FROM STORMWATER DETENTION SYSTEM = 14.67- 6.70 = 7.97 CFS

V - NOTCH WEIR

$Q = 2.5 \text{ Tan } (Ø/2)(H)^{2.5} = (2.5 \text{ X Tan } 3.10)(5.0)^{2.5} = 7.57$ CFS
Ø= 6.20° , H = 5.0'
TOTAL WEIR DISCHARGE AT 5.0' DEPTH WATER = 7.57 CFS
TOTAL WEIR DISCHARGE AT 5.0' DEPTH ALLOWED = 7.97 CFS

18" RCP AT 2.0% SLOPE, Q(CAPACITY) = 15.00 CFS

WEIR STRUCTURE NOTE:
USE CITY OF ROCKWALL YARD INLET DETAIL AND MODIFY IT TO CONSTRUCT THE PROPOSED WEIR STRUCTURE.

ALLOWABLE DISCHARGE VS WEIR DISCHARGE TABLE

DISCHARGE FREQUENCY	ALLOWABLE DISCHARGE THROUGH WEIR (CFS)	TOTAL DISCHARGE THROUGH WEIR (CFS)
Q5	3.98	1.73
Q10	5.65	2.38
Q25	6.26	3.30
Q100	7.97	7.57

PROJECT NO. SP2012-032

MJR Engineering LLC
New Construction • Engineering • Environmental Services
7953 PINKERTON COURT
PLANO, TEXAS 75025
PH: (469) 544-8150 FAX: (972) 767-3003
EMAIL: mkamal67@gmail.com
FIRM # F - 9928

Rockwall Commons, Phase-2
1301 Ridge Road
Rockwall, Texas

JAHVANI CONSULTING ENGINEERS, INC.
TBPE REGISTRATION NO. F-10198
2121 N. JOSEY LANE, #100
CARROLLTON, TEXAS 75006
TEL. (214) 718-9469
jahvani@hotmail.com

REVISIONS	DATE
1 90" CM PIPE HAS BEEN INSTALLED INSTEAD OF 60" HDPE UNDERGROUND DETENTION PIPE.	

SEAL
STATE OF TEXAS
HOUSHANG JAHVANI
72242
LICENSED PROFESSIONAL ENGINEER
5-31-2019

DWG. TITLE:
UNDERGROUND STORMWATER DETENTION COMPUTATIONS.

PROJECT #:
DRAWN BY: HJ
SCALE: 1" = 30'
FILE NO:

DATE 5-31-2019

14 OF 20

SHEET NUMBER

NOTES:

1. NO CONSTRUCTION WORK TO BE DONE INSIDE THE RAIL ROAD RIGHT OF WAY WITHOUT LETTER OF PERMISSION FROM RAIL ROAD AUTHORITIES.

2. FIRE LANE TO BE 6" MIN, 3600 PSI, 6.5 SACK.

EROSION CONTROL PLAN STANDARD GENERAL NOTES

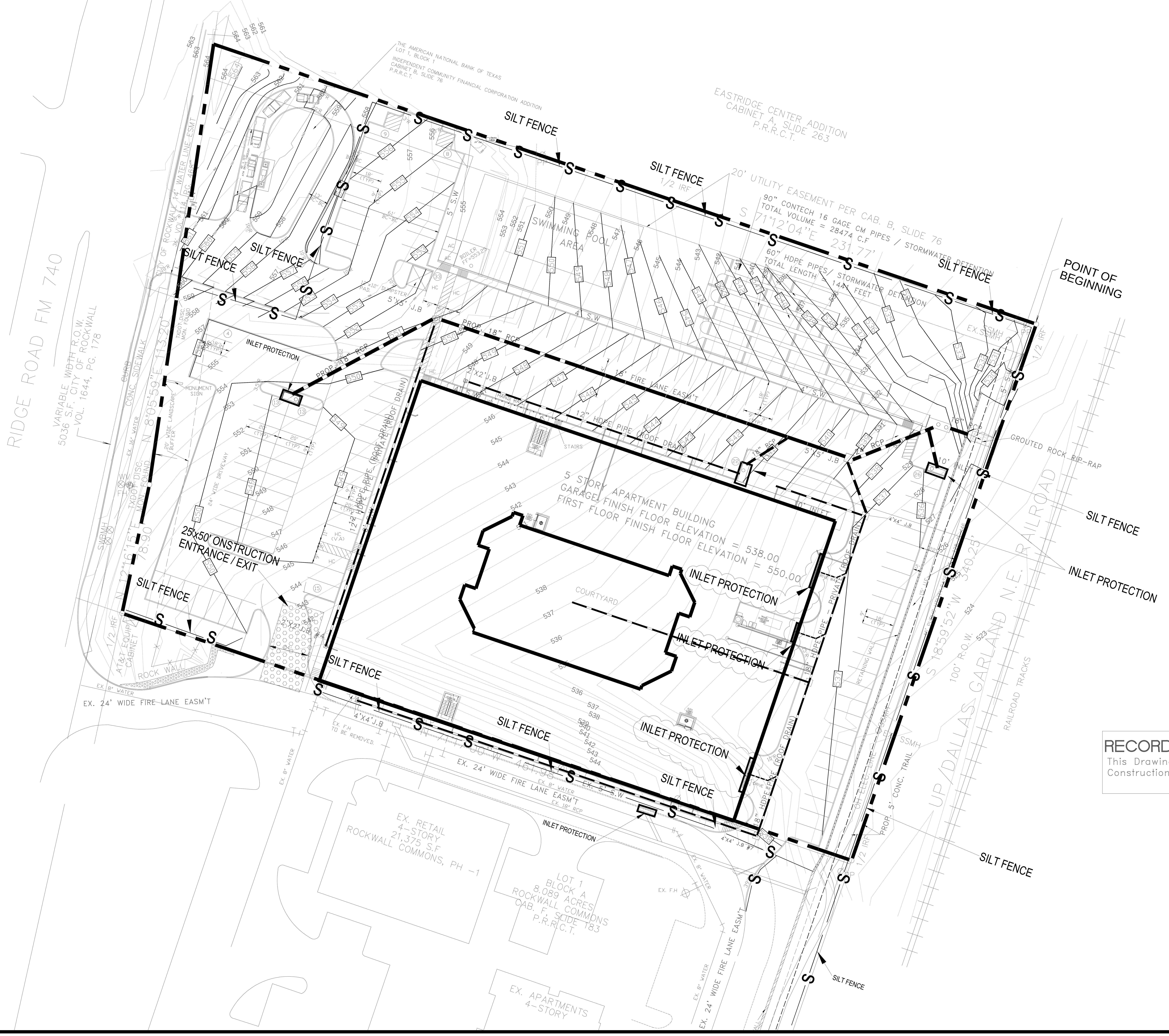
1. EROSION CONTROL DEVICES AS SHOWN ON THE EROSION CONTROL PLAN FOR THE PROJECT SHALL BE INSTALLED PRIOR TO THE START OF LAND DISTURBING ACTIVITIES ON THE PROJECT.

2. ALL EROSION CONTROL DEVICES ARE TO BE INSTALLED IN ACCORDANCE WITH APPROVED PLANS AND SPECIFICATIONS FOR THE PROJECT. CHANGES ARE TO BE APPROVED BEFORE CONSTRUCTION BY THE DESIGN ENGINEER AND THE CITY OF ROCKWALL ENGINEERING DIVISION.

3. IF THE EROSION CONTROL PLAN AS APPROVED CANNOT CONTROL EROSION AND OFF-SITE SEDIMENTATION FROM THE PROJECT, THE EROSION CONTROL PLAN WILL BE REQUIRED TO BE REVISED AND/OR ADDITIONAL EROSION CONTROL DEVICES WILL BE REQUIRED ON-SITE.

4. IF OFF-SITE SOIL BORROW OR SPOIL SITES ARE USED IN CONJUNCTION WITH THIS PROJECT, THIS INFORMATION SHALL BE DISCLOSED AND SHOWN ON THE EROSION CONTROL PLAN. OFF-SITE BORROW AND SPOIL AREAS ARE CONSIDERED A PART OF THE PROJECT SITE AND THEREFORE SHALL COMPLY WITH THE CITY OF ROCKWALL EROSION CONTROL PLAN REQUIREMENTS. THESE AREAS SHALL BE STABILIZED WITH PERMANENT GROUND COVER PRIOR TO FINAL APPROVAL OF THE PROJECT.

5. 75-80% OF ALL DISTURBED AREA TO HAVE A MINIMUM OF 1 INCH TALL GRASS ESTABLISHED PRIOR TO ENGINEERING ACCEPTANCE IF SITE.



ASBUILT

RECORD DRAWING
This Drawing Has Been Modified to Reflect Construction Records Provided To the Engineer.
5-31-2019

GRAPHIC SCALE 1" = 30' (0, 30, 60)

LEGENDS:

- = CONSTRUCTION ENTRANCE
- —S— = SILT FENCE
- ▭ = INLET PROTECTION

PROJECT NO. SP2012-032

MJR Engineering inc.
New Construction • Engineering • Environmental Services
7953 PINKERTON COURT
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2121 N. JOSEY LANE, #100
CARROLLTON, TEXAS 75006
TEL. (214) 718-9469
jahvani@hotmail.com

REVISIONS	DATE
ADDED 3 MORE INLET PROTECTIONS.	2-15-2015

SEAL: STATE OF TEXAS — HOUSHANG JAHVANI — 72242 — REGISTERED PROFESSIONAL ENGINEER — 5-31-2019

DWG. TITLE: EROSION CONTROL PLAN

PROJECT #:
DRAWN BY: HJ
SCALE: 1" = 30'
FILE NO:
DATE 5-31-2019

Solid Waste Management

DESCRIPTION
Large volumes of solid waste are often generated at construction sites including: packaging, pallets, wood waste, concrete waste, soil, electrical wiring, cuttings, and a variety of other materials. The solid waste management practice lists techniques to minimize the potential of storm water contamination from solid waste through appropriate storage and disposal practices.

PRIMARY USE
These practices should be a part of all construction practices. By limiting the trash and debris on site, storm water quality is improved along with reduced clean up requirements at the completion of the project.

APPLICATIONS
The solid waste management practice for construction sites is based on proper storage and disposal practices by construction workers and supervisors.. Key elements of the program are education and modification of improper disposal habits..
Cooperation and vigilance is required on the part of supervisors and workers to ensure that the recommendations and procedures are followed. Following are lists describing the targeted materials and recommended procedures:

- ☐ Targeted Solid Waste Materials
  - Paper and cardboard containers
  - Plastic packaging
  - Styrofoam packing and forms
  - Insulation materials (non-hazardous)
  - Wood pallets
  - Wood cuttings
  - Pipe and electrical cuttings
  - concrete, brick, and mortar waste
  - Shingle cuttings and waste
  - Roofing tar
  - Steel (cuttings, nails, rust residue)
  - Gypsum board cuttings and waste
  - Sheathing cuttings and waste
  - Miscellaneous cuttings and waste
  - Food waste
  - Demolotion waste

Storage Procedures
- ☐ Wherever possible, minimize production of solid waste materials.
- ☐ Designate a foreman or supervisor to oversee and enforce proper solid waste procedures.
- ☐ Instruct construction workers in proper solid waste procedures.
- ☐ Segregate potentially hazaedous waste from non-hazardous construction site debris.
- ☐ Keep solid waste materials under cover in either a closed dumpster or other enclosed trash container that limits contact with rain and runoff.
- ☐ Store waste materials away from drainage ditches, swales and catch basins.
- ☐ Do not allow trash containers to overflow.
- ☐ Do not allow waste materials to accumulate on the ground.
- ☐ Prohibit littering by workers and visitors.
- ☐ Police area daily for litter and debris.
- ☐ Enforce solid waste handling and storage procedures.

Disposal Procedures
- ☐ If feasible, segregate recyclable wastes from non-recyclable waste materials and dispose of properly.
- ☐ General construction debris may be hauled to a licensed construction debris landfill (typically less expensive than a sanitary landfill).
- ☐ Use waste facilities approved by local jurisdiction.
- ☐ Runoff which comes into contact with unprotected waste shall be directed into structural be dirtreatment such as silt fence to remove debris.

Education
- ☐ Educate all workers on solid waste storage and disposal procedures.
- ☐ Instruct workers in identification of solid waste and hazardous waste.
- ☐ Have regular meetings to discuss and reinforce disposal procedures (incorporate in regular safety seminars).
- ☐ Clearly mark on all solid waste containers which materials are acceptable.

Quality Control
- ☐ Foreman and/or construction supervisor shall monitor on-site solid waste storage and disposal procedures.
- ☐ Disipline workers who repeatedly violate procedures.

Requirements
- ☐ Job-site waste handling and disposal education and awareness program.
- ☐ Commitment by management to implement and enforce Solid Waste Management Program.
- ☐ Compliance by workers.
- ☐ Sufficient and appropriate waste storage containers.
- ☐ Timely removal of stored solid waste materials.
- ☐ Possible modest cost impact for additional waste storage containers.
- ☐ Minimal overall cost impact.

LIMITATIONS
Only addresses non-hazardous solid waste.
One part of a comprehensive construction site management program.

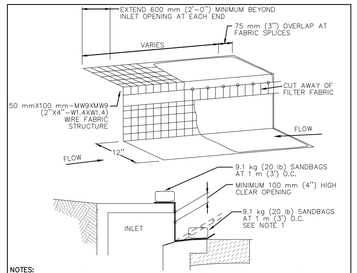
Applications
Perimeter Control
Slope Protection
Sediment Trapping
Channel Protection
Temporary Stabilization
Permanent Stabilization
Waste Management
Housekeeping Practices

Targeted Constituents
○ Sediment
● Nutrients
Toxic Materials
○ Oil & Grease
● Floatable Materials
● Other Construction Wastes

Implementation Requirements
◒ Capital Costs
◒ Maintenance
◒ Training
○ Suitability for Slopes > 5%

Legend
● Significant Impact
◒ Medium Impact
○ Low Impact
? Unknown or Questionable Impact

W-1



NOTES:
1. TO HOLD THE FILTER DIKE IN PLACE, 9.1 kg (20 lb) SANDBAGS SHALL BE USED AT 1 m (3') O.C. WHERE MINIMUM CLEARANCES CAUSE TRAFFIC TO DRIVE IN THE GUTTER, THE CONTRACTOR MAY SUBSTITUTE A 25 mm X 100 mm (1" x4") BOARD, SECURED WITH ⅜" OR ½" CONCRETE SCREWS. THE ⅜" OR ½" CONCRETE SCREWS SHALL BE ATTACHED TO THE GUTTER BY DRILLING AN APPROPRIATE PILOT HOLE WITH A CONCRETE BIT AND INSERT PLASTIC FASTENERS. THE TOP OF THE SCREW SHALL BE RECESSED BELOW THE TOP OF THE BOARD. THE SCREWS SHALL BE PLACED ON 1 m (3') O.C. THIS METHOD IS USED IN LIEU OF SANDBAGS, IN THE GUTTER ONLY, TO HOLD THE FILTER DIKE IN PLACE. UPON REMOVAL, EITHER LEAVE THE PLASTIC FASTENERS IN PLACE, OR REMOVE THE PLASTIC FASTENERS, CLEAN ANY DIRT/DEBRIS FROM THE SCREW LOCATIONS, APPLY CHEMICAL SANDING AGENT AND APPLY NON-SHRINK GROUT FLUSH WITH THE SURFACE OF THE GUTTER. THIS METHOD SHALL NOT BE USED ON THE INLET IN THE LIEU OF SANDBAGS.
2. A SECTION OF FILTER FABRIC SHALL BE REMOVED AS SHOWN ON THIS DETAIL OR AS DIRECTED BY THE ENGINEER OR DESIGNATED REPRESENTATIVE. FABRIC MUST BE SECURED TO WIRE BACKING WITH CLIPS OR HOG RINGS AT THIS LOCATION.
3. DAILY INSPECTION SHALL BE MADE BY THE CONTRACTOR AND SILT ACCUMULATION MUST BE REMOVED WHEN DEPTH REACHES 50 mm (2").
4. CONTRACTOR SHALL MONITOR THE PERFORMANCE OF INLET PROTECTION DURING EACH RAINFALL EVENT AND IMMEDIATELY REMOVE THE INLET PROTECTIONS IF THE STORM-WATER BEGINS TO OVERTOP THE CURB.
5. INLET PROTECTIONS SHALL BE REMOVED AS SOON AS THE SOURCE OF SEDIMENT IS STABILIZED.

FILTER DIKE CURB INLET PROTECTION DETAIL

Hazardous Waste Management

DESCRIPTION
The hazardous waste management BMP addresses the problem of storm water polluted with hazardous waste through spills or other forms of contact. The objective of the Management Program is to minimize the potential of stormwater contamination from common construction site hazardous wastes through appropriate recognition, handling, storage and disposal practices.

It is not the intent of this Management Program to supersede or replace normal site assesment and remediation procedures. Significant spills and/or contamination warrant immediate response by trained professionals. Suspected job-site contaminants should be immediately reported to regulatory authorities and protective actions taken. The General Permit requires reporting of significant spills to the National Response Center (NRC) at (800) 424-8802.

INSTALLATION, APPLICATION AND DISPOSAL CRITERIA
The hazardous waste management techniques presented here are based on proper recognition, handling, and disposal practices by construction workers and supervisors. Key elements of the management program are education, proper disposal practices, as well as provisions for safe storage and disposal. Following are lists describing the targeted materials and recommended procedures:

- ☐ Targeted Solid Waste Materials
  - Paints
  - Solvents
  - Stains
  - Wood preservatives
  - Cutting oils
  - Greases
  - Roofing tar
  - Pesticides
  - Fuels and lube oils
  - Lead based paints (Demolition)

Storage Procedures
- ☐ Wherever possible, minimize use of hazardous materials.
- ☐ Minimize generation of hazardous wastes on the job-site.
- ☐ Segregate potentially hazaedous waste from non-hazardous construction site debris.
- ☐ Designate a foreman or supervisor to oversee hazardous materials handling procedures.
- ☐ Keep liquid or semi-liquid hazardous waste in appropriate containers (closed drums or similar) and under cover.
- ☐ Store waste materials away from drainage ditches, swales and catch basins.
- ☐ Use containment berms in fueling and maintenance areas and where the potential for spills is high.
- ☐ Ensure that adequate hazardous waste storage volume is available.
- ☐ Ensure tht hazardous waste collection containers are conveniently located.
- ☐ Do not allow potentially hazardous waste materials to accumulate on the ground.
- ☐ Enforce hazardous waste handling and disposal procedures.
- ☐ Clearly mark on all hazardous waste containers which materials are acceptable for the container.

Disposal Procedures
- ☐ Regularly schedule hazardous removal to minimize on-site storage.
- ☐ Use only reputable, licensed hazardous waste haulers.

Education
- ☐ Instruct workers in identification of hazardous waste.
- ☐ Educate workers of potential dangers to humans and the environment from hazardous wastes.
- ☐ Instruct workers on safety procedures for common construction site hazardous wastes.
- ☐ Educate all workers on hazardous waste storage and disposal procedures.
- ☐ Have regular meetings to discuss and reinforce identification, handling and disposal procedures (incorporate in regular safety seminars).
- ☐ Establish a continuing education program to indoctrinate new employees.

Quality Assurance
- ☐ Foreman and/or construction supervisor shall monitor on-site hazardous waste storage and disposal procedures.
- ☐ Educate and if necessary, discipline workers who violate procedures.
- ☐ Ensure that the hazardous waste disposal contractor is reputable and licensed.

Requirements
- ☐ Job-site hazardous waste handling and disposal education and awareness program.
- ☐ Commitment by management to implement hazardous waste management practices.
- ☐ Compliance by workers.
- ☐ Sufficient and appropriate hazardous waste storage containers.
- ☐ Timely removal of stored hazardous waste materials.

Costs
- ☐ Possible modest cost impact for additional hazardous storage containers.
- ☐ Commitment by management to implement hazardous waste management practices.
- ☐ Small cost impact for training and monitoring.
- ☐ Potential cost impact for hazardous waste collection and disposal by licensed hauler - actual cost depends on type of material and volume.

LIMITATIONS
This practice is not intended to address site-assessments and pre-existing contamination. Major contamination, large spills and other serious hazardous waste incidents require immediate response from specialists.
Demolition activities and potential pre-existing materials, such as asbestos, are not addressed by this program. Site specific information on plans is necessary.
Contaminated soils are not addressed.
One part of a comprehensive construction site waste management program.

Applications
Perimeter Control
Slope Protection
Sediment Trapping
Channel Protection
Temporary Stabilization
Permanent Stabilization
Waste Management
Housekeeping Practices

Targeted Constituents
○ Sediment
● Nutrients
Toxic Materials
● Oil & Grease
○ Floatable Materials
● Other Construction Wastes

Implementation Requirements
◒ Capital Costs
◒ Maintenance
◒ Training
○ Suitability for Slopes > 5%

Legend
● Significant Impact
◒ Medium Impact
○ Low Impact
? Unknown or Questionable Impact

W-2

Concrete Waste Management

DESCRIPTION
Concrete waste at construction sites comes in two forms; 1)excess fresh concrete mix including truck and equipment washing, and 2) concrete dust and concrete debris resulting from demolition. Both forms have the potential to impact water quality through storm water runoff contact with the waste.

PRIMARY USE
Concrete waste is present at most construction sites. This BMP should be utilized at sites in which concrete waste is present.

APPLICATIONS
A number of water quality parameters can be affected by introduction of concrete – especially fresh concrete. Concrete affects the pH of runoff, causing significant chemical changes in water bodies and harming aquatic life. Suspended solids in the form of both cement and aggregate dust are also generated from both fresh and demolished concrete waste.

Current Unacceptable Waste Concrete Disposal Practices
- ☐ Dumping in vacant areas on the job-site.
- ☐ Illicit dumping off-site.
- ☐ Dumping into ditches or drainage facilities.

Recommended Disposal Practices
- ☐ Avoid unacceptable disposal practices listed above.
- ☐ Develop pre-determined, safe concrete disposal areas.
- ☐ Provide a washout area with a minimum of 6 cubic feet of containment area volume for every 10 cubic yards of concrete poured.
- ☐ Never dump waste concret illicitly or without property owners knowledge and consent.
- ☐ Treat runoff from storage areas through the use of structural controls as required.

Education
- ☐ Drivers and equipment operators should be instructed on proper disposal and equipment washing practices (see above).
- ☐ Supervisors must be made aware of the potential enviornmental consequences of improperly handled concrete waste.

Enforcement
- ☐ The construction site manager or foreman must ensure that employees and pre-mix companies follow proper procedures for concrete disposal and equipment washing.
- ☐ Employees violating disposal or equipment cleaning directives must be re-educated or disciplined if necessary.

Demolition Practices
- ☐ Monitor weather and wind direction to ensure concrete dust is not entering drainage structures and surface waters. Where appropriate, construct sediment traps or other types of sediment detention devices downstream of demolition activities.

Requirements
- ☐ Use pre-determined disposal sites for waste concrete.
- ☐ Prohibit dumping waste concrete anywhere but pre-determined areas.
- ☐ Assign pre-determined truck and equipment washing areas
- ☐ Educate drivers and operators on proper disposal and equipment cleaning procedures.

Education
- ☐ Minimal cost impact for training and monitoring.
- ☐ Concrete disposal cost depends on availability and distance to suitable disposal areas.
- ☐ Additional costs involved in equipment washing could be significant.

LIMITATIONS
This concrete waste management program is one part of a comprehensive construction site waste management program.

Applications
Perimeter Control
Slope Protection
Sediment Trapping
Channel Protection
Temporary Stabilization
Permanent Stabilization
Waste Management
Housekeeping Practices

Targeted Constituents
○ Sediment
● Nutrients
Toxic Materials
○ Oil & Grease
● Floatable Materials
● Other Construction Wastes

Implementation Requirements
◒ Capital Costs
◒ Maintenance
◒ Training
○ Suitability for Slopes > 5%

Legend
● Significant Impact
◒ Medium Impact
○ Low Impact
? Unknown or Questionable Impact

W-3

STABILIZED CONSTRUCTION ENTRANCE

GENERAL NOTES:

1. STONE SHALL BE 4 TO 6 INCH DIAMETER CRUSHED ROCK. NO PORTLAND CEMENT CONCRETE ALLOWED.

2. LENGTH SHALL BE SHOWN ON PLANS, WITH A MINIMUM LENGTH OF 30 FEET FOR LOTS WHICH ARE LESS THAN 150 FEET FROM EDGE OF PAVEMENT. THE MINIMUM DEPTH IN ALL OTHER CASES SHALL BE 50 FEET.

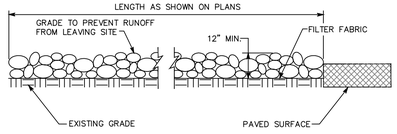
3. THE THICKNESS SHALL NOT BE LESS THAN 12 INCHES.

4. THE WIDTH SHALL BE NO LESS THAN THE FULL WIDTH OF ALL POINTS OF INGRESS OR EGRESS.

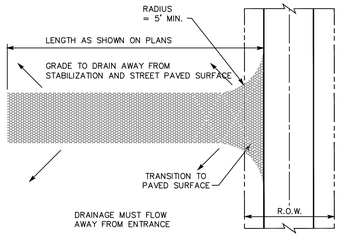
5. WHEN NECESSARY, VEHICLES SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO A PUBLIC ROADWAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE WITH DRAINAGE FLOWING AWAY FROM BOTH THE STREET AND THE STABILIZED ENTRANCE. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATERCOURSE USING APPROVED METHODS.

6. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PAVED SURFACES. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PAVED SURFACES, MUST BE REMOVED IMMEDIATELY.

7. THE ENTRANCE MUST BE PROPERLY GRADED TO INCORPORATE A DRAINAGE SWALE TO PREVENT RUNOFF FROM LEAVING THE CONSTRUCTION SITE.



PROFILE VIEW
N.T.S.



PLAN VIEW
N.T.S.

ASBUILT

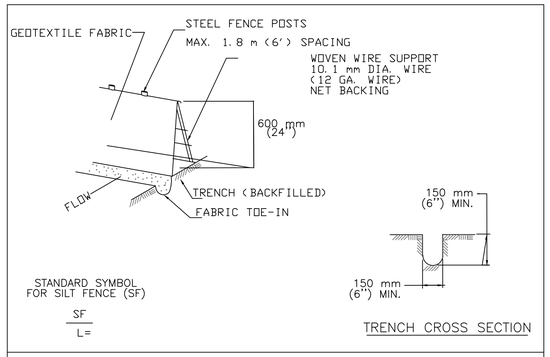
FIGURE 4.3.B
EROSION CONTROL PLAN
STANDARD GENERAL NOTES

1. EROSION CONTROL DEVICES AS SHOWN ON THE EROSION CONTROL PLAN FOR THE PROJECT SHALL BE INSTALLED PRIOR TO THE START OF LAND DISTURBING ACTIVITIES ON THE PROJECT.

2. ALL EROSION CONTROL DEVICES ARE TO BE INSTALLED IN ACCORDANCE WITH APPROVED PLANS AND SPECIFICATIONS FOR THE PROJECT. CHANGES ARE TO BE APPROVED BEFORE CONSTRUCTION BY THE DESIGN ENGINEER AND THE CITY OF ROCKWALL ENGINEERING DIVISION.

3. IF THE EROSION CONTROL PLAN AS APPROVED CANNOT CONTROL EROSION AND OFF-SITE SEDIMENTATION FROM THE PROJECT, THE EROSION CONTROL PLAN WILL BE REQUIRED TO BE REVISED AND/OR ADDITIONAL EROSION CONTROL DEVICES WILL BE REQUIRED ON-SITE.

4. IF OFF-SITE SOIL BORROW OR SPOIL SITES ARE USED IN CONJUNCTION WITH THIS PROJECT, THIS INFORMATION SHALL BE DISCLOSED AND SHOWN ON THE EROSION CONTROL PLAN. OFF-SITE BORROW AND SPOIL AREAS ARE CONSIDERED A PART OF THE PROJECT SITE AND THEREFORE SHALL COMPLY WITH THE CITY OF ROCKWALL EROSION CONTROL PLAN REQUIREMENTS. THESE AREAS SHALL BE STABILIZED WITH PERMANENT GROUND COVER PRIOR TO FINAL APPROVAL OF THE PROJECT.



STANDARD SYMBOL FOR SILT FENCE (SF)

SF
L=

TRENCH CROSS SECTION

NOTES:
1. STEEL POSTS WHICH SUPPORT THE SILT FENCE SHALL BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POST MUST BE EMBEDDED A MINIMUM OF 12 INCHES.
2. THE TOE OF THE SILT FENCE SHALL BE TRENCHED IN WITH A SPADE OR MECHANICAL TRENCHER, SO THAT THE DOWNSLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW. WHERE FENCE CAN NOT BE TRENCHED INTO THE SURFACE (E.G. PAVEMENT), THE FABRIC FLAP SHALL BE WEIGHTED DOWN WITH WASHED GRAVEL ON UPHILL SIDE TO PREVENT FLOW UNDER FENCE.
3. THE TRENCH MUST BE A MINIMUM OF 150 mm (6 inches) DEEP AND 150 mm (6 inches) WIDE TO ALLOW FOR THE SILT FENCE FABRIC TO BE LAID IN THE GROUND AND BACKFILLED WITH COMPACTED MATERIAL.
4. SILT FENCE SHOULD BE SECURELY FASTENED TO EACH STEEL SUPPORT POST OR TO WOVEN WIRE, WHICH IS IN TURN ATTACHED TO THE STEEL FENCE POST.
5. INSPECTION SHALL BE MADE WEEKLY OR AFTER EACH RAINFALL EVENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
6. SILT FENCE SHALL BE REMOVED WHEN THE SITE IS COMPLETELY STABILIZED SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.
7. ACCUMULATED SILT SHALL BE REMOVED WHEN IT REACHES A DEPTH OF 150 mm (6 inches). THE SILT SHALL BE DISPOSED OF ON AN APPROVED SITE AND IN SUCH A MANNER THAT WILL NOT CONTRIBUTE TO ADDITIONAL SILTATION.

SILT FENCE DETAILS

RECORD DRAWING
This Drawing Has Been Modified to Reflect Construction Records Provided To the Engineer.
5-31-2019

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New Construction • Engineering • Environmental Services
7953 PINKERTON COURT
PLANO, TEXAS 75025
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Rockwall Commons, Phase-2
1301 Ridge Road
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JAHVANI CONSULTING ENGINEERS, INC.
TBPE REGISTRATION NO. F-10198
2121 N. JOSEY LANE, #100
CARROLLTON, TEXAS 75006
TEL. (214) 718-9469
jahvani@hotmail.com

REVISIONS	DATE

SEAL
STATE OF TEXAS
HOUSHANG JAHVANI
72242
REGISTERED PROFESSIONAL ENGINEER
5-31-2019

DWG. TITLE:
EROSION CONTROL DETAILS

PROJECT #:
DRAWN BY: HJ
SCALE: 1" = 30'
FILE NO:

DATE 5-31-2019

16 OF 20
SHEET NUMBER

TOTAL AREA OF SITE = 166,755.00 S.F
TOTAL AREA OF OPEN SPACE REQUIRED = 20% OF SITE = 33,351.00 S.F
TOTAL AREA OF OPEN SPACE PROVIDED = 28.71% OF SITE = 47,870.00 S.F

TOTAL ON-SITE CALIPER PROTECTED TREES TO BE REMOVED = 204 INCHES
TOTAL OFF-SITE CALIPER PROTECTED TREES TO BE REMOVED = 174 INCHES
TOTAL ON-SITE AND OFF-SITE CALIPER PROTECTED TREES TO BE REMOVED = 378 INCHES
TOTAL CALIPER PROTECTED TREES TO BE PLANTED = 326 INCHES
TOTAL OFF-SITE CALIPER PROTECTED TREES TO BE PROTECTED = 59 INCHES

TOTAL CALIPER PROTECTED TREES TO BE REMOVED = 378 INCHES
TOTAL CALIPER PROTECTED TREES TO BE SAVED OR PLANTED = 59 + 326 = 385 INCHES

0 30 60
GRAPHIC SCALE
1" = 30'

ASBUILT

SHRUBS TO BE PLANTED 4' BEHIND THE CURB.
(BACK OF THE CURB TO FACE OF THE RETAING WALL = 7')

RECORD DRAWING
This Drawing Has Been Modified to Reflect Construction Records Provided To the Engineer.
5-31-2019

PLANTING SCHEDULE (LARGE TREES)

SYMBOL		QUANTITY	COMMON NAME	BOTANICAL NAME	SIZE/ CAL.	HEIGHT	SPACING
	BC QTY	10	BALD CYPRESS	Taxodium Distichum	4"	10' MIN.	AS-SHOWN' MIN
	BO QTY	11	BUR OAK	Quercus Macrocarpa	4"	10' MIN.	AS-SHOWN' MIN
	Mag QTY	14	MAGNOLIA	Grandiflora	4"	8' MIN.	AS-SHOWN' MIN

PLANTING SCHEDULE (SMALL ORNAMENTAL TREES)

SYMBOL		QUANTITY	COMMON NAME	BOTANICAL NAME	SIZE/ CAL.	HEIGHT	SPACING
	CM QTY	41	CRAPE MYRTLE (RED)	Lagerstroemia Indica	4" MULTI-TRUNK	8' MIN.	AS SHOWN
	RB QTY	11	RED BUD	Cercis Canadensis	2"	8' MIN.	AS-SHOWN

PLANTING SCHEDULE (SHRUBS)

SYMBOL		QUANTITY	COMMON NAME	BOTANICAL NAME	SIZE/ CAL.	HEIGHT	SPACING
	TS QTY	8	TEXAS SAGE	Leucophyllum Frutescens	2 GAL.	24"	AS SHOWN
	IH QTY	179	INDIAN HAWTHORN	Raphiolepis Indica	2 GAL.	24"	3' O.C
	K.R QTY	17	KNOCK OUT ROSES	–	2 GAL.	24"	3' O.C

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jahvani@hotmail.com

REVISIONS DATE

SEAL
STATE OF TEXAS
HOUSHANG JAHVANI
92242
LICENSED PROFESSIONAL ENGINEER
5-31-19

DWG. TITLE:
LANDSCAPE PLAN

PROJECT #:
DRAWN BY: HJ
SCALE: 1" = 30'
FILE NO:

DATE 5-31-2019

17 OF 20
SHEET NUMBER

ASBUILT

PROPERTIES / REINFORCING STEEL FOR 32'-0" PANEL (DESIGN A) / QUANTITIES FOR 32'-0" PANEL

WALL HEIGHT "H"

SURCHARGE LEVEL NONE / SLOPED NONE	1' / UP TO 7:1	2' / " 5:1	3' / " 3½:1	4' / " 2½:1	5' / " 2:1	6' / " 1¾:1	7' / " 1½:1	FW	TW	SW	HW	FT	KW	MAX. SOIL PRESS, T/O'	MAX. REQ'D. A'S 0"/FT. STEM	TOE	HEEL
1								0	0	1'-0"	0	0	0	0	.125	0	0
2	1							1'-4"	4"	1'-0"	0	9"	9"	.235	.125	.125	.125
3	2	1						1'-8"	8"	1'-0"	0	9"	9"	.325	.125	.125	.125
4	3	2	1					2'-0"	8"	1'-0"	4"	1'-0"	9"	.236	.125	.125	.125
5	4	3	2	1				2'-7½"	10½"	1'-0"	9"	1'-0"	9"	.320	.125	.125	.125
6	5	4	3	2	1			3'-1½"	1'-1"	1'-0"	1'-0½"	1'-0"	9"	.403	.125	.125	.125
7	6	5	4	3	2	1		3'-9"	1'-3"	1'-0"	1'-6"	1'-0"	9"	.485	.125	.125	.125
8	7	6	5	4	3	2	1	4'-3"	1'-5"	1'-0"	1'-10"	1'-0"	9"	.576	.154	.125	.125
9	8	7	6	5	4	3	2	4'-9"	1'-7"	1'-0"	2'-2"	1'-0"	9"	.666	.229	.125	.158
10	9	8	7	6	5	4	3	5'-3"	1'-9"	1'-0"	2'-6"	1'-0"	9"	.755	.327	.173	.280
11	10	9	8	7	6	5	4	5'-10"	1'-11½"	1'-0"	2'-10½"	1'-0"	9"	.817	.448	.234	.401
12	11	10	9	8	7	6	5	6'-4½"	2'-1½"	1'-0"	3'-3"	1'-0"	9"	.895	.596	.302	.553
13	12	11	10	9	8	7	6	6'-10½"	2'-3½"	1'-0"	3'-7"	1'-0"	9"	.980	.774	.384	.722
14	13	12	11	10	9	8	7	7'-4½"	2'-5½"	1'-0"	3'-11"	1'-0"	9"	1.064	.985	.480	.924
15	14	13	12	11	10	9	8	7'-10½"	2'-7½"	1'-1⅛"	4'-1⅞"	1'-0"	9"	1.148	1.086	.591	1.113
16	15	14	13	12	11	10	9	8'-4½"	2'-9½"	1'-2"	4'-5"	1'-3"	1'-0"	1.250	1.173	.538	.971
17	16	15	14	13	12	11	10	8'-10½"	2'-11½"	1'-3 1/16"	4'-7 15/16"	1'-3"	1'-0"	1.333	1.297	.844	1.148
18	17	16	15	14	13	12	11	9'-4½"	3'-1½"	1'-3 15/16"	4'-11⅞"	1'-6"	1'-3"	1.434	1.383	.613	1.057
19	18	17	16	15	14	13	12	9'-11½"	3'-4"	1'-5 1/16"	5'-2⅞"	1'-6"	1'-3"	1.489	1.513	.724	1.246
20	19	18	17	16	15	14	13	10'-4½"	3'-5½"	1'-6 3/16"	5'-4 13/16"	1'-6"	1'-3"	1.601	1.650	.838	1.414
21	20	19	18	17	16	15	14	10'-10½"	3'-7½"	1'-7"	5'-8"	1'-9"	1'-6"	1.702	1.758	.811	1.336
22	21	20	19	18	17	16	15	11'-4½"	3'-9½"	1'-8⅛"	5'-10⅞"	1'-9"	1'-6"	1.785	1.939	.931	1.521
23	22	21	20	19	18	17	16	12'-0"	4'-0"	1'-9¼"	6'-2¾"	1'-9"	1'-6"	1.832	2.066	1.063	1.767
24	23	22	21	20	19	18	17	12'-4½"	4'-1½"	1'-10⅛"	6'-4⅞"	2'-0"	1'-6"	1.986	2.189	1.046	1.648
25	24	23	22	21	20	19	18	12'-11½"	4'-4"	1'-11¼"	6'-8¼"	2'-0"	1'-6"	2.025	2.359	1.177	1.870
26	25	24	23	22	21	20	19	13'-5½"	4'-6"	2'-0⅛"	6'-11⅜"	2'-3"	1'-6"	2.133	2.408	1.187	1.813
27	26	25	24	23	22	21	20	13'-11½"	4'-8"	2'-1¼"	7'-2¼"	2'-3"	1'-6"	2.208	2.672	1.299	2.028
28	27	26	25	24	23	22	21	14'-5½"	4'-10"	2'-2⅜"	7'-5⅝"	2'-3"	1'-9"	2.291	2.862	1.448	2.235
29	28	27	26	25	24	23	22	14'-11½"	5'-0"	2'-3½"	7'-8"	2'-3"	1'-9"	2.374	3.057	1.603	2.468
30	29	28	27	26	25	24	23	15'-5½"	5'-2"	2'-4⅝"	7'-10⅞"	2'-3"	1'-9"	2.456	3.261	1.771	2.717
31	30	29	28	27	26	25	24	15'-11½"	5'-4"	2'-5¾"	8'-1¾"	2'-3"	1'-9"	2.539	3.470	1.951	2.992
32	31	30	29	28	27	26	25	16'-5½"	5'-6"	2'-6 15/16"	8'-4 13/16"	2'-6"	1'-9"	2.639	3.631	1.963	2.888
A	B	C	D	E	F	G	K	DESIGN									

REINFORCING STEEL FOR 32'-0" PANEL (DESIGN A)

H (Design A)	+ A1 26~#5 @ 15" LGTH.	WT.	+ A2 25~#6 @ 15" LGTH.	WT.	A3 25~#7 @ 15" LGTH.	WT.	** A4 26~#8 @ 15" LGTH.	WT.	** A5 25~#9 @ 15" LGTH.	WT.	A6 25~#11 @ 15" LGTH.	WT.	A7 26~#11 @ 15" LGTH.	WT.
1														
2														
3														
4	3'-2"	86												
5	4'-5"	120												
6	5'-7"	151												
7	6'-9"	183												
8	7'-11"	215												
9	9'-1"	246												
10	10'-3"	278	3'-4"	125										
11	11'-5"	310	4'-5"	166										
12	12'-8"	343	5'-6"	207										
13	13'-10"	375	6'-7"	247	4'-6"	230								
14	14'-11"	405	7'-8"	288	5'-8"	290								
15	16'-3"	441	8'-9"	329	6'-11"	353								
16	13'-0"	353	9'-10"	389	8'-2"	417	5'-7"	388						
17	13'-0"	353	10'-11"	410	9'-5"	481	6'-10"	474						
18	13'-0"	353	12'-0"	451	10'-7"	541	8'-1"	561						
19	13'-0"	353	13'-1"	491	11'-11"	609	9'-5"	654						
20	13'-0"	353	14'-2"	532	13'-2"	673	10'-7"	336						
21	13'-0"	353	11'-0"	413	14'-5"	737	11'-10"	821	6'-11"	588				
22	13'-0"	353	11'-0"	413	15'-8"	801	13'-1"	908	8'-1"	687				
23	13'-0"	353	11'-0"	413	16'-11"	864	14'-5"	1001	9'-4"	1004				
24	13'-0"	353	11'-0"	413	18'-2"	928	15'-7"	1082	10'-8"	1130				
25	13'-0"	353	11'-0"	413	12'-0"	613	16'-11"	1174	11'-9"	999	5'-1"	675		
26	13'-0"	353	11'-0"	413	12'-0"	613	18'-2"	1261	13'-0"	1105	6'-1"	808		
27	13'-0"	353	11'-0"	413	12'-0"	613	19'-5"	1348	14'-2"	1204	7'-1"	941		
28	13'-0"	353	11'-0"	413	12'-0"	613	20'-8"	1435	15'-5"	1658	8'-1"	1074		
29	13'-0"	353	11'-0"	413	12'-0"	613	21'-11"	1521	16'-8"	1793	9'-1"	1206		
30	13'-0"	353	11'-0"	413	12'-0"	613	13'-10"	960	17'-10"	1516	10'-1"	1339	11'-9"	1623
31	13'-0"	353	11'-0"	413	12'-0"	613	13'-10"	960	19'-1"	1622	11'-1"	1472	13'-0"	1796
32	13'-0"	353	11'-0"	413	12'-0"	613	13'-10"	960	20'-3"	2690	12'-1"	1605	14'-3"	1988

** FOR H=20' USE #9 BARS A4

** FOR FOLLOWING HEIGHTS USE #10 BARS A5 H=23' H=24' H=28' H=29'

** FOR WALLS 32' HIGH USE #11 BARS A5

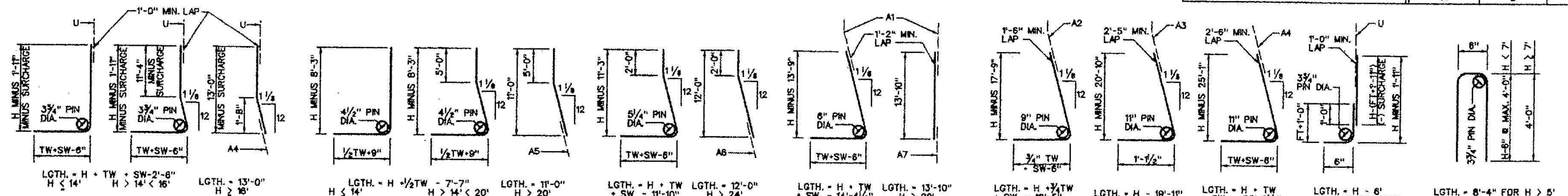
H (Design A)	B 26~#5 @ 15" LGTH.	WT.	C NO.	SIZE	SPA.	LGTH.	WT.	D #5 X 31'-6" @ 12" & 18" NO.	WT.	F ° #8 X 3'-0" @ 12" NO.	WT.	H #5 X 31'-6" @ 12" NO.	WT.	T #5 X 31'-6" @ 12" NO.	WT.	***U 26~#5 @ 15" LGTH.	WT.
1								2	66	2	16					1'-4"	36
2								2	66	3	24			2	66	3'-4"	90
3								4	131	4	32	2	66	2	66	5'-4"	145
4	3'-6"	95	26	#4	15"	1'-10"	32	5	164	5	40	2	66	2	66	7'-4"	199
5	4'-6"	122	26	#4	15"	2'-3"	39	7	230	6	48	2	66	2	66	8'-4"	226
6	5'-6"	149	26	#4	15"	2'-8"	46	9	296	7	56	3	99	2	66	8'-4"	226
7	6'-6"	176	26	#4	15"	3'-0"	52	10	329	8	64	3	99	2	66	8'-4"	226
8	7'-6"	203	26	#4	15"	3'-4"	58	12	394	9	72	3	99	3	99	8'-4"	226
9	8'-6"	231	26	#4	15"	3'-8"	64	13	427	10	80	3	99	3	99	8'-4"	226
10	9'-6"	258	38	#4	10"	4'-0"	102	15	493	11	88	4	131	3	99	8'-4"	226
11	10'-6"	285	38	#6	10"	4'-4"	247	17	559	12	96	4	131	3	99	8'-4"	226
12	11'-6"	312	38	#6	10"	4'-9"	271	19	624	13	104	4	131	4	131	8'-4"	226
13	12'-6"	339	38	#7	10"	5'-1"	395	20	657	14	112	5	164	4	131	8'-4"	226
14	13'-6"	366	38	#8	10"	5'-5"	550	22	723	14	112	5	164	4	131	8'-4"	226
15	14'-6"	393	38	#9	10"	5'-9"	743	24	789	15	120	6	197	4	131	8'-4"	226
16	15'-6"	420	38	#9	10"	6'-1"	786	25	821	16	128	6	197	4	131	8'-4"	226
17	16'-6"	447	38	#9	10"	6'-5"	829	27	887	17	136	7	230	5	164	8'-4"	226
18	17'-6"	475	38	#9	10"	6'-9"	872	29	953	18	144	7	230	5	164	8'-4"	226
19	18'-6"	502	38	#9	10"	7'-2"	926	30	986	18	144	7	230	5	164	8'-4"	226
20	19'-6"	529	38	#10	10"	7'-5"	1213	32	1051	19	152	8	263	5	164	8'-4"	226
21	20'-6"	556	38	#10	10"	7'-9"	1267	34	1117	20	160	8	263	5	164	8'-4"	226
22	21'-6"	583	38	#10	10"	8'-1"	1322	35	1150	21	168	8	263	5	164	8'-4"	226
23	22'-6"	610	76	#8	5"	8'-6"	1725	37	1216	22	176	9	296	6	197	8'-4"	226
24	23'-6"	637	76	#8	5"	8'-9"	1776	39	1281	23	184	9	296	6	197	8'-4"	226
25	24'-6"	664	76	#8	5"	9'-2"	1860	40	1314	24	192	9	296	6	197	8'-4"	226
26	25'-6"	692	76	#8	5"	9'-6"	1928	42	1380	25	200	10	329	6	197	8'-4"	226
27	26'-6"	719	76	#9	5"	9'-10"	2541	44	1446	26	208	10	329	6	197	8'-4"	226
28	27'-6"	746	76	#9	5"	10'-1"	2606	45	1478	27	216	10	329	7	230	8'-4"	226
29	28'-6"	773	76	#9	5"	10'-5"	2692	47	1544	28	224	11	361	7	230	8'-4"	226
30	29'-6"	800	76	#10	5"	10'-9"	3516	49	1610	29	232	11	361	7	230	8'-4"	226
31	30'-6"	827	76	#10	5"	11'-2"	3652	50	1643	31	248	11	361	7	230	8'-4"	226
32	31'-6"	854	76	#10	5"	11'-6"	3761	52	1708	32	256	12	394	8	283	8'-4"	226

DESIGN

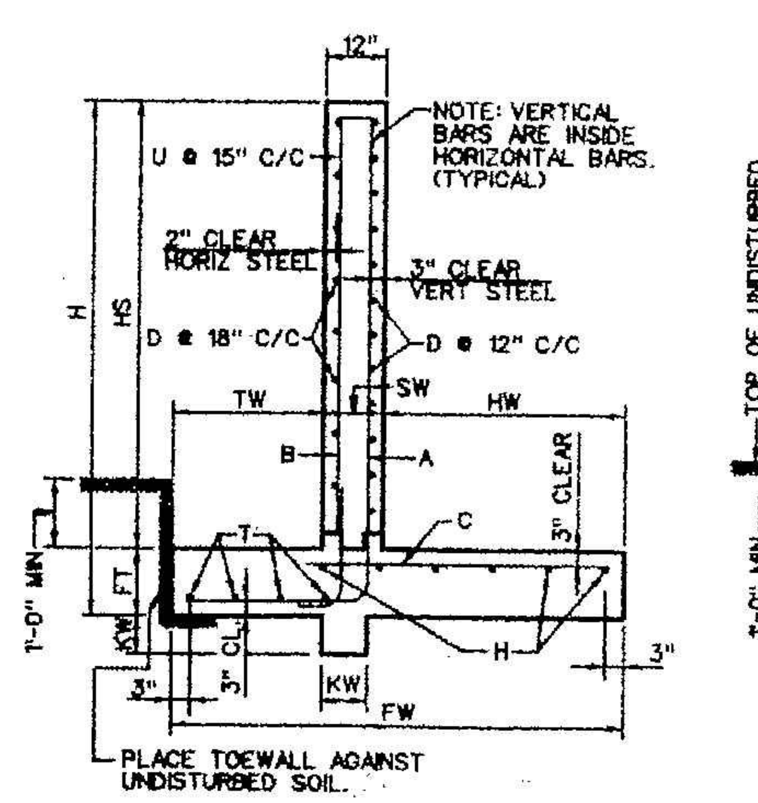
QUANTITIES FOR 32'-0" PANEL

SURCHARGE

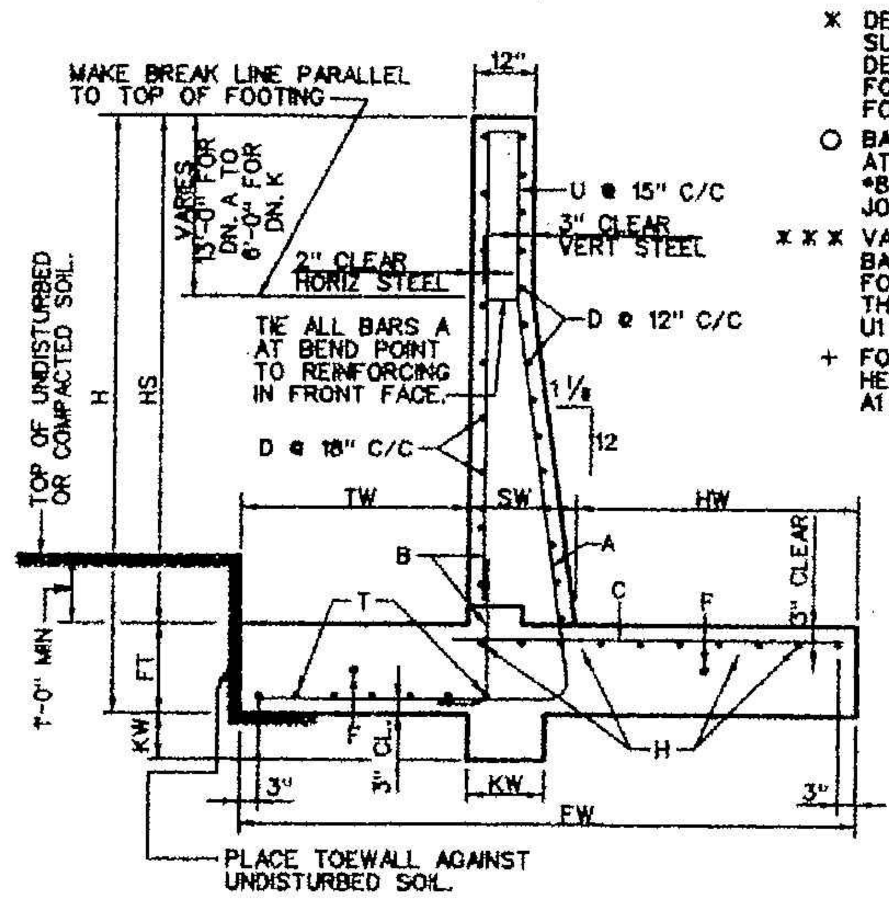
NONE CONC. C.Y.	NONE REINF. L.B.	1' OR 7:1 CONC. C.Y.	REINF. L.B.	2' OR 5:1 CONC. C.Y.	REINF. L.B.	3' OR 3½:1 CONC. C.Y.	REINF. L.B.	4' OR 2½:1 CONC. C.Y.	REINF. L.B.	5' OR 2:1 CONC. C.Y.	REINF. L.B.	6' OR 1¾:1 CONC. C.Y.	REINF. L.B.	7' OR 1½:1 CONC. C.Y.	REINF. L.B.	HEIGHT PLUS SURCHARGE
1.2	118															1
3.3	246	2.1	184													2
4.7	440	3.5	312	2.3	184											3
6.6	748	5.4	472	4.2	344	3.0	282									4
8.5	917	7.3	762	6.1	479	5.0	351	3.8	289							5
10.3	1089	9.1	961	7.9	711	6.7	519	5.6	391	4.4	329					6
12.2	1195	11.0	1100	9.9	972	8.7	817	7.5	525	6.3	397	5.1	335			7
14.0	1366	12.8	1239	11.6	1143	10.4	1015	9.3	880	8.1	564	6.9	436	5.7	374	8
15.8	1472	14.6	1376	13.4	1249	12.2	1154	11.0	1026	9.9	871	8.7	570	7.5	442	9
17.6	1800	16.4	1672	15.2	1576	14.0	1449	12.8	1353	11.6	1225	10.4	1070	9.3	708	10
19.4	2119	18.2	1990	17.1	1862	15.9	1766	14.7	1639	13.6	1544	12.3	1416	11.1	1261	11
21.3	2349	20.1	2222	18.9	2094	17.7	1966	16.5	1870	15.3	1743	14.1	1648	13.0	1520	12
23.0	2876	21.9	2781	20.7	2654	19.5	2526	18.3	2398	17.1	2302	15.9	2174	14.7	2079	13
24.8	3255	23.6	3134	22.4	3039	21.3	2912	20.1	2784	18.9	2656	17.7	2560	16.5	2433	14
26.6	3722	25.5	3594	24.3	3473	23.1	3378	21.9	3251	20.7	3123	19.5	2995	18.4	2899	15
31.2	4236	30.1	4141	28.9	4013	27.7	3893	26.5	3798	25.3	3671	24.1	3543	22.9	3415	16
33.4	4637	32.2	4508	31.0	4414	29.9	4286	28.7	4166	27.5	4071	26.3	3944	25.1	3816	17
38.8	4970	37.6	4840	36.4	4712	35.2	4818	34.0	4490	32.8	4370	31.6	4275	30.5	4148	18
41.4	5285	40.2	5197	39.1	5068	37.9	4940	36.7	4846	35.5	4718	34.3	4598	33.1	4503	19
43.9	6092	42.7	6964	41.5	5877	40.3	5748	39.2	5620	38.0	5526	36.8	5398	35.6	5278	20
50.2	6665	49.0	6536	47.8	6409	46.7	6322	45.5	6193	44.3	6065	43.1	5971	41.8	5843	21
53.2	7038	52.0	6942	50.8	6814	49.6	6687	48.4	6600	47.3	6471	46.1	6343	44.9	6249	22
56.5	8081	55.3	7952	54.1	7857	53.0	7729	51.8	7602	50.6	7515	49.4	7388	48.2	7258	23
62.6	8503	61.4	8375	60.2	8247	59.0	8152	57.8	8024	56.6	7897	55.5	7810	54.3	7681	24
66.2	8976	65.0	8860	63.8	8753	62.6	8625	61.4	8530	60.3	8402	59.1	8275	57.9	8188	25
73.1	9505	71.9	9375	70.7	9280	69.6	9153	68.4	9025	67.2	8930	66.0	8802	64.8	8675	26
76.9	10538	75.7	10409	74.5	10280	73.3	10185	72.1	10058	71.0	9930	69.8	9835	68.6	9707	27
81.7	11614	80.5	11519	79.4	11391	78.2	11262	77.0	11167	75.8	11040	74.6	10912	73.4	10817	28
85.7	11949	84.5	11820	83.3	11726	82.2	11598	81.0	11469	79.8	11374	78.6	11247	77.4	11119	29
89.8	13792	88.6	13663	87.4	13535	86.3	13441	85.1	13313	83.9	13184	82.7	13089	81.5	12962	30
94.0	14449	92.8	14345	91.7	14217	90.5	14089	89.3	13995	88.1	13867	86.9	13738	85.7	13643	31
102.5	16064	101.3	15936	100.1	15833	98.9	15705	97.7	15577	96.5	15483	95.4	15355	94.2	15226	32
A		B		C		D		E		F		G		K		



BARS A1 BARS A2 BARS A3 BARS A4 BARS A5 BARS A6 BARS A7 BARS B BARS U



SECTION
H ≤ 14'



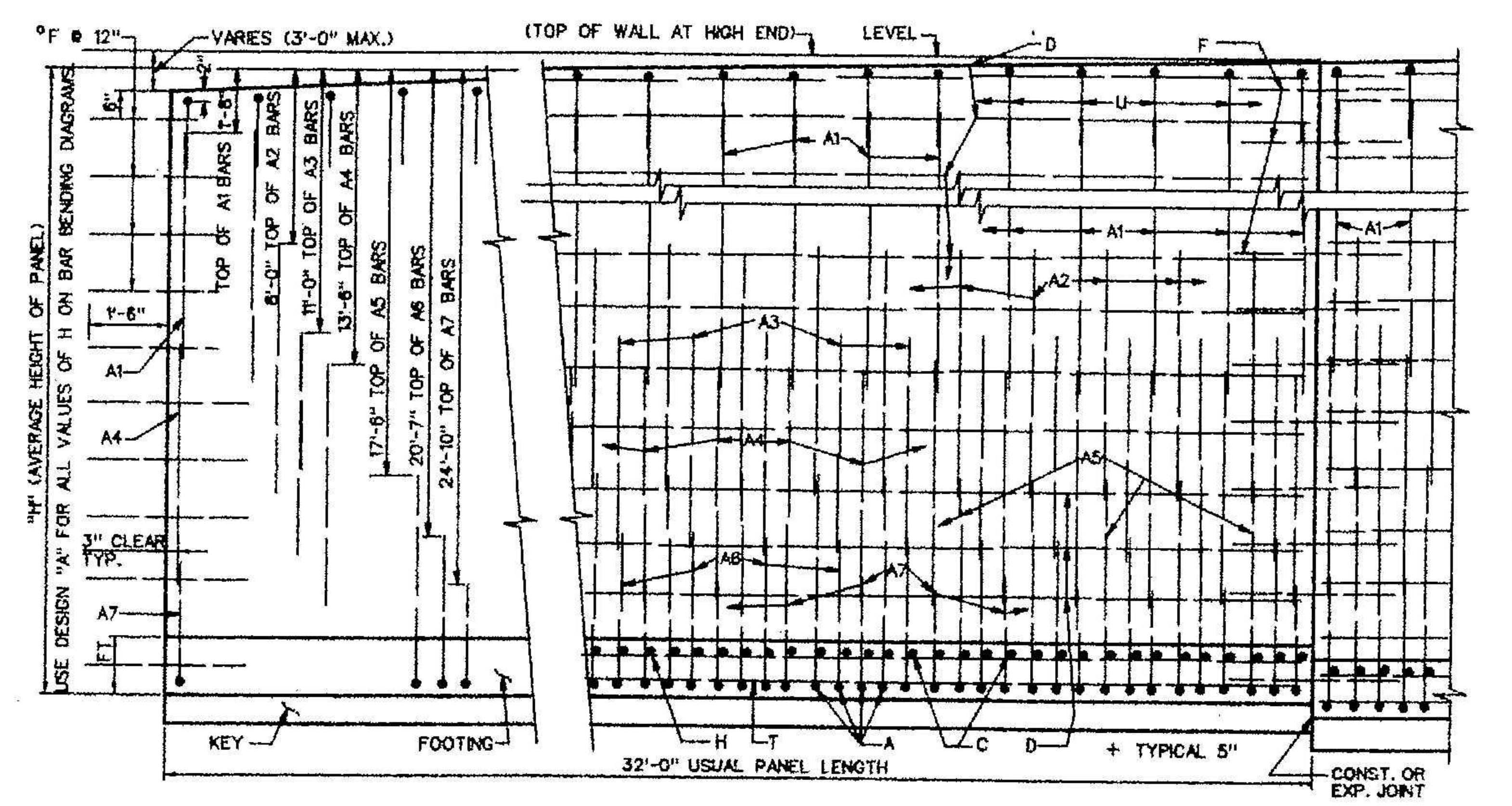
SECTION
H > 14'

* DESIGN "A" WALL WITH ZERO SURCHARGE SHOWN AT RIGHT. DEDUCT AMOUNT OF SURCHARGE FOR DISTANCE TO TOP OF BAR FOR OTHER DESIGNS.

○ BARS F TO BE #8 SMOOTH AT EXPANSION JOINTS AND #8 DEFORMED AT CONSTRUCTION JOINTS.

*** VARY LENGTH OF LEGS OF BARS U TO FIT SLOPE OF PANEL FOR ALL VALUES OF H LESS THAN 5'-0" I.E. FOR 10% GRADE U1 LEGS = 1'-0", U26 = 4'-0".

\+ FOR WALLS LESS THAN 13' IN HEIGHT, SPACING BETWEEN BARS A1 AND A2 = 7½".



REAR ELEVATION

GENERAL NOTES:

① REINFORCING STEEL BAR LENGTHS TABULATED ARE FOR NO SURCHARGE DESIGN A. TO MODIFY BAR LENGTHS FOR DIFFERENT SURCHARGE DESIGN, SUBTRACT THE AMOUNT OF LEVEL SURCHARGE FROM BARS A1 AND B. TAKE BARS D AND F FOR DESIGN B THRU K WALLS FROM DESIGN A WALL OF THE SAME HEIGHT. LENGTHS AND NUMBER OF OTHER BARS WILL BE UNCHANGED EXCEPT BAR A2 FOR H < 14'-0" WHEN SURCHARGE EXCEEDS 6 FT.

② WALLS ARE DESIGNED USING 40# EQUAL FLUID PRESSURE AND WITH WEIGHT OF EARTH AT 120# / CU. FT.

[1] ③ ALL CONCRETE TO BE CLASS C; f'c = 3600 PSI; fc = 1440 PSI.

[1] ④ ALL REINFORCING STEEL TO BE GRADE 60; fs = 24,000 PSI.

⑤ FOR NOTES AND DETAILS NOT SHOWN ON THIS SHEET SEE SHEETS 2, AND 3.

⑥ 3¾ INCH TO 11 INCH DIAMETER PINS ARE FOR BAR BENDING ONLY.

⑦ QUANTITIES ARE BASED ON "H" BEING AVERAGE HEIGHT OF PANEL.

⑧ RETAINING WALLS ARE DESIGNED TO BE CODED AS FOLLOWS ON RETAINING WALL LAYOUT SHEETS.

LC - 21 - 28
HA - 28 - 32

- LENGTH OF PANEL {28' REQUIRES SPECIAL QUANTITIES; 32' IS STANDARD}
- AVERAGE HEIGHT "H" OF PANEL.
- DESIGN C = 2' LEVEL SURCHARGE OR SLOPED SURCHARGE UP THROUGH 5:1. A = NO SURCHARGE.
- FOOTING PRESSURE DESIGN. H = HIGH, L = LOW

[1] USE 1993 TEXAS STATE HIGHWAY DEPARTMENT SPECIFICATIONS.

NOTE:
ARTIFICIAL STONE VENEER TO BE INSTALLED AT THE FACE OF RETAINING WALL PER MANUFACTURER SPECIFICATION.

RECORD DRAWING
This Drawing Has Been Modified to Reflect Construction Records Provided To the Engineer.
5-31-2019

MJR Engineering Inc.
New Construction • Engineering • Environmental Services
7953 PINKERTON COURT
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Rockwall Commons, Phase-2
1301 Ridge Road
Rockwall, Texas

JAHVANI CONSULTING ENGINEERS, INC.
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2121 N. JOSEY LANE, #100
CARROLLTON, TEXAS 75006
TEL. (214) 718-9469
jahvani@hotmail.com
CONSULTING J ENGINEERS

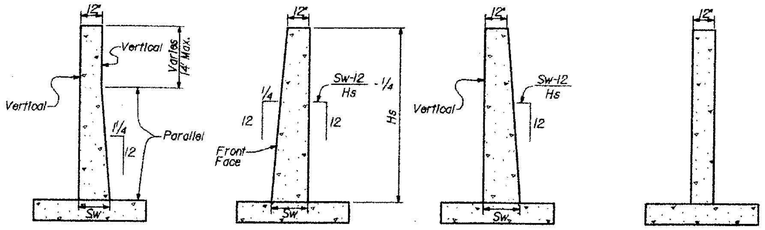
REVISIONS	DATE

SEAL
STATE OF TEXAS
HOUSHANG JAHVANI
72242
REGISTERED PROFESSIONAL ENGINEER
5-31-2019
[illegible]

DWG. TITLE:
CONCRETE RETAINING WALL DETAILS

PROJECT #:
DRAWN BY: HJ
SCALE: 1" = 30'
FILE NO:

DATE 5-31-2019



AS DETAILED ALL HEIGHTS
(Basis for Payment)

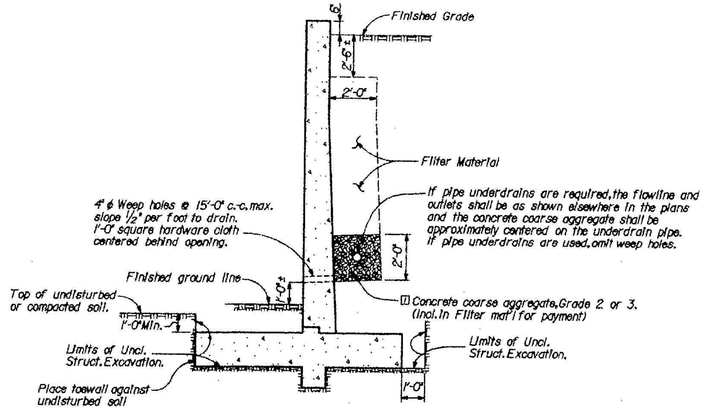
BOTH FRONT & BACK FACES SLOPING
Other slopes may be used on either front or back face of wall.

FRONT FACE VERTICAL BACK FACE SLOPED
(For "H" > 14')

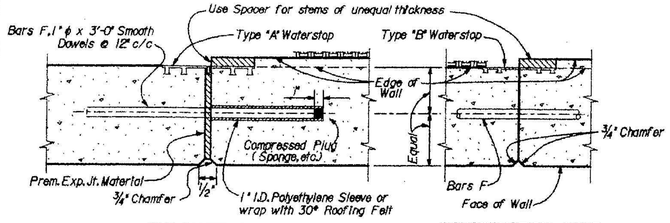
BOTH FACES VERTICAL
(As detailed for "H" ≤ 14')

ALTERNATE STEM SLOPE DETAILS

Walls with slopes other than these may be used after approval by the Engineer. Sw shall not be less than shown in Table on page 3001 or 3002. No payment will be made for excess concrete due to changing of slope of wall face.

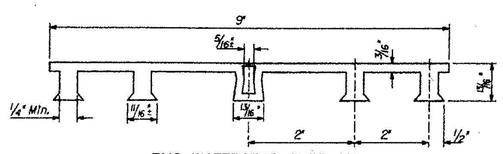


DRAINAGE DETAILS & EXCAVATION

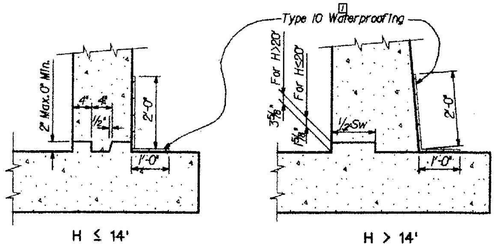


EXPANSION JOINT

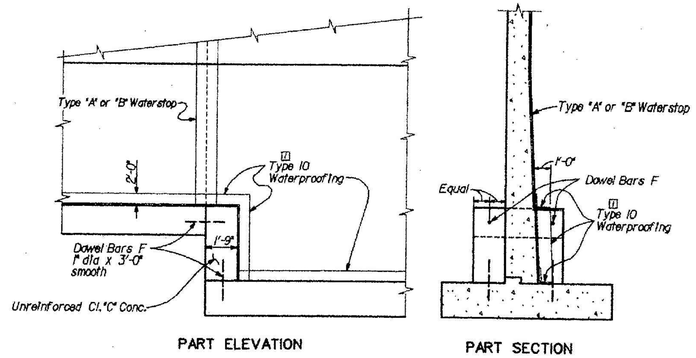
CONSTRUCTION JOINT



Note : Dimensions & shapes may vary slightly depending on manufacturer.



JOINT AND WATERSTOP DETAILS



SHOWING WATERSTOP @ FOOTING JOINT

GENERAL NOTES :

Walls are designed to provide a minimum factor of safety against sliding of 1.5. The undisturbed or compacted soil depth in front of walls, from bottom of key up, shall not be less than Kw * Fr * 1'-0". The angle of internal friction (ϕ) of this soil must be greater than 20°.

The bearing capacity of the soil must be equal to or greater than the wall footing pressure.

Retaining walls with heights up to 15'-0" are detailed to be placed on grades up thru 10 % with footing level, with no changes in reinforcing steel. Steeper grades can be accomodated by shortening Bars A, & B and increasing length of legs of Bars U by the same amount. No change in Quantities will be involved. Walls over 15'-0" in height can be placed on steeper grades with no revisions.

Retaining walls may be placed on Horizontal Curves by adjusting lengths of Footing Bars T & H. Minor revisions of Concrete Quantities may be required when maximum footing pressure walls are used.

Designed in accordance with A.A.S.H.T.O. 1973 Standard Specifications.

[1] All concrete to be Class C, f'c = 3600 psi. fc = 1440 psi

Reinforcing bar laps and splices shall conform to City of Dallas Specifications.

[2] Cost of Furnishing and Installing expansion joint material and waterstops shall be included in price bid for Class C Concrete (Retaining Walls)

For notes and details not shown on this sheet, see sheets 3001 & 3002

[1] Use 1993 Texas State Highway Department Specifications.

NOTE:
ARTIFICIAL STONE VENEER TO BE INSTALLED AT THE FACE OF RETAINING WALL PER MANUFACTURER SPECIFICATION.

ASBUILT

RECORD DRAWING
This Drawing Has Been Modified to Reflect Construction Records Provided To the Engineer.
5-31-2019

MJR Engineering LLC
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jahvani@hotmail.com

REVISIONS DATE

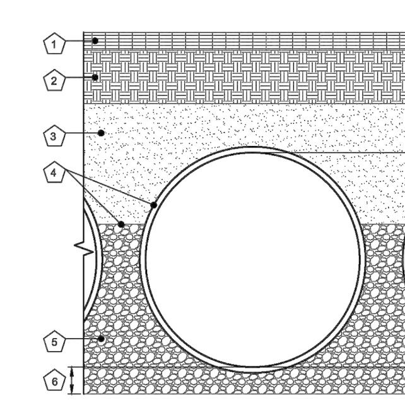
SEAL
STATE OF TEXAS
HOUSHANG JAHVANI
72242
REGISTERED PROFESSIONAL ENGINEER
5-31-2019

DWG. TITLE:
CONCRETE RETAINING WALLL MISCELLANEOUS DETAILS

PROJECT #:
DRAWN BY: HJ
SCALE: 1" = 30'
FILE NO:

DATE 5-31-2019

19 OF 20
SHEET NUMBER



KEY:

1. RIGID OR FLEXIBLE PAVEMENT.
2. NORMAL ROADWAY EMBANKMENT FILL PLACED IN 8" LIFTS AND COMPACTED TO MIN. 90% STANDARD DENSITY PER AASHTO T-99.
3. SELECT BACKFILL TO 12" ABOVE PIPE.
4. CONTECH C40 NON-WOVEN GEOTEXTILE (RECOMMENDED, NOT PROVIDED BY CONTECH) TO PREVENT SOIL MIGRATION. SEE NOTES BELOW.
5. WELL GRADED CRUSHED STONE.
6. 6" WELL GRADED CRUSHED STONE BEDDING BELOW PIPE.

FOUNDATION/BEDDING PREPARATION

PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND BROUGHT BACK TO THE GRADE WITH A FILL MATERIAL AS APPROVED BY THE ENGINEER. ONCE THE FOUNDATION PREPARATION IS COMPLETE, THE 6 INCHES OF A WELL-GRADED GRANULAR MATERIAL SHALL BE PLACED AS THE BEDDING.

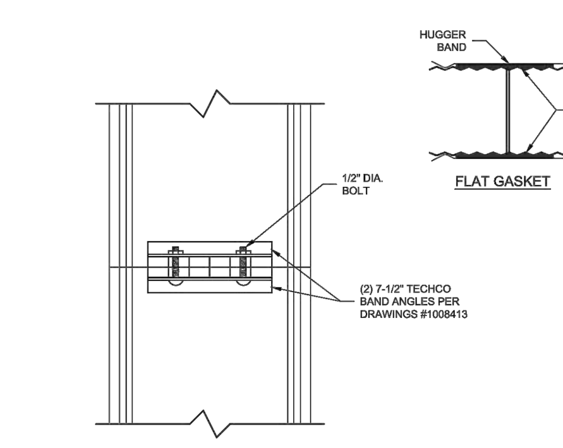
BACKFILL

THE SELECT BACKFILL SHALL BE AN A1, A2 OR A3 GRANULAR FILL PER AASHTO M-145 OR A WELL-GRADED GRANULAR FILL AS APPROVED BY THE ENGINEER (SEE INSTALLATION GUIDELINES). THE MATERIAL SHALL BE PLACED IN 8-INCH LOOSE LIFTS AND COMPACTED TO 90% AASHTO T99 STANDARD PROCTOR DENSITY. WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO LIFT (16") DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHALL BE ADVANCED ALONG THE LENGTH OF THE DETENTION SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON THE PIPE.

OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS. REFER TO TYPICAL BACKFILL DETAIL FOR MATERIAL REQUIRED.

IF SOIL MIGRATION IS NOT A CONCERN, THEN GEOTEXTILE FABRIC WILL NOT BE REQUIRED.

BACKFILL DETAIL
SCALE: N.T.S.



CONNECTION DETAIL
SINGLE
7-1/2" TECHCO ANGLE

GENERAL NOTES

1. BANDS ARE NORMALLY FURNISHED AS FOLLOWS:
   12" THRU 48" 1-PIECE
   54" THRU 96" 2-PIECE
   102" THRU 144" 3-PIECES
2. BAND FASTENERS ARE ATTACHED WITH SPOT WELDS, RIVETS OR HAND WELDS
3. REROLLED ANNULAR END CORRUGATIONS ARE NORMALLY 2⅔" x ½". DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES

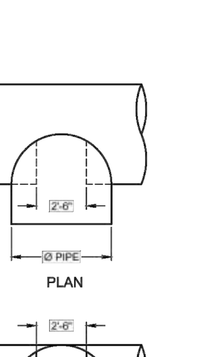
H-12 HUGGER BAND DETAIL
SCALE: N.T.S.

CONTECH ENGINEERED SOLUTIONS LLC · www.ContechES.com · 9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069 · 800-338-1122 · 513-645-7000 · 513-645-7993 FAX
CONTECH CMP DETENTION SYSTEMS · CONTECH CONTRACT DRAWING

Ø90" UNDERGROUND DETENTION SYSTEM - 487690-020
COMMONS PHASE 2 ROCKWALL TX AKA ROCKWALL COMMONS
ROCKWALL, TX
SITE DESIGNATION: ALTERNATE TO 60"

PROJECT No.: 487690 · SEQ. No.: 020 · DATE: 10/05/2016 · DESIGNED: SDS · DRAWN: TW · CHECKED: · APPROVED: · SHEET NO.: C3 OF 8

TYPICAL SECTION VIEW
SCALE: N.T.S.

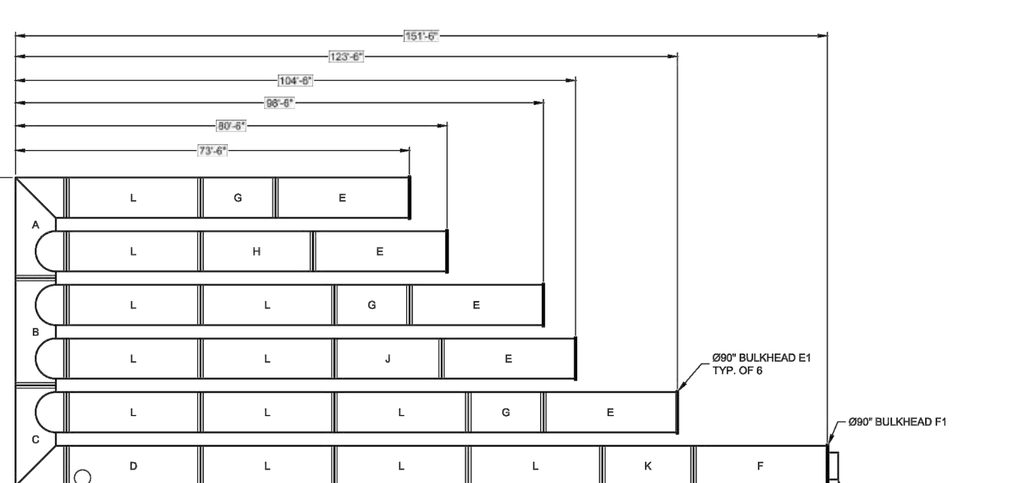


TYPICAL MANWAY DETAIL
SCALE: N.T.S.

FABRICATION BoM									
FITTING	TYPE	QTY	Ø	CORRUGATION	GAUGE	FINISH	WALL TYPE	LENGTH	TOTAL
A	MANIFOLD - 1 ELBOW (S)	1	90	5X1	16	ALT2	SOLID	20.75	20.75
A - TEE	TEE	1	90	5X1	16	ALT2	SOLID	5.75	5.75
B	MANIFOLD - 0 ELBOW (S)	1	90	5X1	16	ALT2	SOLID	20	20
B - TEE	TEE	2	90	5X1	16	ALT2	SOLID	5.75	11.5
C	MANIFOLD - 1 ELBOW (S)	1	90	5X1	16	ALT2	SOLID	20.75	20.75
C - TEE	TEE	1	90	5X1	16	ALT2	SOLID	5.75	5.75
D	PIPE	1	90	5X1	16	ALT2	SOLID	25	25
D1	RISER	1	36	2 2/3X1/2	16	ALT2	SOLID	12.25	12.25
D1A	LADDER	1		16		GALV			
E	PIPE	5	90	5X1	16	ALT2	SOLID	25	125
E1	BULKHEAD	5	90		12	ALT2	SOLID		
F	PIPE	1	90	5X1	16	ALT2	SOLID	25	25
F1	BULKHEAD	1	90		12	ALT2	SOLID		
F2	STUB	1	60	5X1	16	ALT2	SOLID	2	2
G	PIPE	3	90	5X1	16	ALT2	SOLID	14	42
H	PIPE	1	90	5X1	16	ALT2	SOLID	21	21
J	PIPE	1	90	5X1	16	ALT2	SOLID	20	20
K	PIPE	1	90	5X1	16	ALT2	SOLID	17	17
L	PIPE	12	90	5X1	16	ALT2	SOLID	25	300
BAND	12 HUGGER	27	90	W/7" TECHCO WD	18	ALT2			
GASKETS	FLAT	27	90	12" WIDE					

Ø90" UNDERGROUND DETENTION SYSTEM - 487690-020
COMMONS PHASE 2 ROCKWALL TX AKA ROCKWALL COMMONS
ROCKWALL, TX
SITE DESIGNATION: ALTERNATE TO 60"

PROJECT No.: 487690 · SEQ. No.: 020 · DATE: 10/05/2016 · DESIGNED: SDS · DRAWN: TW · SHEET NO.: C2 OF 8



ASSEMBLY
SCALE: 1" = 20'
PIPE STORAGE: 28,474 CF
LOADING: H20/H25
SYSTEM INV = 528.5'±

THE UNDERSIGNED HEREBY APPROVES THE ATTACHED (8) PAGES INCLUDING THE FOLLOWING:

- **PIPE STORAGE = 28,474 CF**
- **MAINLINE PIPE GAGE = 16**
- **WALL TYPE = SOLID**
- **DIAMETER = 90"**
- **FINISH = ALT2**
- **CORRUGATION = 5x1**

CUSTOMER DATE

STUB INFORMATION		
PIECE	STUB INVERT	SYSTEM INVERT
Ø60" STUB F2	528.50	528.50

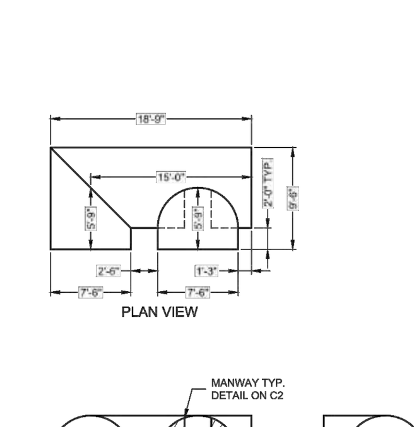
RISER INFORMATION		
PIECE	RIM ELEV.	SYSTEM INVERT
Ø36" RISER D1	544.50	528.50

NOTES

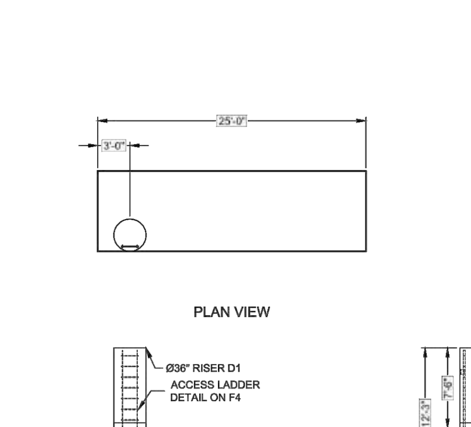
- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE.
- ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE 2⅔" x ½" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.

Ø90" UNDERGROUND DETENTION SYSTEM - 487690-020
COMMONS PHASE 2 ROCKWALL TX AKA ROCKWALL COMMONS
ROCKWALL, TX
SITE DESIGNATION: ALTERNATE TO 60"

PROJECT No.: 487690 · SEQ. No.: 020 · DATE: 10/05/2016 · DESIGNED: SDS · DRAWN: TW · SHEET NO.: C1 OF 8



PART C
SCALE: 1"=10'



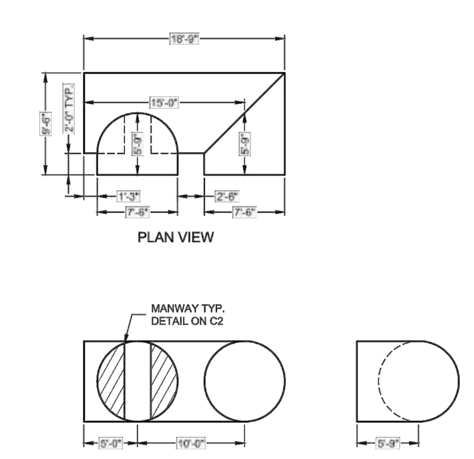
PART D
SCALE: 1"=10'

PROVIDED FOR INFORMATION ONLY
INTENDED FOR PLANT USE

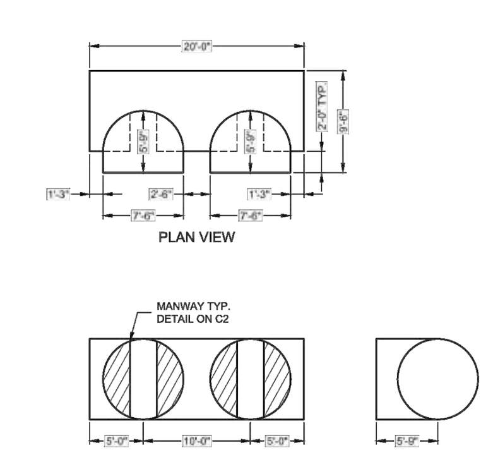
CONTECH FABRICATION DRAWING

Ø90" UNDERGROUND DETENTION SYSTEM - 487690-020
COMMONS PHASE 2 ROCKWALL TX AKA ROCKWALL COMMONS
ROCKWALL, TX
SITE DESIGNATION: ALTERNATE TO 60"

PROJECT No.: 487690 · SEQ. No.: 020 · DATE: 10/05/2016 · DESIGNED: SDS · DRAWN: TW · SHEET NO.: F2 OF 8



PART A
SCALE: 1"=10'



PART B
SCALE: 1"=10'

PROVIDED FOR INFORMATION ONLY
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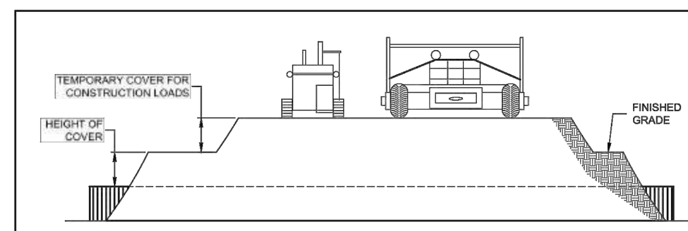
Ø90" UNDERGROUND DETENTION SYSTEM - 487690-020
COMMONS PHASE 2 ROCKWALL TX AKA ROCKWALL COMMONS
ROCKWALL, TX
SITE DESIGNATION: ALTERNATE TO 60"

PROJECT No.: 487690 · SEQ. No.: 020 · DATE: 10/05/2016 · DESIGNED: SDS · DRAWN: TW · SHEET NO.: F1 OF 8



CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM
SCALE: N.T.S.

SPECIFICATION FOR CORRUGATED STEEL PIPE-ALUMINIZED TYPE 2 STEEL

SCOPE

THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE CORRUGATED STEEL PIPE (CSP) DETAILED IN THE PROJECT PLANS.

MATERIAL

THE ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M274 OR ASTM A929.

PIPE

THE CSP SHALL BE MANUFACTURED IN ACCORDANCE WITH THE APPLICABLE REQUIREMENTS OF AASHTO M36 OR ASTM A760. THE PIPE SIZES, GAGES AND CORRUGATIONS SHALL BE AS SHOWN ON THE PROJECT PLANS.

ALL FABRICATION OF THE PRODUCT SHALL OCCUR WITHIN THE UNITED STATES.

HANDLING AND ASSEMBLY

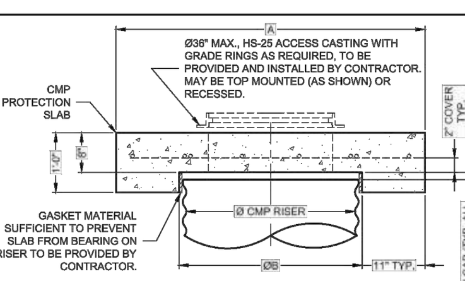
SHALL BE IN ACCORDANCE WITH RECOMMENDATIONS OF THE NATIONAL CORRUGATED STEEL PIPE ASSOCIATION (NCSPA)

INSTALLATION

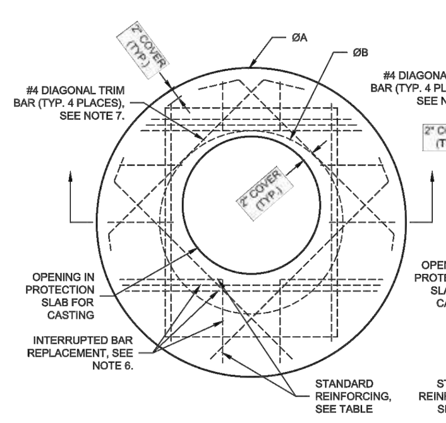
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II OR ASTM A798 AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

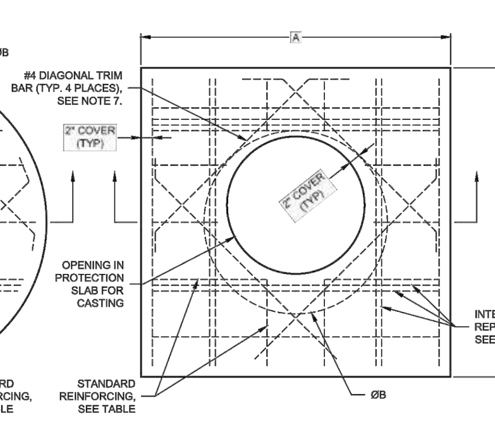
MATERIAL SPECIFICATION
SCALE: N.T.S.



SECTION VIEW



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

REINFORCING TABLE				
Ø CMP RISER	A	Ø B	REINFORCING	**BEARING PRESSURE (PSF)
24"	Ø 4' 4'x4'	26"	#5 @ 10" OCEW / #5 @ 10" OCEW	2,540 / 1,900
30"	Ø 4'-6" 4'-6" x 4'-6"	32"	#5 @ 10" OCEW / #5 @ 9" OCEW	2,260 / 1,670
36"	Ø 5' 5' x 5'	38"	#5 @ 9" OCEW / #5 @ 8" OCEW	2,060 / 1,500
42"	Ø 5'-6" 5'-6" x 5'-6"	44"	#5 @ 8" OCEW / #5 @ 8" OCEW	1,490 / 1,370
48"	Ø 6' 6' x 6'	50"	#5 @ 7" OCEW / #5 @ 7" OCEW	1,210 / 1,270

** ASSUMED SOIL BEARING CAPACITY

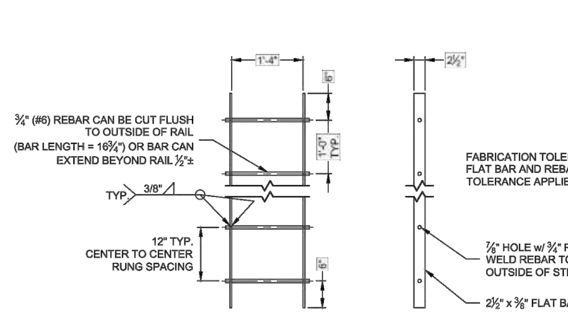
NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION AND ACI 350.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 4,000 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERS, ARCHITECTS AND LAND SURVEYORS, ENDWELL, NY.

MANHOLE CAP DETAIL
SCALE: N.T.S.

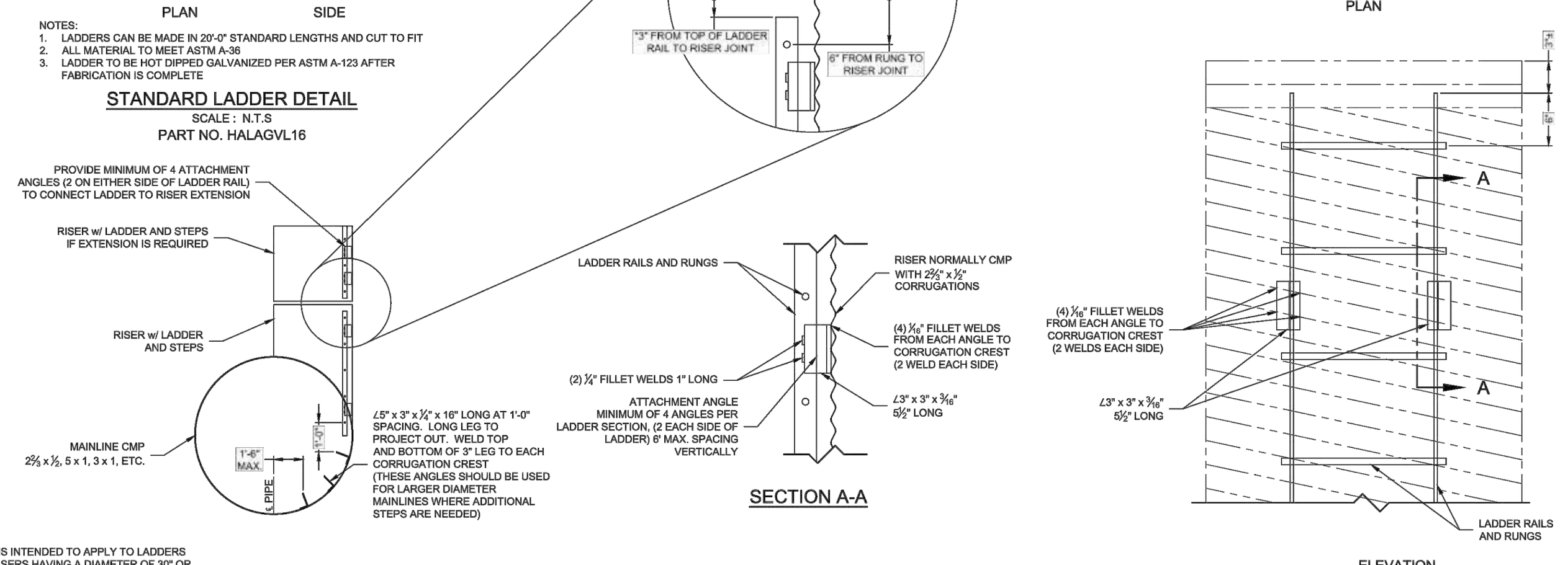
Ø90" UNDERGROUND DETENTION SYSTEM - 487690-020
COMMONS PHASE 2 ROCKWALL TX AKA ROCKWALL COMMONS
ROCKWALL, TX
SITE DESIGNATION: ALTERNATE TO 60"

PROJECT No.: 487690 · SEQ. No.: 020 · DATE: 10/05/2016 · DESIGNED: SDS · DRAWN: TW · SHEET NO.: C4 OF 8



NOTES:
1. LADDERS CAN BE MADE IN 20'-0" STANDARD LENGTHS AND CUT TO FIT
2. ALL MATERIAL TO MEET ASTM A-36
3. LADDER TO BE HOT DIPPED GALVANIZED PER ASTM A-123 AFTER FABRICATION IS COMPLETE

STANDARD LADDER DETAIL
SCALE: N.T.S
PART NO. HALAGVL16



NOTE:
THIS DRAWING IS INTENDED TO APPLY TO LADDERS INSTALLED IN RISERS HAVING A DIAMETER OF 30" OR LARGER. DUE TO SPACE CONSTRAINTS AND LIMITED ACCESSIBILITY, THE PRACTICALITY AND SUITABILITY OF UTILIZING RISERS SMALLER THAN 30" DIAMETER AND/OR INCORPORATING LADDERS IN THESE SMALLER DIAMETER RISERS SHOULD BE ADDRESSED BY THE OWNER AND PROJECT ENGINEER

RISER LADDER DETAIL
SCALE: N.T.S.

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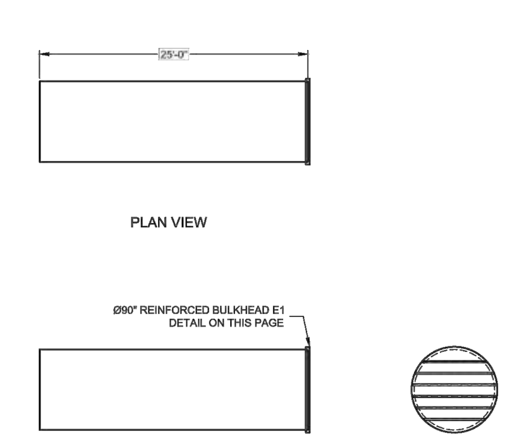
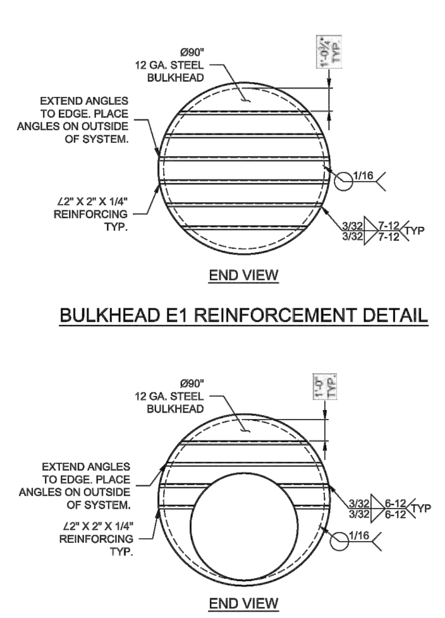
INTENDED FOR PLANT USE

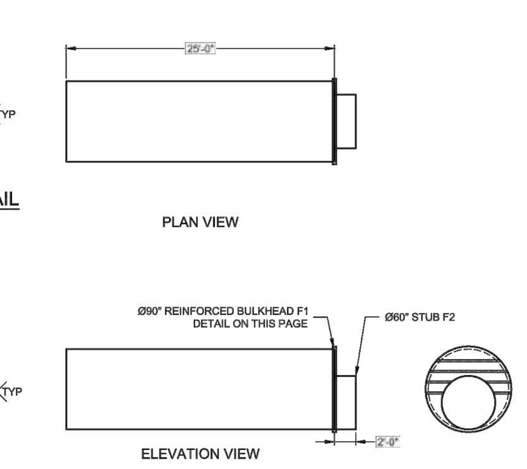
Ø90" UNDERGROUND DETENTION SYSTEM - 487690-020
COMMONS PHASE 2 ROCKWALL TX AKA ROCKWALL COMMONS
ROCKWALL, TX
SITE DESIGNATION: ALTERNATE TO 60"

PROJECT No.: 487690 · SEQ. No.: 020 · DATE: 10/05/2016 · DESIGNED: SDS · DRAWN: TW · SHEET NO.: F4 OF 8



PART E
SCALE: 1"=10'





PART F
SCALE: 1"=10'

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Ø90" UNDERGROUND DETENTION SYSTEM - 487690-020
COMMONS PHASE 2 ROCKWALL TX AKA ROCKWALL COMMONS
ROCKWALL, TX
SITE DESIGNATION: ALTERNATE TO 60"

PROJECT No.: 487690 · SEQ. No.: 020 · DATE: 10/05/2016 · DESIGNED: SDS · DRAWN: TW · SHEET NO.: F3 OF 8

ASBUILT

RECORD DRAWING
This Drawing Has Been Modified to Reflect Construction Records Provided To the Engineer.
5-31-2019

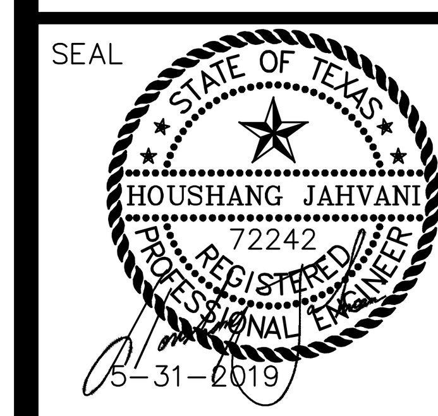
MJR Engineering Inc.
New Construction • Engineering • Environmental Services
7953 PINKERTON COURT
PLANO, TEXAS 75025
PH: (469) 544-8150 FAX: (972) 767-3003
EMAIL: mkamal67@gmail.com
FIRM # F - 9928

Rockwall Commons, Phase-2
1301 Ridge Road
Rockwall, Texas

JAHVANI CONSULTING ENGINEERS, INC.
TBPE REGISTRATION NO. F-10198
2121 N. JOSEY LANE, #100
CARROLLTON, TEXAS 75006
TEL. (214) 718-9469
jahvani@hotmail.com

REVISIONS	DATE
REVISED 60" HDPE PIPE WITH 90 INCH 16 GAGE CM PIPE.	

SEAL



DWG. TITLE:
90" 16 GAGE CM PIPE DETAILS

PROJECT #:
DRAWN BY: HJ
SCALE: 1" = 30'
FILE NO:

DATE 5-31-2019