PROPOSED DRAINAGE
AND GRADING CONSTRUCTION PLANS

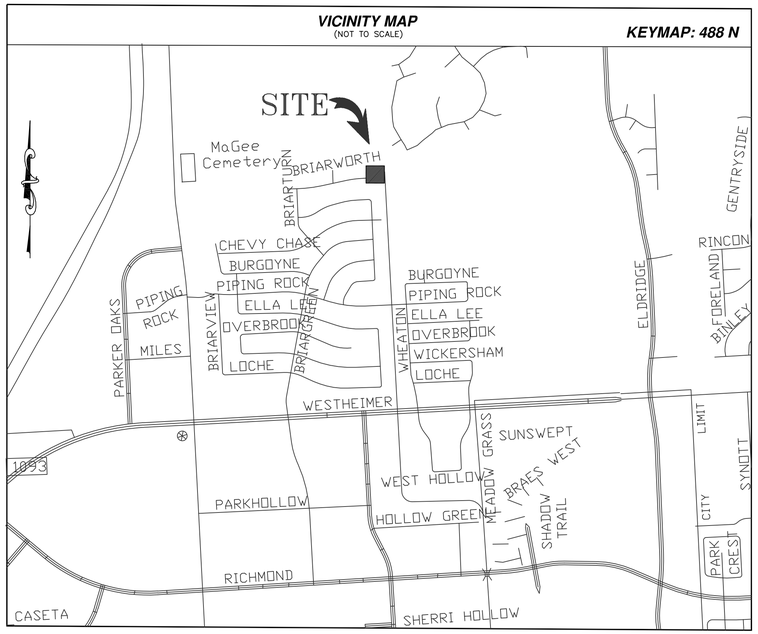
TO SERVE

TOWNHOMES DEVELOPMENT @ 13900 BRIARWORTH

AT

13900 BRIARWORTH DRIVE,
HOUSTON, TEXAS 77077

FEBRUARY, 2022



INDEX OF DRAWINGS	SHEET
COVER SHEET	C1.0
TOPOGRAPHIC MAP	C2.0
SITE PLAN	C3.1
DRAINAGE AREA MAP	C4.0
DRAINAGE CALCULATIONS	C4.1
SITE DRAINAGE PLAN	C4.2
SITE GRADING PLAN	C4.3
STORM WATER POLLUTION PREVENTION PLAN	C5.1
STORM WATER POLLUTION PREVENTION DETAILS	C5.2
SITE UTILITIES PLAN	C6.1
CONSTRUCTION NOTES	C7.0
CONSTRUCTION DETAILS	C7.1
CONSTRUCTION DETAILS	C7.2

RSG ENGINEERING
13501 KATY FREEWAY
SUITE 3180
HOUSTON, TEXAS 77079
PH. 713-783-7777
TBPE FIRM #: 15498

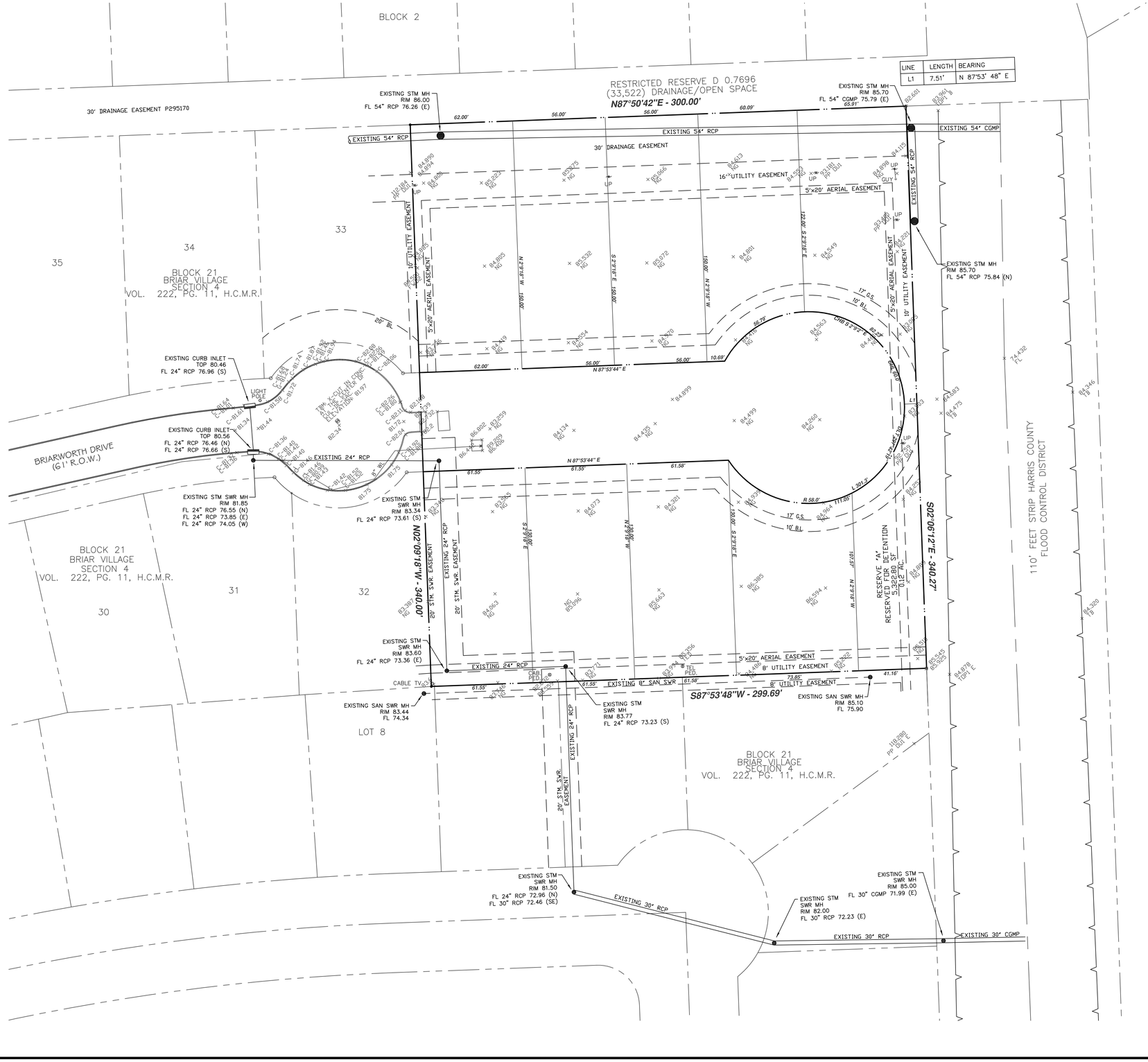
project
TOWNHOMES DEVELOPMENT
@ 13900 BRIARWORTH
at
13900 BRIARWORTH DRIVE
HOUSTON, TEXAS 77077

REVISIONS

STATE OF TEXAS
SALIM NAZIH OBEID
118989
LICENSED
PROFESSIONAL ENGINEER
02.18.2022

COVER SHEET

DRAWN BY:	CHECKED:
BSS	SNO
PROJECT No	SHEET No:
21254.02	C1.0



FLOODPLAIN DATA

PROPERTY "IS NOT" IN THE 100 YEAR FLOOD ZONE. THIS PROPERTY LIES IN ZONE "X-UNSHADED" ACCORDING TO F.I.R.M. MAP NO. 48201C0810L DATED 06-18-2007.

BENCHMARK DATA

ALL ELEVATIONS SHOWN HEREON ARE TIED TO H.C.F.C.D. REFERENCE MARK NO. 040680, BRASS DISK IN CONCRETE, STAMPED D129BM04, APPROXIMATELY LOCATED ON TOP OF CURB AT BRIARWORTH DRIVE. ELEVATION = 80.64', NAVD 1988, 2001 ADJ.

RSG ENGINEERING
13501 KATY FREEWAY
SUITE 3180
HOUSTON, TEXAS 77079
PH. 713-783-7777
TBPE FIRM #: 15498

project
TOWNHOMES DEVELOPMENT
@ 13900 BRIARWORTH
at
13900 BRIARWORTH DRIVE
HOUSTON, TEXAS 77077

REVISIONS

STATE OF TEXAS
SALIM NAZIH OBEID
118989
LICENSED
PROFESSIONAL ENGINEER
02.18.2022

TOPOGRAPHIC MAP

DRAWN BY:	CHECKED:
BSS	SNO
PROJECT No	**SHEET No:**
21254.02	C2.0

LEGAL DESCRIPTION

BEING A TRACT OR PARCEL CONTAINING 2.341 ACRES (101,987 SQUARE FEET) OF LAND IN THE JOEL WHEATON SURVEY, ABSTRACT NO 80 IN HARRIS COUNTY, TEXAS AND BEING THAT SAME CERTAIN TRACT OF LAND CONVEYED BY GENERAL WARRANTY DEED ON AUGUST 31, 2019 FROM JOHN AND SQUAD S. YOUSSEF, A MARRIED COUPLE, TO DAWOOD LEASING, LLC, RECORDED IN HARRIS COUNTY CLERK'S FILE NO. RP-2019-380595 OF THE OFFICIAL PUBLIC RECORDS OF REAL PROPERTY IN HARRIS COUNTY, TEXAS.

LINE	LENGTH	BEARING
L1	7.51'	N 87°53' 48" E

RESTRICTED RESERVE D 0.7696
(33,522) DRAINAGE/OPEN SPACE
N87°50'42"E - 300.00'

30' DRAINAGE EASEMENT P295170

EXISTING STM MH
RIM 86.00
FL 54" RCP 76.26 (E)

EXISTING STM MH
RIM 85.70
FL 54" CGMP 75.79 (E)

EXISTING 54" RCP

EXISTING 54" CGMP

30' DRAINAGE EASEMENT

16' UTILITY EASEMENT

5'x20' AERIAL EASEMENT

10' UTILITY EASEMENT

PROPOSED YARD PONDING AREA 1
RE: C4.3 FOR GRADING DETAILS

142.0'
94.0'
35.0'

2,925 SF AREA RESERVED FOR LOT 6 FUTURE STRUCTURE

2,585 SF AREA RESERVED FOR LOT 5 FUTURE STRUCTURE

2,300 SF AREA RESERVED FOR LOT 9 FUTURE STRUCTURE

2,350 SF AREA RESERVED FOR LOT 8 FUTURE STRUCTURE

2,350 SF AREA RESERVED FOR LOT 7 FUTURE STRUCTURE

EXISTING STM MH
RIM 85.70
FL 54" RCP 75.84 (N)

BLOCK 21
BRIAR VILLAGE
SECTION 4
VOL. 222, PG. 11, H.C.M.R.

PROPOSED 5.0' CONCRETE SIDEWALK

BRIARWORTH DRIVE
(61' R.O.W.)

EXISTING CURB INLET
TOP 80.46
FL 24" RCP 76.96 (S)

EXISTING SAN SWR MH
RIM 82.66

EXISTING CURB INLET
TOP 80.56
FL 24" RCP 76.46 (N)
FL 24" RCP 76.66 (S)

EXISTING 24" RCP

EXISTING STM SWR MH
RIM 81.85
FL 24" RCP 76.55 (N)
FL 24" RCP 73.85 (E)
FL 24" RCP 74.05 (W)

EXISTING STM
SWR MH
RIM 83.34
FL 24" RCP 73.61 (S)

R15.0'
R20.0'
R40.0'
80.0'
188.5'
188.8'
78.8'

N87°53'44"E
61.55'

S02°06'12"E - 340.27'

N02°06'18"W - 340.00'

1,810 SF AREA RESERVED FOR LOT 1 FUTURE STRUCTURE

2,610 SF AREA RESERVED FOR LOT 2 FUTURE STRUCTURE

2,575 SF AREA RESERVED FOR LOT 3 FUTURE STRUCTURE

2,300 SF AREA RESERVED FOR LOT 4 FUTURE STRUCTURE

PROPOSED PUBLIC POND
RE: PUBLIC PLANS FOR DETAILS

PROPOSED 25' SANITARY SEWER EASEMENT

PROPOSED 20' STORM SEWER EASEMENT

20' STM. SWR. EASEMENT

EXISTING 24" RCP

PROPOSED YARD PONDING AREA 2
RE: C4.3 FOR GRADING DETAILS

165.0'
117.0'
26.0'
50.0'

EXISTING STM
SWR MH
RIM 83.60
FL 24" RCP 73.36 (E)

EXISTING SAN SWR MH
RIM 83.44
FL 74.34

EXISTING STM
SWR MH
RIM 83.77
FL 24" RCP 73.23 (S)

EXISTING 8" SAN SWR

S87°53'48"W - 299.69'

EXISTING SAN SWR MH
RIM 85.10
FL 75.90

8' UTILITY EASEMENT

CABLE TV

TEL PED.

CRB PED.

LOT 8

BLOCK 21
BRIAR VILLAGE
SECTION 4
VOL. 222, PG. 11, H.C.M.R.

EXISTING STM
SWR MH
RIM 81.50
FL 24" RCP 72.96 (N)
FL 30" RCP 72.46 (SE)

EXISTING 30" RCP

EXISTING STM
SWR MH
RIM 82.00
FL 30" RCP 72.23 (E)

EXISTING STM
SWR MH
RIM 85.00
FL 30" CGMP 71.99 (E)

EXISTING 30" CGMP

110' FEET STRIP HARRIS COUNTY
FLOOD CONTROL DISTRICT

60 30 0 30 60 Feet
SCALE: 1"= 30'

RSG ENGINEERING
13501 KATY FREEWAY
SUITE 3180
HOUSTON, TEXAS 77079
PH. 713-783-7777
TBPE FIRM #: 15498

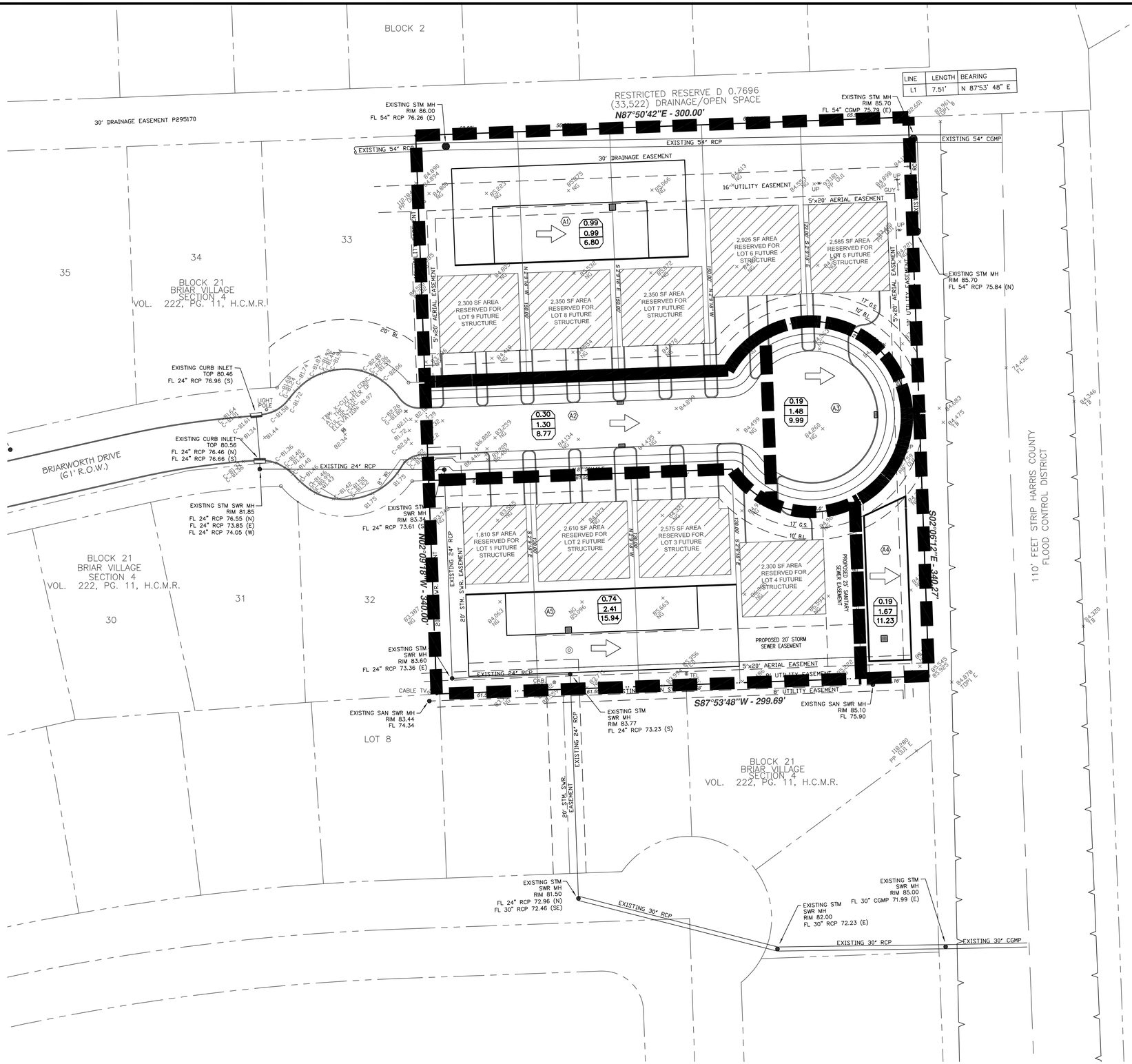
project
TOWNHOMES DEVELOPMENT
@ 13900 BRIARWORTH
at
13900 BRIARWORTH DRIVE
HOUSTON, TEXAS 77077

REVISIONS

STATE OF TEXAS
SALIM NAZIH OBEID
118989
LICENSED
PROFESSIONAL ENGINEER
02.18.2022

SITE PLAN

DRAWN BY:	CHECKED:
BSS	SNO
PROJECT No	SHEET No:
21254.02	C3.1



LINE	LENGTH	BEARING
L1	7.51'	N 87°53' 48" E

LEGEND

- PROPOSED STORM SEWER (PVC SCHEDULE 40 U.N.O.)
- EXISTING STORM SEWER
- PROPERTY LINE
- GRADE BREAK (G.B.)
- DENOTES DETENTION AREA
- OFFSITE SHEET FLOW
- STORM SEWER MANHOLE
- EXIST.=FILLED PROP.=OPEN
- DRAINAGE AREA DESIGNATION
- CATCH BASIN (RE: DETAIL & SCHEDULE)
- EXISTING NATURAL GRADE ELEVATIONS
- DRAINAGE AREA
- CUMULATIVE DRAINAGE AREA
- CUMULATIVE FLOW RATE
- EXTREME EVENT FLOW DIRECTION

RSG ENGINEERING
13501 KATY FREEWAY
SUITE 3180
HOUSTON, TEXAS 77079
PH. 713-783-7777
TBPE FIRM #: 15498

project
TOWNHOMES DEVELOPMENT
@ 13900 BRIARWORTH
at
13900 BRIARWORTH DRIVE
HOUSTON, TEXAS 77077

REVISIONS

STATE OF TEXAS
SALIM NAZIH OBEID
118989
LICENSED
PROFESSIONAL ENGINEER
02.18.2022

DRAINAGE AREA MAP

DRAWN BY:	CHECKED:
BSS	SNO

PROJECT No	SHEET No:
21254.02	C4.0

RESTRICTOR CALCULATIONS AND DETAILS

Q = CA x (2gH)^0.5
D = Q^0.5/(k H^0.25)
Q(ALLOWED)
C = COEFFICIENT OF DISCHARGE
(0.8 FOR SHORT SEGMENT OF PIPE)
(0.6 FOR OPENING IN PLATE, STANDPIPE OR WALL)
g = GRAVITY FACTOR 32.2 FT/s^2
H = HEAD (FT)
D = ORIFICE DIAMETER (FT)
k = 2.25 FOR C = 0.8
1.945 FOR C = 0.6

Q1 ALLOWED = 0.5 X A = 0.5 X 2.341 = 1.17 CFS
H (25%) = 5.05'

D1 = 1.17^0.5/(2.25x5.05^0.25) = 0.32' ~ USE 6"

Q2 ALLOWED = 2.0 X A = 2 X 2.341 = 4.68 CFS
@ H = 10.50' –> Q1 = 0.8(π (D^2)/4)(2g(H2))^0.5
= 4.08 CFS < 2 X 2.341 = 4.68

THEREFORE, SECONDARY RESTRICTOR IS REQUIRED

CITY OF HOUSTON RESTRICTOR CALCULATION SUMMARY:

LOW LEVEL RESTRICTOR (25%FLOW)

TOTAL DRAINAGE AREA = 2.341 AC.
OUTFALL RATE ALLOWED FOR LOW FLOW Q(L1) = 1.17 CFS
HEAD H(L1) FOR LOW FLOW = 5.05'
CALCULATED LOW LEVEL RESTRICTOR SIZE = 0.32'
PROVIDED LOW LEVEL RESTRICTOR SIZE = 6"

HIGH LEVEL RESTRICTOR (75% FLOW)

TOTAL DRAINAGE AREA = 2.341 AC.
OUTFALL RATE ALLOWED FOR LOW FLOW Q(L1) = 4.68 CFS

RECALCULATED HEAD H(L2) FOR LOW LEVEL RESTRICTOR = 10.50'
RECALCULATED LOW FLOW Q(L2) = 4.08 CFS

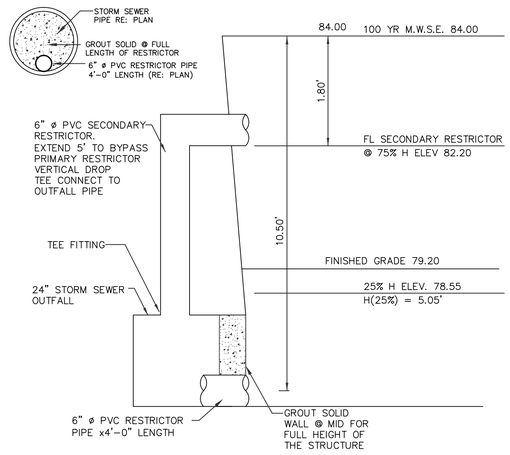
OUTFALL RATE ALLOWED FOR HIGH FLOW = 4.68 – 4.08 = 0.60

THEREFORE SECONDARY RESTRICTOR REQUIRED

Q2 = 4.68 – 4.08 = 0.60

D2 = 0.60^0.5/(2.25X10.50X0.2^0.25) = 0.05' ~ USE 6"

USE 6" SECONDARY RESTRICTOR



DETENTION CALCULATIONS

PROPERTY AREA = 101,987.00 SF. = 2.341 ACRES

*LOTS 1–4 ARE DETAINED IN YARD PONDING AREA 2.
*LOTS 5–9 ARE DETAINED IN YARD PONDING AREA 1.
*THE RIGHT–OF–WAY IS DETAINED IN RESERVE "A" PUBLIC POND.

REQUIRED DETENTION: (LOTS 1–4)
TOTAL BUILDING AREA = 9,295 SF.
TOTAL PATIO AREA = 1,367 SF.
TOTAL DRIVEWAY AREA = 2,606 SF.
YARD PONDING AREA = 8,250.00 SF.

TOTAL PROPOSED IMPERVIOUS COVER = 21,518 SF. = 0.49 AC.

REQUIRED DETENTION = (0.75 x 0.49) x 43560 = 16,008.3 CF. = 0.37 AC.FT.

PROPOSED DETENTION: (YARD PONDING AREA 2)
DETENTION VOLUME = $[(50 + 26) \times \frac{4}{2}] \times 140 = 21,280$ CF. = 0.48 AC.FT.

TOTAL DETENTION PROVIDED (LOTS 1–4) = 21,280 CF. = 0.48 AC.FT.

REQUIRED DETENTION: (LOTS 5–9)
TOTAL BUILDING AREA = 12,513 SF.
TOTAL PATIO AREA = 1,522.75 SF.
TOTAL DRIVEWAY AREA = 3,564.75 SF.
YARD PONDING AREA = 8,378.00 SF.

TOTAL PROPOSED IMPERVIOUS COVER = 25,978.50 SF. = 0.59 AC.

REQUIRED DETENTION = (0.75 x 0.59) x 43560 = 19,483.875 CF. = 0.44 AC.FT.

PROPOSED DETENTION: (YARD PONDING 1)
DETENTION VOLUME = $[(59 + 35) \times \frac{3.75}{2}] \times 118 = 20,797.50$ CF. = 0.47 AC.FT.

TOTAL DETENTION PROVIDED (LOTS 5–9) = 20,797.50 CF. = 0.47 AC.FT.

REQUIRED DETENTION: (PUBLIC)
RIGHT–OF–WAY AREA = 21,309.72 SF.
PUBLIC DETENTION POND AREA = 2,471.58 SF.
TOTAL AREA = 23,781.30 SF. = 0.54 AC.FT.

REQUIRED DETENTION =[43,560 X (0.54 X 0.75)] = 17,835.97 CF. = 0.405 AC.FT.

PROPOSED DETENTION: (PUBLIC DETENTION POND)
POND OUTER AREA = 2,471.58 SF
CONCRETE WALL DEPTH = 7.25 FT.

DETENTION POND VOLUME = 2,471.58 SF. x 7.25 FT. = 17,918.95 CF. = 0.41 AC.FT.

TOTAL DETENTION PROVIDED (PUBLIC) = 17,918.95 CF. = 0.41 AC.FT.

Storm Sewer Calculations

PROJECT:	TOWNHOMES DEV @ 13900 BRIARWORTH				DESIGN STORM															
JOB NO:	21254.02					2-YR	10-YR	100-YR		I = b/(d+TC)^e					FL=Flowline					
SYSTEM:	2 YR STM DESIGN				b=	48.35	54.68	60.66		Tc = 10xA^(0.1761) + 15					HG= Hydraulic Gradient					
BY:	BS				d=	9.07	6.96	4.44		C = 0.60 Ia + 0.20					UP=Upstream					
CHCKD BY:	SNO				e=	0.724	0.6623	0.5797		Q = C x I x A					G=Gutter					
															R=Top of Rim					
DA FROM	DA TO	AREA (ACRES)	TOTAL AREA (ACRES)	RUNOFF COEFF. C	SUM OF C * A	TC (MIN.)	INTENSITY I (IN/HR)	SUM OF FLOWS (CFS)	REACH LENGTH (FT)	DIAM. OR RISE (IN)	Slope %	Manning's "n"	Design Capacity (CFS)	Design Velocity (ft/s)	Fall (FT)	FL. Elev. UP (FT)	FL. Elev. DS (FT)	Actual Velocity (ft/s)	Friction Loss (ft)	HGL Elev UP (FT)	HGL Elev DS (FT)	TG Elev UP (FT)
A1	A2	0.99	0.99	0.80	0.80	24.99	3.75	2.99	150	24	0.18	0.011	11.37	3.62	0.27	74.36	74.09	0.95	0.02	76.36	76.09	80.00
A2	A3	0.30	1.30	0.80	1.04	25.47	3.72	3.85	155	24	0.18	0.011	11.37	3.62	0.28	74.09	73.82	1.23	0.03	76.09	75.82	83.30
A3	A4	0.19	1.48	0.80	1.19	25.72	3.70	4.39	118	24	0.18	0.011	11.37	3.62	0.21	73.82	73.60	1.40	0.03	75.82	75.60	83.20
A4	A5	0.19	1.67	0.80	1.34	25.95	3.68	4.93	192	24	0.18	0.011	11.37	3.62	0.35	73.60	73.26	1.57	0.07	75.60	75.26	76.50
A5	OUT	0.74	2.41	0.80	1.93	26.68	3.62	6.99	15	24	0.18	0.011	11.37	3.62	0.03	73.26	73.23	2.22	0.01	75.26	74.90	79.20

Storm Sewer Calculations

PROJECT:	TOWNHOMES DEV @ 13900 BRIARWORTH				DESIGN STORM															
JOB NO:	21254.02					2-YR	10-YR	100-YR		I = b/(d+TC)^e					FL=Flowline					
SYSTEM:	100 YR STM DESIGN				b=	48.35	54.68	60.66		Tc = 10xA^(0.1761) + 15					HG= Hydraulic Gradient					
BY:	BS				d=	9.07	6.96	4.44		C = 0.60 Ia + 0.20					UP=Upstream					
CHCKD BY:	SNO				e=	0.724	0.6623	0.5797		Q = C x I x A					G=Gutter					
															R=Top of Rim					
DA FROM	DA TO	AREA (ACRES)	TOTAL AREA (ACRES)	RUNOFF COEFF. C	SUM OF C * A	TC (MIN.)	INTENSITY I (IN/HR)	SUM OF FLOWS (CFS)	REACH LENGTH (FT)	DIAM. OR RISE (IN)	Slope %	Manning's "n"	Design Capacity (CFS)	Design Velocity (ft/s)	Fall (FT)	FL. Elev. UP (FT)	FL. Elev. DS (FT)	Actual Velocity (ft/s)	Friction Loss (ft)	HGL Elev UP (FT)	HGL Elev DS (FT)	TG Elev UP (FT)
A1	A2	0.99	0.99	0.80	0.80	24.99	8.54	6.80	150	24	0.18	0.011	11.37	3.62	0.27	74.36	74.09	2.16	0.10	76.36	76.09	80.00
A2	A3	0.30	1.30	0.80	1.04	25.47	8.46	8.77	155	24	0.18	0.011	11.37	3.62	0.28	74.09	73.82	2.79	0.17	76.09	75.82	83.30
A3	A4	0.19	1.48	0.80	1.19	25.72	8.42	9.99	118	24	0.18	0.011	11.37	3.62	0.21	73.82	73.60	3.18	0.16	75.82	75.62	83.20
A4	A5	0.19	1.67	0.80	1.34	25.95	8.38	11.23	192	24	0.18	0.011	11.37	3.62	0.35	73.60	73.26	3.58	0.34	75.62	75.28	76.50
A5	OUT	0.74	2.41	0.80	1.93	26.68	8.27	15.94	15	24	0.18	0.011	11.37	3.62	0.03	73.26	73.23	5.07	0.05	75.28	75.23	79.20

RSG ENGINEERING
13501 KATY FREEWAY
SUITE 3180
HOUSTON, TEXAS 77079
PH. 713-783-7777
TBPE FIRM #: 15498

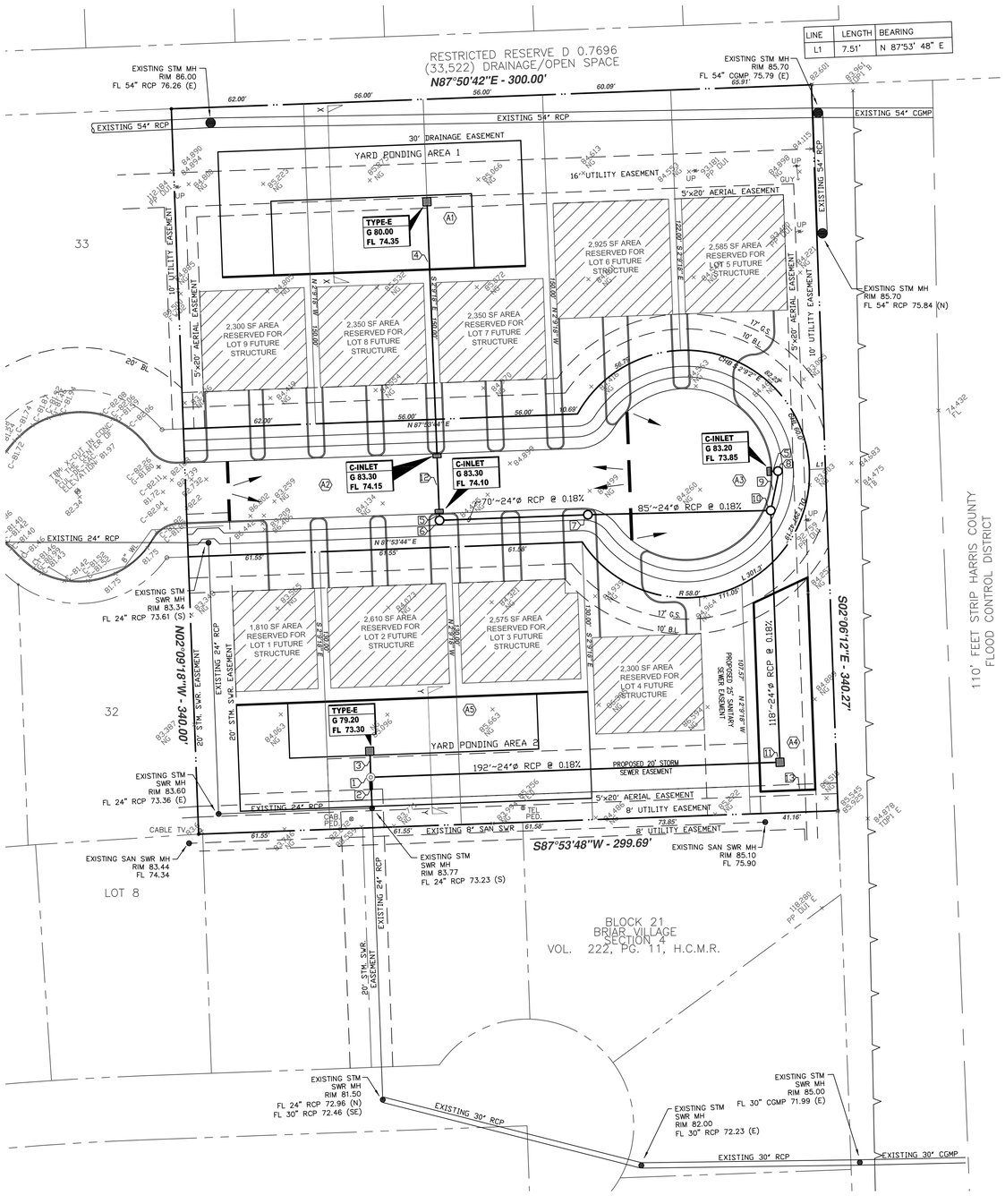
project
TOWNHOMES DEVELOPMENT
@ 13900 BRIARWORTH
at
13900 BRIARWORTH DRIVE
HOUSTON, TEXAS 77077

REVISIONS

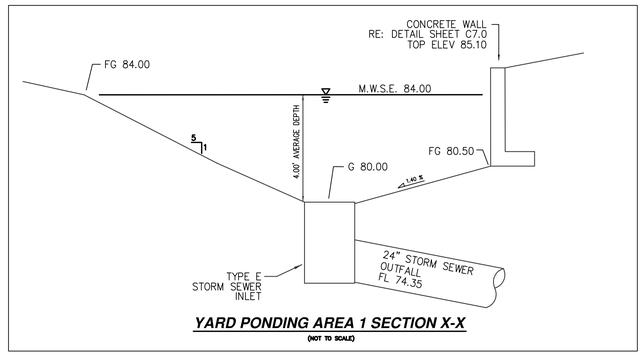
STATE OF TEXAS
SALIM NAZIH OBEID
118989
LICENSED
PROFESSIONAL ENGINEER
02.18.2022

DRAINAGE CALCULATIONS

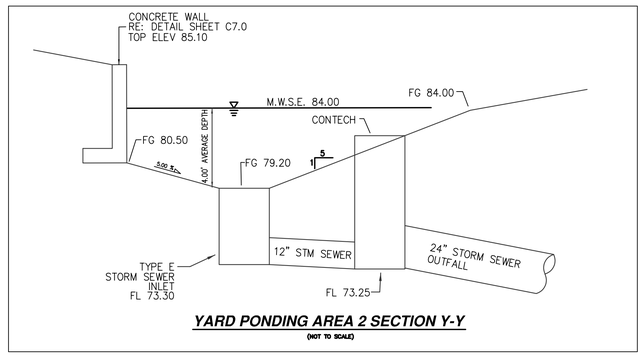
DRAWN BY:	CHECKED:
BSS	SNO
PROJECT No	SHEET No:
21254.02	C4.1



LINE	LENGTH	BEARING
L1	7.51'	N 87°53' 48" E



YARD PONDING AREA 1 SECTION X-X
(NOT TO SCALE)



YARD PONDING AREA 2 SECTION Y-Y
(NOT TO SCALE)

LEGEND

- PROPOSED STORM SEWER (PVC SCHEDULE 40 U.N.O.)
- EXISTING STORM SEWER
- PROPERTY LINE
- GRADE BREAK (G.B.)
- DENOTES DETENTION AREA
- SLOPE OF PAVEMENT OR FINISH GRADE
- EXIST.=FILLED, PROP.=OPEN — STORM SEWER MANHOLE
- DRAINAGE AREA DESIGNATION
- CATCH BASIN (RE: DETAIL & SCHEDULE)
- XX.XX — EXISTING NATURAL GRADE ELEVATIONS
- 0.20 — DRAINAGE AREA
- 0.20 — CUMULATIVE DRAINAGE AREA
- 0.58 — CUMULATIVE FLOW RATE
- PROPOSED 0.25' CONTOURS
- FL — DENOTES FLOW LINE ELEVATION
- TP — DENOTES TOP OF PAVEMENT ELEVATION
- TS — DENOTES TOP OF SIDEWALK ELEVATION
- FG — DENOTES FINISH GRADE ELEVATION
- HB — DENOTES HIGH BANK ELEVATION

NOTE

DRAINAGE SYSTEMS BELOW THE GROUND SURFACE NEED TO BE DRAINED WITHIN 48 HOURS.

NOTE

DETENTION FACILITY WILL BE MAINTAINED BY THE OWNER OF THE PROPERTY.

KEYED PLAN NOTES:

1. PROPOSED STORM WATER QUALITY STRUCTURE CDS2015-4-C
   RE: DETAILS SHEET C7.2
   RIM 81.20
   FL 73.25
2. PROPOSED 15'~12"ø HDPE @ 0.32%
   WITH RESTRICTOR STRUCTURE
   RE: DETAIL SHEET C4.1
3. PROPOSED 16'~12"ø HDPE @ 0.32%
4. PROPOSED 119'~24"ø RCP @ 0.18%
5. PROPOSED 4'~24"ø RCP @ 0.18%
6. PROPOSED STORM SEWER MH
   RIM 83.80
   FL 74.10
7. PROPOSED STORM SEWER MH
   RIM 84.40
   FL 73.95
8. PROPOSED STORM SEWER MH
   RIM 83.70
   FL 73.85
9. PROPOSED 19'~24"ø RCP @ 0.18%
10. PROPOSED STORM SEWER MH
    RIM 84.10
    FL 73.80
11. PROPOSED TYPE-E INLET
    G 76.50
    FL 73.60
12. PROPOSED 27'~24"ø RCP @ 0.18%
13. PROPOSED PUBLIC DETENTION POND
    7.25' WALL
    RE: PUBLIC PLANS FOR DETAILS

60 30 0 30 60 Feet
SCALE: 1"= 30'

RSG ENGINEERING
13501 KATY FREEWAY
SUITE 3180
HOUSTON, TEXAS 77079
PH. 713-783-7777
TBPE FIRM #: 15498

project
TOWNHOMES DEVELOPMENT
@ 13900 BRIARWORTH
at
13900 BRIARWORTH DRIVE
HOUSTON, TEXAS 77077

REVISIONS

STATE OF TEXAS
SALIM NAZIH OBEID
118989
LICENSED
PROFESSIONAL ENGINEER
02.18.2022

SITE DRAINAGE PLAN

DRAWN BY:	CHECKED:
BSS	SNO
PROJECT No	SHEET No:
21254.02	C4.2

LEGEND

- PROPOSED STORM SEWER
- EXISTING STORM SEWER
- PROPERTY LINE
- GRADE BREAK (G.B.)
- DENOTES DETENTION AREA
- SLOPE OF PAVEMENT OR FINISH GRADE
- EXIST.=FILLED, PROP.=OPEN — STORM SEWER MANHOLE
- DRAINAGE AREA DESIGNATION
- CATCH BASIN (RE: DETAIL & SCHEDULE)
- EXISTING NATURAL GRADE ELEVATIONS
- DRAINAGE AREA
- CUMULATIVE DRAINAGE AREA
- CUMULATIVE FLOW RATE
- PROPOSED 0.25' CONTOURS
- FL — DENOTES FLOW LINE ELEVATION
- TP — DENOTES TOP OF PAVEMENT ELEVATION
- TS — DENOTES TOP OF SIDEWALK ELEVATION
- FG — DENOTES FINISH GRADE ELEVATION
- HB — DENOTES HIGH BANK ELEVATION
- TG — DENOTES TOP OF GRATE ELEVATION
- G — DENOTES GUTTER ELEVATION
- ESW — DENOTES EDGE OF STATIC WATER ELEVATION

FLOODPLAIN DATA

PROPERTY "IS NOT" IN THE 100 YEAR FLOOD ZONE. THIS PROPERTY LIES IN ZONE "X-UNSHADED" ACCORDING TO F.I.R.M. MAP NO. 48201C0810L DATED 06-18-2007.

BENCHMARK DATA

ALL ELEVATIONS SHOWN HEREON ARE TIED TO H.C.F.C.D. REFERENCE MARK NO. 040680, BRASS DISK IN CONCRETE, STAMPED D129BM04, APPROXIMATELY LOCATED ON TOP OF CURB AT BRIARWORTH DRIVE. ELEVATION = 80.64', NAVD 1988, 2001 ADJ.

LINE	LENGTH	BEARING
L1	7.51'	N 87°53' 48" E

RESTRICTED RESERVE D 0.7696
(33,522) DRAINAGE/OPEN SPACE
N87°50'42"E - 300.00'

S87°53'48"W - 299.69'

N02°09'18"W - 340.00'

S02°06'12"E - 340.27'

30' DRAINAGE EASEMENT P295170

BLOCK 21
BRIAR VILLAGE
SECTION 4
VOL. 222, PG. 11, H.C.M.R.

BLOCK 2

LOT 8

BRIARWORTH DRIVE
(61' R.O.W.)

EXISTING STM MH
RIM 86.00
FL 54" RCP 76.26 (E)

EXISTING STM MH
RIM 85.70
FL 54" CGMP 75.79 (E)

EXISTING STM MH
RIM 85.70
FL 54" RCP 75.84 (N)

EXISTING 54" RCP

EXISTING 54" CGMP

30' DRAINAGE EASEMENT

16' UTILITY EASEMENT

5'x20' AERIAL EASEMENT

10' UTILITY EASEMENT

2,925 SF AREA RESERVED FOR LOT 6 FUTURE STRUCTURE

2,585 SF AREA RESERVED FOR LOT 5 FUTURE STRUCTURE

2,300 SF AREA RESERVED FOR LOT 9 FUTURE STRUCTURE

2,350 SF AREA RESERVED FOR LOT 8 FUTURE STRUCTURE

2,350 SF AREA RESERVED FOR LOT 7 FUTURE STRUCTURE

1,810 SF AREA RESERVED FOR LOT 1 FUTURE STRUCTURE

2,610 SF AREA RESERVED FOR LOT 2 FUTURE STRUCTURE

2,575 SF AREA RESERVED FOR LOT 3 FUTURE STRUCTURE

2,300 SF AREA RESERVED FOR LOT 4 FUTURE STRUCTURE

PROPOSED 20' STORM SEWER EASEMENT

PROPOSED 20' SANITARY SEWER EASEMENT

20' STM. SWR. EASEMENT

EXISTING 24" RCP

EXISTING 8" SAN SWR

8' UTILITY EASEMENT

EXISTING CURB INLET
TOP 80.46
FL 24" RCP 76.96 (S)

EXISTING CURB INLET
TOP 80.56
FL 24" RCP 76.46 (N)
FL 24" RCP 76.66 (S)

EXISTING SAN SWR MH
RIM 82.66

EXISTING STM SWR MH
RIM 81.85
FL 24" RCP 76.55 (N)
FL 24" RCP 73.85 (E)
FL 24" RCP 74.05 (W)

EXISTING STM
SWR MH
RIM 83.34
FL 24" RCP 73.61 (S)

EXISTING STM
SWR MH
RIM 83.60
FL 24" RCP 73.36 (E)

EXISTING SAN SWR MH
RIM 83.44
FL 74.34

EXISTING STM
SWR MH
RIM 83.77
FL 24" RCP 73.23 (S)

EXISTING SAN SWR MH
RIM 85.10
FL 75.90

EXISTING STM
SWR MH
RIM 81.50
FL 24" RCP 72.96 (N)
FL 30" RCP 72.46 (SE)

EXISTING STM
SWR MH
RIM 82.00
FL 30" RCP 72.23 (E)

EXISTING STM
SWR MH
RIM 85.00
FL 30" CGMP 71.99 (E)

EXISTING 30" RCP

EXISTING 30" CGMP

110' FEET STRIP HARRIS COUNTY FLOOD CONTROL DISTRICT

60 30 0 30 60 Feet
SCALE: 1"= 30'

RSG ENGINEERING
13501 KATY FREEWAY
SUITE 3180
HOUSTON, TEXAS 77079
PH. 713-783-7777
TBPE FIRM #: 15498

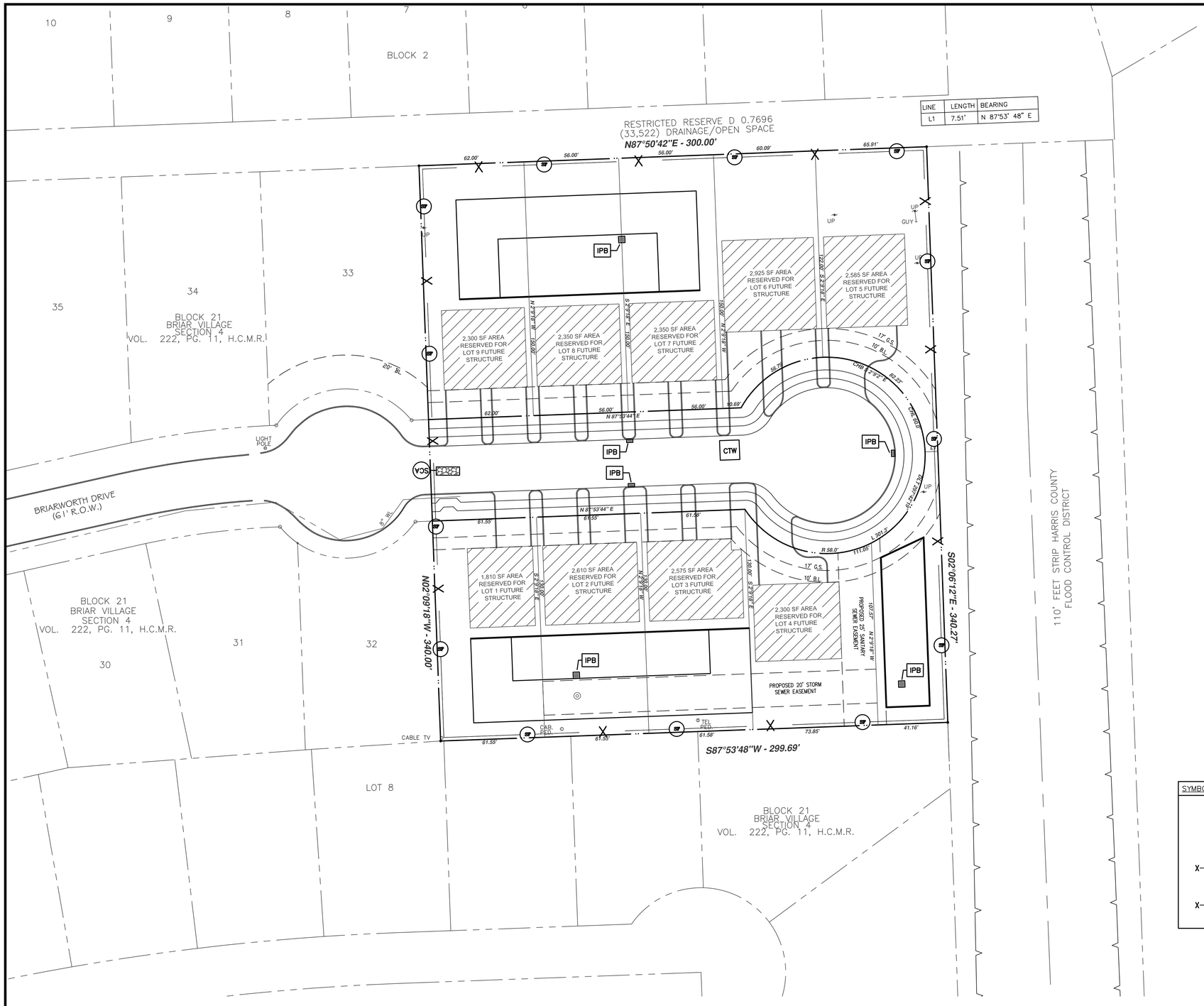
project
TOWNHOMES DEVELOPMENT
@ 13900 BRIARWORTH
at
13900 BRIARWORTH DRIVE
HOUSTON, TEXAS 77077

REVISIONS

STATE OF TEXAS
SALIM NAZIH OBEID
118989
LICENSED
PROFESSIONAL ENGINEER
02.18.2022

SITE GRADING PLAN

DRAWN BY:	CHECKED:
BSS	SNO
PROJECT No	**SHEET No:**
21254.02	C4.3



LINE	LENGTH	BEARING
L1	7.51'	N 87°53' 48" E

EROSION CONTROL SYSTEM NOTES :

1. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING BERMS, SILT FENCES, STRAW BALES, OR OTHER MEANS TO PREVENT EROSION FROM REACHING ADJACENT PROPERTY. IN THE EVENT THE PREVENTION MEASURES ARE NOT EFFECTIVE, THE CONTRACTOR SHALL REMOVE ANY EROSION DEBRIS AND RESTORE ADJACENT PROPERTY AND/ OR THE RIGHT-OF-WAY TO ORIGINAL OR BETTER CONDITION.
2. EROSION CONTROL FEATURES SHOWN ARE THE MINIMUM REQUIREMENTS ACCEPTABLE. PLACE ADDITIONAL EROSION CONTROL DEVICES AS RUNOFF AND DRAINAGE PATTERNS CHANGE DURING CONSTRUCTION TO PROHIBIT LOSS OF SOIL FROM THE SITE.
   A RERECORD OF REVISION FORM MUST BE COMPLETED WHEN EROSION CONTROL FEATURES ARE MODIFIED. RED-LINED REVISIONS OF SWPPP/ECP WILL BE NEEDED WITHIN 7 DAYS OF WHEN MODIFICATION NEEDS ARE IDENTIFIED.
3. MINIMIZE THE AMOUNT OF SURFACE AREA EXPOSED TO THE EXTENT PRACTICABLE.
4. LEAVE GRADED AREAS WITH A ROUGH TEXTURE TO PROMOTE INFILTRATION.
5. LIMIT UNNECESSARY TRAFFIC ON GRADED AREAS.
6. INSTALL SILT FENCES OR STRAW BALE DIKES ON DOWNSTREAM SLOPES FOR THE EXTENT OF THE CONSTRUCTION LIMITS PRIOR TO BEGINNING ANY GRADING OPERATIONS.
7. SILT FENCES:
   A. INSTALL SILT FENCES AT LOCATIONS SHOWN GENERALLY ALONG THE CONTOUR OF DOWNSTREAM SLOPES.
   B. INSTALL POSTS ANGLING SLIGHTLY UPSTREAM. SPACE POSTS AT 10 FEET IF WIRE FENCING IS TO BE USED TO SUPPORT FABRIC, OTHERWISE SPACE POSTS AT 6 FEET.
   C. EXCAVATE 4 INCH BY 4 INCH TRENCH ON UPSTREAM SIDE, EMBED FABRIC 8 INCHES, BACKFILL TRENCH AND COMPACT.
   D. FASTEN FABRIC (AND WIRE FENCE, IF USED) SECURELY TO POSTS.

   STRAW BALE DIKES:
   A. INSTALL STRAW BALE DIKES AT LOCATION SHOWN GENERALLY ALONG THE CONTOUR OF DOWNSTREAM SLOPES.
   B. INSTALL STRAW BALE DIKES AND DITCH CHECKS AS SHOWN.
   C. EXCAVATE TO 4 INCH DEPTH, PLACE BALES FIRMLY AGAINST DOWNSTREAM FACE OF EXCAVATION AND BACKFILL UPSTREAM SIDE OF TRENCH TO 4 INCHES ABOVE EXISTING GROUND.
   D. PLACE BALES FIRMLY ABUTTING DOWNSTREAM FACE OF EXCAVATION AND EACH OTHER.
   E. ANCHOR EACH BALE WITH TWO STAKES. ANGLE FIRST STAKE TOWARDS PREVIOUSLY ANCHORED BALE TO FORCE BALES TOGETHER.
   F. CHINK SPACES BETWEEN BALES WITH LOOSE STRAW.
   G. STRAW BALES SHOULD BE REPLACED EVERY TWO MONTHS OR WHEN REQUIRED BY WET WEATHER
8. MAINTAIN EROSION CONTROL DEVICES IN GOOD CONDITION AT ALL TIMES. INSPECT FREQUENTLY AND AFTER EACH RAINFALL.
9. REDISTRIBUTE ACCUMULATED SEDIMENT UPSTREAM OF DEVICES.
10. EROSION CONTROL DEVICES SHALL BE REMOVED AFTER FINAL STABILIZATION IS ACHIEVED.
11. PROPERLY DISPOSE OF SOLID WASTE, PAINTS, SOLVENTS, CLEANING COMPOUNDS, ETC.
12. STORE CONSTRUCTION MATERIALS AWAY FROM LOW AREAS AND DRAINAGEWAYS.
13. PROVIDE PORTABLE TOILETS AND PROPERLY DISPOSE OF SANITARY SEWAGE. PROVIDE MINIMUM 2 ADJACENT TO OFFICE TRAILER. CONSTRUCT CONTAINMENT BERMS AND USE DRIP PANS AT FUEL AND LIQUID STORAGE TANKS.
14. LOCATE FUEL/MATERIAL STORAGE AREAS AWAY FROM STORM WATER CONVEYANCE SYSTEMS. USE A LINER UNDER ABOVE GROUND STORAGE TANKS. USE SILT FENCING, HAY BALES, OR BERMS AROUND FUEL STORAGE AREAS. (NO SEPARATE PAY)
15. FUEL AND MATERIAL STORAGE AREAS SHALL BE LOCATED AT LEAST 100 FEET AWAY FROM STREAM BANKS AND WETLANDS. MATERIAL STORAGE AREAS SHALL BE LOCATED UNDER ROOF OR OTHER ENCLOSURE STRUCTURE. FUELING MUST BE ATTENDED BY PERSONNEL AT ALL TIMES TO REPORT ANY SPILLS.
16. CONTRACTOR WILL ADVISE OWNER IMMEDIATELY, VERBALLY, AND IN WRITING, OF ANY FUEL SPILLS ONTO THE PROJECT/ CONSTRUCTION AREA AND THE ACTIONS TAKEN TO REMEDY THE PROBLEM.
17. CONTRACTOR IS RESPONSIBLE FOR COMPLYING WITH ALL ENVIRONMENTAL LAWS.
18. CONTRACTOR IS RESPONSIBLE FOR DISPOSING FUELS, MATERIALS, AND EXCAVATIONS IN A LEGALLY APPROVED MANNER.
19. CONTRACTOR IS TO INSPECT ALL STRUCTURAL CONTROLS SPECIFIED HEREIN, AT A MINIMUM, ONCE EVERY 7 CALENDAR DAYS OR WITHIN 24 HOURS AFTER EVERY STORM EVENT THAT MEETS OR EXCEEDS 0.5 INCHES/24 HOUR PERIOD.
20. CONTRACTOR WILL PROVIDE STORAGE AREAS FOR CHEMICALS, PAINTS, SOLVENTS, FERTILIZERS, AND OTHER POTENTIALLY TOXIC MATERIALS.
21. FILTER FABRIC (SILT FENCE) FLOWRATE WILL BE 30 GALLONS PER SQUARE FOOT PER MINUTE.
22. FILTER FABRIC WILL BE STAPLED OVER BOARDS ON ALL STAGE ONE STORM SEWER INLETS.

SYMBOLS:

CTW	CONCRETE TRUCK WASHOUT LOCATIONS ARE APPROXIMATE SHALL BE VERIFIED ON THE FIELD DURING CONSTRUCTION
X—SF—X	FILTER FABRIC FENCE
X—RSF—X	REINFORCED FILTER FABRIC FENCE
IPB	STAGE I INLET PROTECTION BARRIER
IPB II	STAGE II INLET PROTECTION BARRIER
FD-TYPE #	FILTER DAM
SCA	STABILIZED CONSTRUCTION ACCESS

60 30 0 30 60 Feet
SCALE: 1"= 30'

RSG ENGINEERING
13501 KATY FREEWAY
SUITE 3180
HOUSTON, TEXAS 77079
PH. 713-783-7777
TBPE FIRM #: 15498

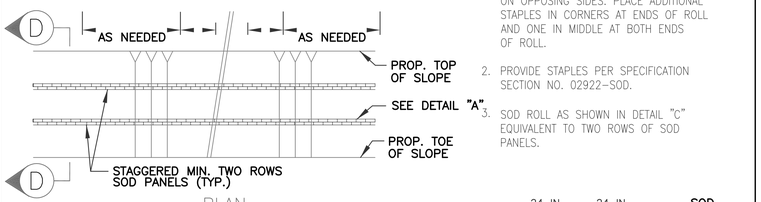
project
TOWNHOMES DEVELOPMENT
@ 13900 BRIARWORTH
at
13900 BRIARWORTH DRIVE
HOUSTON, TEXAS 77077

REVISIONS

STATE OF TEXAS
SALIM NAZIH OBEID
118989
LICENSED
PROFESSIONAL ENGINEER
02.18.2022

STORM WATER POLLUTION PREVENTION PLAN

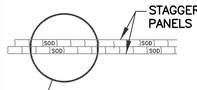
DRAWN BY:	CHECKED:
BSS	SNO
PROJECT No	SHEET No:
21254.02	C5.1



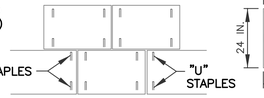
PLAN

FOR SOD ROLLS, 24 INCHES WIDE, PLACE STAPLES ON 24 INCH CENTERS NEAR THE EDGES. STAGGER STAPLES ON OPPOSING SIDES. PLACE ADDITIONAL STAPLES IN CORNERS AT ENDS OF ROLL AND ONE IN MIDDLE AT BOTH ENDS OF ROLL.

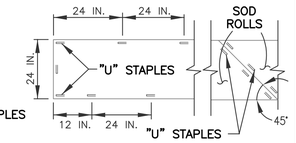
2. PROVIDE STAPLES PER SPECIFICATION SECTION NO. 02922-SOD.
3. SOD ROLL AS SHOWN IN DETAIL "C" EQUIVALENT TO TWO ROWS OF SOD PANELS.



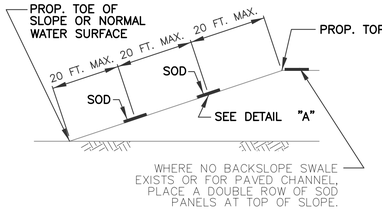
DETAIL "A"



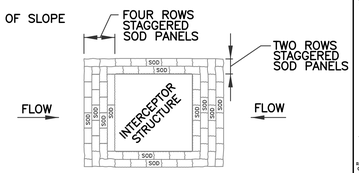
DETAIL "B"



DETAIL "C"



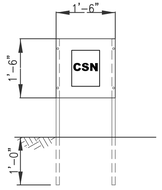
D SECTION



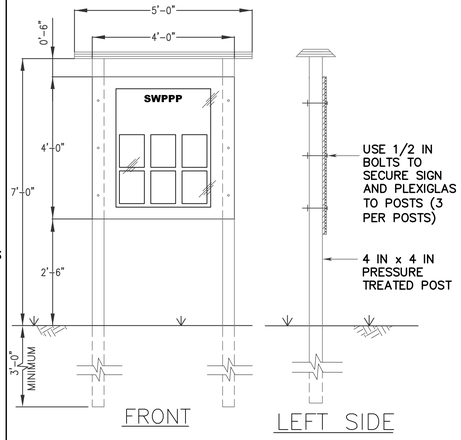
DETAIL "D"
INTERCEPTOR STRUCTURE & INLET PROTECTION

SODDING

NOTE:
CONSTRUCT IN ACCORDANCE WITH HCFCD SPECIFICATION SECTION 01580 – PROJECT SIGNS.

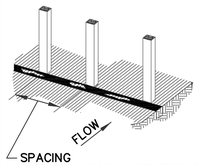


CSN HOLDER

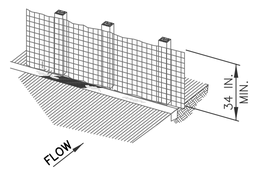


SWPPP / BMP SIGN AND CONSTRUCTION SITE NOTICE HOLDER DETAILS

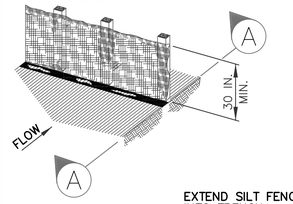
1. SET SUPPORTS AND EXCAVATE 4 IN. X 6 IN. TRENCH UPSLOPE ALONG LINE OF SUPPORTS.



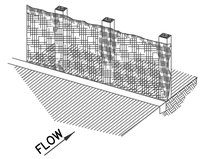
2. SECURE WIRE FENCING TO SUPPORTS.

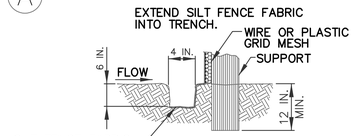


3. ATTACH SILT FENCE FABRIC TO WIRE FENCE AND EXTEND INTO THE TRENCH.



4. BACKFILL AND COMPACT THE EXCAVATED SOIL.





A SECTION

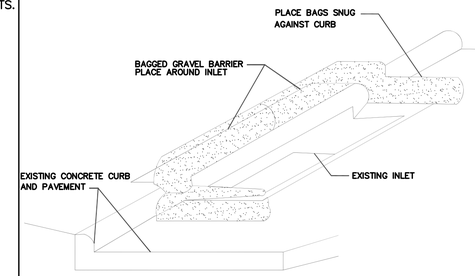
CONSTRUCTION NOTES:

1. SEE SPECIFICATION SECTION NO. 02361-SILT FENCES.

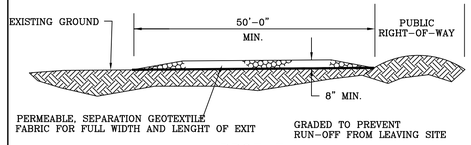
RSF SYMBOL — REINFORCED SILT FENCE

SF SYMBOL — SILT FENCE

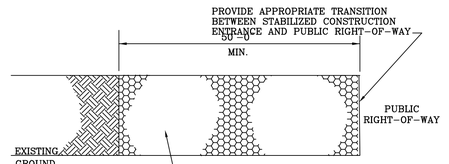
SILT FENCE



STAGE II INLET PROTECTION BARRIER



PROFILE

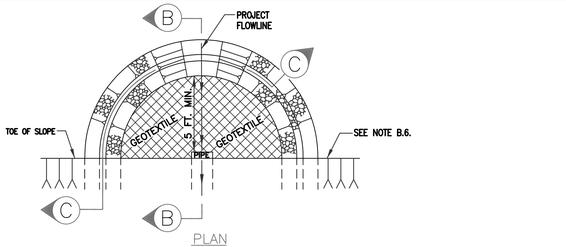


PLAN VIEW

GENERAL NOTES:

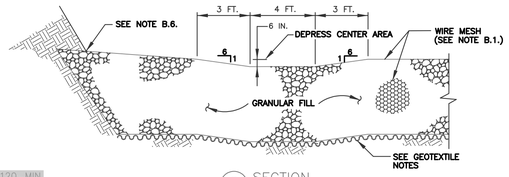
1. MINIMUM LENGTH IS AS SHOWN ON CONSTRUCTION DRAWINGS OR 50 FEET, WHICHEVER IS MORE.
2. CONSTRUCT AND MAINTAIN CONSTRUCTION EXIT WITH CONSTANT WIDTH ACROSS ITS LENGTH, INCLUDING ALL POINTS OF INGRESS OR EGRESS.
3. UNLESS SHOWN ON THE CONSTRUCTION DRAWINGS, STABILIZATION FOR OTHER AREAS WILL HAVE THE SAME AGGREGATE THICKNESS AND WIDTH REQUIREMENTS AS THE STABILIZED CONSTRUCTION EXIT.
4. WHEN SHOWN ON THE CONSTRUCTION DRAWINGS, WIDEN OR LENGTHEN STABILIZED AREA TO ACCOMMODATE A TRUCK WASHING AREA. PROVIDE OUTLET SEDIMENT TRAP FOR THE TRUCK WASHING AREA.
5. PROVIDE PERIODIC TOP DRESSING WITH ADDITIONAL COARSE AGGREGATE TO MAINTAIN THE REQUIRED DEPTH OR WHEN SURFACE BECOMES PACKED WITH MUD.
6. PERIODICALLY TURN AGGREGATE TO EXPOSE A CLEAN DRIVING SURFACE.
7. ALTERNATIVE METHODS OF CONSTRUCTION INCLUDE
   -CEMENT STABILIZED SOIL: COMPACTED CEMENT STABILIZED SOIL, LIMESTONE AGGREGATE, OR OTHER FILL MATERIAL IN AN APPLICATION OF THICKNESS OF 8 INCHES.
   -WOOD MATS: OAK OR OTHER HARDWOOD TIMBERS PLACED EDGE TO EDGE AND ACROSS SUPPORT WOODEN BEAMS WHICH ARE PLACED ON TOP OF EXISTING SOIL IN AN APPLICATION THICKNESS OF 6 INCHES.
   -STEEL MATS: PERFORATED MATS PLACED ACROSS PERPENDICULAR SUPPORT MEMBERS.

STABILIZED CONSTRUCTION ACCESS

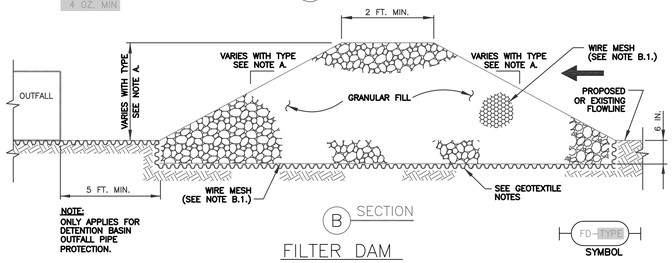


PLAN

FILTER DAM AT DETENTION BASIN OUTFALL PIPE



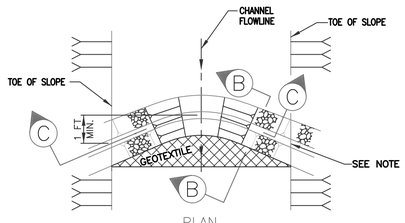
C SECTION



B SECTION

FILTER DAM

FD-TYPE SYMBOL



PLAN

IN-CHANNEL FILTER DAM

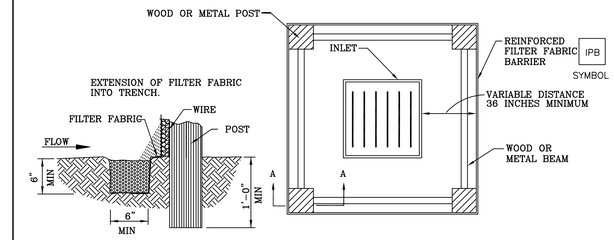
GEOTEXTILE NOTES:

MIN. AOS	SIEVE NO.
MAX. AOS	SIEVE NO.
WEIGHT	OZ/SY

FILTER DAM NOTES:

A. TYPES OF FILTER DAMS
1. TYPE 1 (NON-REINFORCED)
   a. HEIGHT – 18-24 INCHES. MEASURE VERTICALLY FROM EXISTING GROUND TO TOP OF FILTER DAM.
   b. TOP WIDTH – 2 FEET (MINIMUM)
   c. SLOPES – 2:1 (MAXIMUM).
2. TYPE 2 (REINFORCED)
   a. HEIGHT – 18-36 INCHES. MEASURE VERTICALLY FROM EXISTING GROUND TO TOP OF FILTER DAM.
   b. TOP WIDTH – 2 FEET (MINIMUM).
   c. SLOPES – 2:1 (MAXIMUM).
3. TYPE 3 (REINFORCED)
   a. HEIGHT – 36-48 INCHES. MEASURE VERTICALLY FROM EXISTING GROUND TO TOP OF FILTER DAM.
   b. TOP WIDTH – 2 FEET (MINIMUM).
   c. SLOPES – 3:1 (MAXIMUM).
4. TYPE 4 (GABION)
   a. HEIGHT – 30 INCHES (MINIMUM). MEASURE VERTICALLY FROM EXISTING GROUND TO TOP OF FILTER DAM.
   b. TOP WIDTH – 2 FEET (MINIMUM).
5. TYPE 5. AS SHOWN ON THE PLANS.

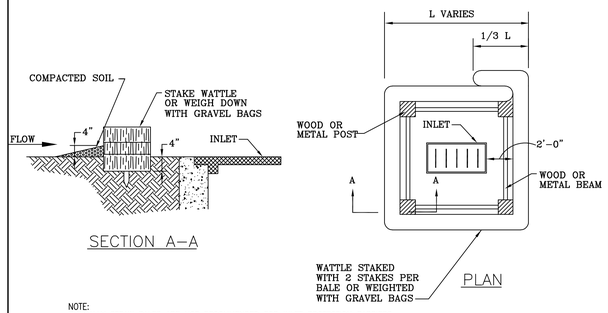
B. CONSTRUCT FILTER DAMS ACCORDING TO THE FOLLOWING CRITERIA UNLESS SHOWN OTHERWISE ON THE PLANS.
1. TYPE 2 AND 3 FILTER DAMS: SECURE WITH 20 GAUGE GALVANIZED WOVEN WIRE MESH WITH 1 INCH DIAMETER HEXAGONAL OPENINGS.
2. GRANULAR FILL:
   a. PLACE ON MESH TO HEIGHT AND SLOPES SHOWN ON PLANS OR AS SPECIFIED BY THE ENGINEER.
   b. 3-5 INCHES FOR ROCK FILTER DAM TYPES 1,2, AND 4 AND 4-8 INCHES FOR ROCK FILTER DAM TYPE 3. REFER TO GRANULAR FILL IN SPECIFICATION SECTION NO. 02378-RIPRAP AND GRANULAR FILL.
3. WIRE MESH: FOLD AT UPSTREAM SIDE OVER GRANULAR FILL AND TIGHTLY SECURE TO ITSELF ON THE DOWNSTREAM SIDE USING WIRE TIES OR HOG RINGS.
4. IN STREAMS: SECURE OR STAKE MESH TO STREAM BED PRIOR TO AGGREGATE PLACEMENT.
5. SEE SPECIFICATION SECTION NO. 02364-FILTER DAMS.
6. EMBED ONE FOOT MINIMUM INTO SLOPE AND AT SLOPE RAISE ONE FOOT HIGHER THAN CENTER OF DEPRESSED AREA.



SECTION A-A

PLAN

SEE REINFORCED FILTER FABRIC BARRIER DETAIL FOR REINFORCED FILTER FABRIC BARRIER REQUIREMENTS

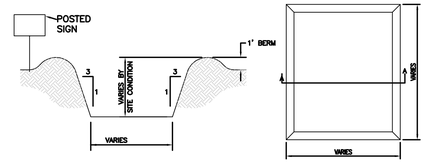


SECTION A-A

PLAN

NOTE:
TYPICALLY STRAW BALES ARE NOT RECOMMENDED FOR INLET PROTECTION BARRIERS.

INLET PROTECTION BARRIERS FOR STAGE I INLETS



SECTION A-A
N.T.S.

PLAN VIEW
N.T.S.

GENERAL NOTES:

1. POST A SIGN READING "CONCRETE WASH OUT PIT" NEXT TO THE PIT.
2. VERBALLY INSTRUCT THE CONCRETE TRUCK DRIVERS WHERE THE PIT IS AND TO WASH OUT THEIR TRUCKS IN THE PIT AND NO WHERE ELSE.
3. UNPON THE CONCRETE SETTING UP (CURING, DRYING OUT), THE CONCRETE WASTE SHALL BE REMOVED FROM THE PROJECT SITE AND DISPOSED OF PROPERLY BY THE CONTRACTOR. AFTER REMOVAL OF THE CONCRETE WASTE, THE WASH OUT PIT SHALL BE FILLED WITH CLEAN FILL MATERIAL AND COMPACTED TO IN-SITU CONDITIONS, OR AS DIRECTED BY THE PROJECT SPECIFICATIONS.
4. CONCRETE WASH OUT PITS SHALL NOT BE LOCATED DIRECTLY ADJACENT TO, NOR AT ANY TIME DRAIN INTO THE STORM SEWER SYSTEM OR ANY OTHER SWALE, DITCH, OR WATERWAY.
5. CONSTRUCT ENTRY ROAD AND BOTTOM OF WASHOUT AREA TO SUPPORT EXPECTED LOADINGS FROM TRUCKS EQUIPMENT.

CONCRETE TRUCK WASHOUT AREA

RSG ENGINEERING
13501 KATY FREEWAY
SUITE 3180
HOUSTON, TEXAS 77079
PH. 713-783-7777
TBPE FIRM #: 15498

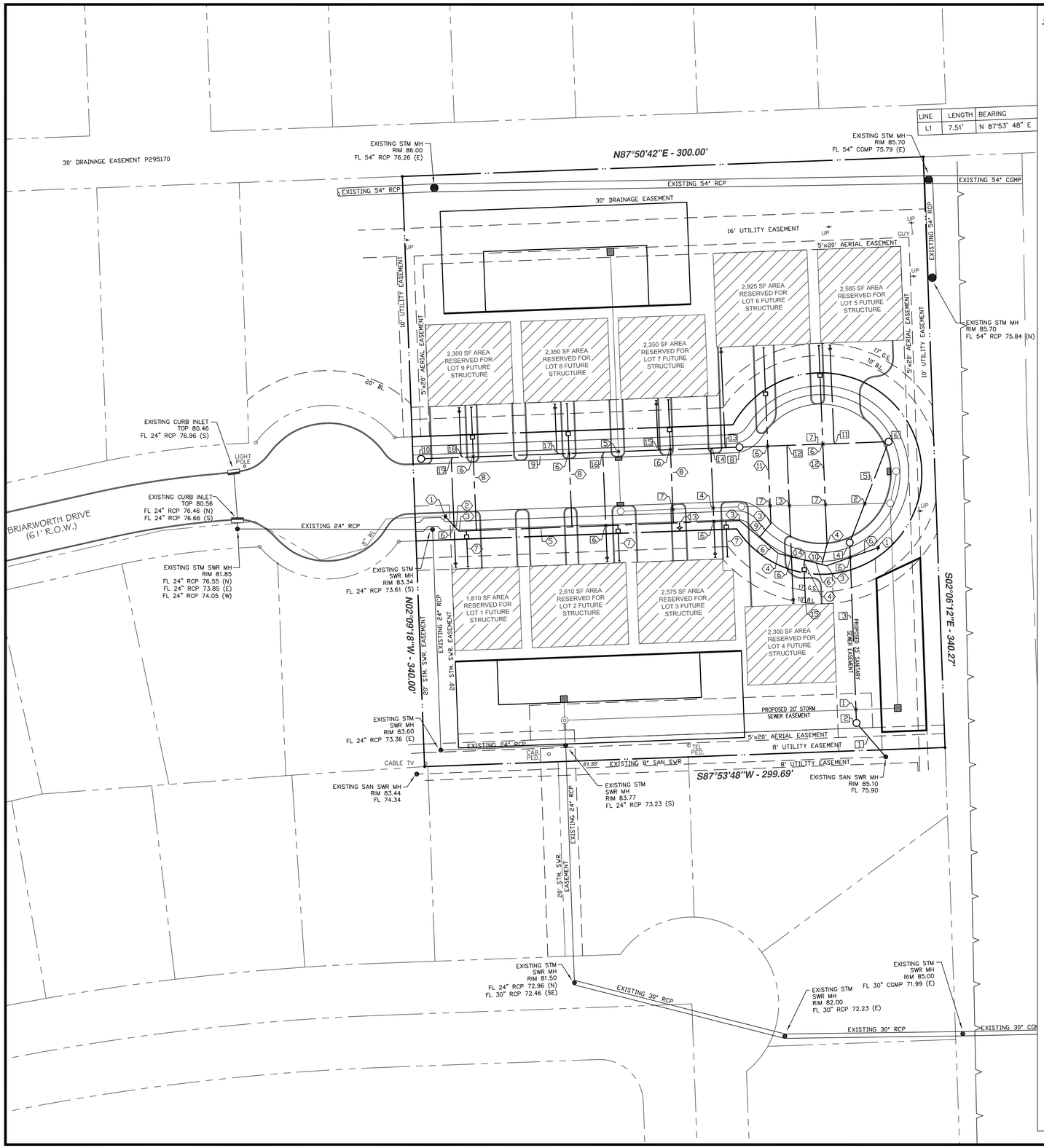
project
TOWNHOMES DEVELOPMENT
@ 13900 BRIARWORTH
at
13900 BRIARWORTH DRIVE
HOUSTON, TEXAS 77077

REVISIONS

STATE OF TEXAS
SALIM NAZIH OBEID
118989
LICENSED
PROFESSIONAL ENGINEER
02.18.2022

SWPPP DETAILS

DRAWN BY:	CHECKED:
BSS	SNO
PROJECT No	SHEET No:
21254.02	C5.2



LINE	LENGTH	BEARING
L1	7.51'	N 87°53' 48" E

SANITARY KEYED PLAN NOTES

1. 26'~8" C-900 DR-18 GREEN PVC SANITARY SEWER @ 1.00%
2. PROPOSED SAN. SEWER MANHOLE
   RIM 84.15
   FL 76.75
3. 104'~8" C-900 DR-18 GREEN PVC SANITARY SEWER @ 0.44%
4. PROPOSED SAN. SEWER MANHOLE
   RIM 84.15
   FL 77.20
5. 62'~8" C-900 DR-18 GREEN PVC SANITARY SEWER @ 1.00%
6. PROPOSED SAN. SEWER MANHOLE
   RIM 84.15
   FL 77.80
7. 85'~8" C-900 DR-18 GREEN PVC SANITARY SEWER @ 1.00%
8. PROPOSED SAN. SEWER MANHOLE
   RIM 84.15
   FL 78.65
9. 183'~8" C-900 DR-18 GREEN PVC SANITARY SEWER @ 1.00%
10. PROPOSED SAN. SEWER MANHOLE
    RIM 85.00
    FL 80.50
11. 8"X6" SADDLE TAP @ FL = 78.10
    1'~6" PVC SCH-40 SAN. SEWER @ 1.00%
    45° BEND
    54'~6" PVC SCH-40 SAN. SEWER @ 1.00%
    PROPOSED 6" SAN. SEWER CLEAN-OUT
    RIM MATCH FG ELEVATION
    FL 79.50
    1'~6" SANITARY SEWER LEAD
    PLUG SANITARY SEWER
12. 8"X6" SADDLE TAP @ FL = 78.35
    1'~6" PVC SCH-40 SAN. SEWER @ 1.00%
    45° BEND
    88'~6" PVC SCH-40 SAN. SEWER @ 1.00%
    PROPOSED 6" SAN. SEWER CLEAN-OUT
    RIM MATCH FG ELEVATION
    FL 80.05
    1'~6" SANITARY SEWER LEAD
    PLUG SANITARY SEWER
13. 8"X6" SADDLE TAP @ FL = 78.70
    1'~6" PVC SCH-40 SAN. SEWER @ 1.00%
    45° BEND
    54'~6" PVC SCH-40 SAN. SEWER @ 1.00%
    PROPOSED 6" SAN. SEWER CLEAN-OUT
    RIM MATCH FG ELEVATION
    FL 80.10
    1'~6" SANITARY SEWER LEAD
    PLUG SANITARY SEWER
14. 8"X6" SADDLE TAP @ FL = 78.80
    1'~6" PVC SCH-40 SAN. SEWER @ 1.00%
    45° BEND
    60'~6" PVC SCH-40 SAN. SEWER @ 1.00%
    PROPOSED 6" SAN. SEWER CLEAN-OUT
    RIM MATCH FG ELEVATION
    FL 80.25
    1'~6" SANITARY SEWER LEAD
    PLUG SANITARY SEWER
15. 8"X6" SADDLE TAP @ FL = 79.10
    1'~6" PVC SCH-40 SAN. SEWER @ 1.00%
    45° BEND
    25'~6" PVC SCH-40 SAN. SEWER @ 1.00%
    PROPOSED 6" SAN. SEWER CLEAN-OUT
    RIM MATCH FG ELEVATION
    FL 80.20
    1'~6" SANITARY SEWER LEAD
    PLUG SANITARY SEWER
16. 8"X6" SADDLE TAP @ FL = 79.40
    1'~6" PVC SCH-40 SAN. SEWER @ 1.00%
    45° BEND
    60'~6" PVC SCH-40 SAN. SEWER @ 1.00%
    PROPOSED 6" SAN. SEWER CLEAN-OUT
    RIM MATCH FG ELEVATION
    FL 80.85
    1'~6" SANITARY SEWER LEAD
    PLUG SANITARY SEWER
17. 8"X6" SADDLE TAP @ FL = 79.70
    1'~6" PVC SCH-40 SAN. SEWER @ 1.00%
    45° BEND
    25'~6" PVC SCH-40 SAN. SEWER @ 1.00%
    PROPOSED 6" SAN. SEWER CLEAN-OUT
    RIM MATCH FG ELEVATION
    FL 80.80
    1'~6" SANITARY SEWER LEAD
    PLUG SANITARY SEWER
18. 8"X6" SADDLE TAP @ FL = 80.25
    1'~6" PVC SCH-40 SAN. SEWER @ 1.00%
    45° BEND
    25'~6" PVC SCH-40 SAN. SEWER @ 1.00%
    PROPOSED 6" SAN. SEWER CLEAN-OUT
    RIM MATCH FG ELEVATION
    FL 81.35
    1'~6" SANITARY SEWER LEAD
    PLUG SANITARY SEWER
19. 8"X6" SADDLE TAP @ FL = 80.30
    1'~6" PVC SCH-40 SAN. SEWER @ 1.00%
    45° BEND
    60'~6" PVC SCH-40 SAN. SEWER @ 1.00%
    PROPOSED 6" SAN. SEWER CLEAN-OUT
    RIM MATCH FG ELEVATION
    FL 81.75
    1'~6" SANITARY SEWER LEAD
    PLUG SANITARY SEWER

WATER KEYED PLAN NOTES

1. PROPOSED BLOW OFF VALVE
2. 12'~8"ø C-900 DR-18 WATER LINE
3. 45° BEND
4. 22.5° BEND
5. 162'~8"ø C-900 DR-18 WATER LINE
6. 29'~8"ø C-900 DR-18 WATER LINE
7. 8"X2" TAPPING SADDLE WITH CORPORATION STOP
   3'~2"ø COPPER WATER LINE
   PROPOSED 2" DOMESTIC WATER METER ASSEMBLY
   16'~2"ø DOMESTIC WATER LINE
   PLUG WATER LINE
8. 8"X2" TAPPING SADDLE WITH CORPORATION STOP
   53'~2"ø COPPER WATER LINE
   PROPOSED 2" DOMESTIC WATER METER ASSEMBLY
   16'~2"ø DOMESTIC WATER LINE
   PLUG WATER LINE
9. 8"X2" TAPPING SADDLE WITH CORPORATION STOP
   10'~2"ø COPPER WATER LINE
10. 8"X2" TAPPING SADDLE WITH CORPORATION STOP
    12'~2"ø COPPER WATER LINE
11. 74'~2"ø COPPER WATER LINE
    PROPOSED 2" DOMESTIC WATER METER ASSEMBLY
    25'~2"ø DOMESTIC WATER LINE
    PLUG WATER LINE
12. 96'~2"ø COPPER WATER LINE
    PROPOSED 2" DOMESTIC WATER METER ASSEMBLY
    16'~2"ø DOMESTIC WATER LINE
    PLUG WATER LINE
13. 8"X6" TAP SLEEVE AND VALVE
    PROPOSED 6" FIRE HYDRANT ASSEMBLY
14. 8"X2" TAPPING SADDLE WITH CORPORATION STOP
    2'~2"ø COPPER WATER LINE
15. 2'~2"ø COPPER WATER LINE
    PROPOSED 2" DOMESTIC WATER METER ASSEMBLY
    18'~2"ø DOMESTIC WATER LINE
    PLUG WATER LINE

KEYED PLAN NOTES

1. SANITARY SEWER LINE – STORM SEWER LINE
   CROSSING MINIMUM 1.25' SEPARATION
   FL SAN SWR 8" – 76.80
   FL STM SWR 24" – 73.55
2. SANITARY SEWER LINE – STORM SEWER LINE
   CROSSING MINIMUM 1.5' SEPARATION
   FL SAN SWR 8" – 77.45
   FL STM SWR 24" – 73.80
3. SANITARY SEWER LINE – STORM SEWER LINE
   CROSSING MINIMUM 1.5' SEPARATION
   FL SAN SWR 6" – 79.50
   FL STM SWR 24" – 73.90
4. SANITARY SEWER LINE – STORM SEWER LINE
   CROSSING MINIMUM 1.5' SEPARATION
   FL SAN SWR 6" – 80.00
   FL STM SWR 24" – 73.95
5. SANITARY SEWER LINE – STORM SEWER LINE
   CROSSING MINIMUM 1.5' SEPARATION
   FL SAN SWR 8" – 79.40
   FL STM SWR 24" – 74.15
6. WATER LINE – SANITARY SEWER LINE
   CROSSING MINIMUM 2' SEPARATION
7. WATER LINE – STORM SEWER LINE
   CROSSING MINIMUM 2' SEPARATION

LEGEND

- PROPERTY LINE
- STORM SEWER
- WASTEWATER { 6" OR SMALLER–PVC SCH 40 / 8" OR LARGER–PVC SDR 35
- WATER LINE
- FIRE HYDRANT (FH)
- GATE VALVE
- DOUBLE WATER LEADS
- SINGLE WATER LEAD
- DOUBLE SANITARY LEADS
- SINGLE SANITARY LEAD
- EXIST.=FILLED, PROP.=OPEN — WASTEWATER MANHOLE
- EXIST.=FILLED, PROP.=OPEN — STORM SEWER MANHOLE
- C.O. — CLEAN–OUT
- C.O. — INLINE CLEAN OUT
- PROPOSED WATER METER
- PIPELINE CROSSING

GENERAL NOTES: SITEWORK

(THESE NOTES CONTROL EXCEPT AS NOTED OTHERWISE IN PLANS & DETAILS)

1. CONTRACTOR SHALL FIELD VERIFY LOCATION AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION OF PROPOSED FACILITIES. NOTIFY ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.
2. CONTRACTOR SHALL NOTIFY THE APPROPRIATE UTILITY COMPANY 48 HOURS PRIOR TO EXCAVATING NEAR THEIR UTILITY.
3. CONTRACTOR SHALL TAKE ALL DUE PRECAUTIONS TO PROTECT EXISTING FACILITIES FROM DAMAGE. ANY DAMAGE TO EXISTING FACILITIES INCURRED AS A RESULT OF CONSTRUCTION OPERATIONS WILL BE REPAIRED BY THE CONTRACTOR AT HIS OWN EXPENSE.
4. CONTRACTOR SHALL TAKE EXTRA CARE TO PROTECT TREES IN AREAS ADJACENT TO CONSTRUCTION.

B. DOMESTIC WATER SYSTEM

1. ALL WATER LINE MAINS SIZES 1 THRU 3 INCH SHALL BE PVC SCH 40.
2. ALL WATER MAINS SIZES 4 THRU 12 INCH SHALL BE AWWA C-900 CLASS 150 DR-18.
3. ALL WATER METERS SHALL BE FIRE RATED ACCORDING TO HARRIS COUNTY STANDARDS.
4. WATER LINE SHALL BE CONSTRUCTED AND TESTED IN ACCORDANCE WITH HARRIS COUNTY SPECIFICATION FOR WATER MAIN CONSTRUCTION AS CURRENTLY AMENDED.
5. WATER LINE SHALL HAVE BANK SAND BEDDING AND BACKFILL.
6. PROVIDE THRUST BLOCKING ACCORDING TO HARRIS COUNTY STANDARDS & SPECIFICATIONS.
7. PROVIDE A MINIMUM 24–INCHES OF CLEARANCE AT STORM SEWER AND WATER LINE CROSSING.

C. SANITARY SEWER SYSTEM

1. POLY–VINYL–CHLORIDE PSM (PVC) PIPE SHALL CONFIRM TO ASTM SPECIFICATIONS D3034 AND BE INSTALLED ACCORDING TO ASTM D2321.
2. ALL SANITARY SEWER SERVICE LINES SHALL BE CONSTRUCTED TO TRUE ALIGNMENT AND GRADE, WRAPPED AND SAGGING LINES WILL NOT BE PERMITTED.
3. BUILDING TIE–ON CONNECTION WILL BE MADE DIRECTLY TO THE STUB–OUT FROM THE BUILDING PLUMBING AT THE FOUNDATION ON ALL WASTES OUTLETS.
4. WATER–TIGHT ADAPTERS OF A TYPE COMPATIBLE WITH THE MATERIALS BEING JOINED WILL BE USED AT THE POINT OF CONNECTION OF THE SERVICE LINE TO THE BUILDING PLUMBING. NO CEMENT GROUT MATERIALS ARE PERMITTED.
5. NO BENDS OR TURNS AT ANY POINT WILL BE GREATER THAN 45 DEGREES.
6. EACH CLEANOUT WILL BE INSTALLED SO THAT IT OPENS IN A DIRECTION OPPOSITE TO THE FLOW OF THE WASTE AND, EXCEPT IN THE CASE OF "WYE" BRANCH AND END–OF–THE–LINE CLEANOUTS, CLEANOUTS WILL BE INSTALLED VERTICALLY ABOVE THE FLOW LINE OF THE PIPE.
7. CLEANOUT WILL BE MADE WITH AIRTIGHT MECHANICAL PLUG.
8. THE PHYSICAL CONNECTION TO THE DISTRICT'S SEWER MAIN WILL BE MADE BY USE OF AN ADAPTER OF A TYPE COMPATIBLE WITH MATERIALS BEING JOINED. THE CONNECTION SHALL BE WATERTIGHT. NO CEMENT GROUT MATERIALS ARE PERMITTED.
9. BACKFILLING OF SERVICE LINES TRENCH MUST BE ACCOMPLISHED WITHIN TWENTY–FOUR (24) HOURS OF INSPECTION AND APPROVAL. NO DEBRIS WILL BE PERMITTED IN THE TRENCH.
10. INLINE CLEAN OUTS SHALL BE INSTALLED AT EVERY 90' FEET.
11. ALL SANITARY SEWER LINES 6" OR SMALLER SHALL BE PVC SCHEDULE 40. PIPE SIZES 8" OR LARGER SHALL BE PVC SDR 35.

NOTES:

1. OWNER/CONTRACTOR SHALL REFER TO ARCHITECTURAL SITE PLAN FOR ALL DIMENSIONS, PAD LOCATIONS AND ALL OTHER SITE RELATED ITEMS.
2. OVERHEAD AND UNDERGROUND UTILITIES MAY EXIST IN THE VICINITY OF THIS PROJECT. LOCATIONS SHOWN FOR EXISTING UTILITIES ARE APPROXIMATE AND OTHER UTILITIES MAY EXIST IN THE VICINITY OF THE PROJECT WHICH ARE NOT SHOWN ON THE PLANS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE ALL EXISTING UTILITIES IN THE VICINITY OF THE PROJECT, PRIOR TO BEGINNING CONSTRUCTION. IF ANY DISCREPANCIES EXIST, NOTIFY ENGINEER IMMEDIATELY.
3. WHEN CONCRETE IS PLACED OVER AN EASEMENT A SAWCUT OR EXPANSION JOINT MUST BE PLACED AT THE EASEMENT LINE AND CROSS THE EASEMENT EVERY 10'.

60 30 0 30 60 Feet

SCALE: 1"= 30'

RSG ENGINEERING
13501 KATY FREEWAY
SUITE 3180
HOUSTON, TEXAS 77079
PH. 713-783-7777
TBPE FIRM #: 15498

project
TOWNHOMES DEVELOPMENT
@ 13900 BRIARWORTH
at
13900 BRIARWORTH DRIVE
HOUSTON, TEXAS 77077

REVISIONS

STATE OF TEXAS
SALIM NAZIH OBEID
118089
LICENSED
PROFESSIONAL ENGINEER
02.18.2022

SITE UTILITIES PLAN

DRAWN BY:	CHECKED:
BSS	SNO
PROJECT No	SHEET No:
21254.02	C6.1

GENERAL

1. ALL WATER LINES, WASTEWATER COLLECTION SYSTEMS, PAVING, TRAFFIC SIGNALS AND DRAINAGE SYSTEMS SHALL BE CONSTRUCTED IN ACCORDANCE WITH CITY OF HOUSTON, DEPARTMENT OF PUBLIC WORKS AND ENGINEERING'S "STANDARD CONSTRUCTION SPECIFICATIONS (MOST RECENT ISSUE OCTOBER 2002) AND "STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING" (MOST RECENT ISSUE OCTOBER 2002) WITH ALL SUBSEQUENT AMENDMENTS ADDED THERETO UNLESS OTHERWISE NOTED AND APPROVED ON THESE PLANS. THE DESIGN MUST AGREE WITH THE MINIMUM STANDARDS ESTABLISHED IN THE LATEST ISSUE OF THE "INFRASTRUCTURE DESIGN MANUAL" (MOST RECENT ISSUE OCTOBER 2002) REVISED NOV 2008. NOTE THAT PLAN SIGNATURES AND LETTERS OF CAPACITY AVAILABILITY FOR STORM, WASTEWATER AND WATER EXPIRE AFTER ONE YEAR AND THAT THE LATEST EDITIONS OF DESIGN RULES, SPECIFICATIONS, STANDARD DETAILS AND MANUALS SHALL GOVERN AS OF THE DATES FOR RESIGNING.

2. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGE TO EXISTING PUBLIC OR PRIVATE UTILITY LINES, INCLUDING BUT NOT LIMITED TO PAVING, WATER LINES, WASTEWATER COLLECTION SYSTEMS, STORM SEWER AND TRAFFIC SIGNALS DURING CONSTRUCTION. ALL DAMAGES SHALL BE REPAIRED IN ACCORDANCE WITH CURRENT EDITIONS OF CITY OF HOUSTON STANDARD CONSTRUCTION SPECIFICATIONS, DESIGN DETAILS AND DESIGN MANUALS. REPAIRS SHALL BE AT NO COST TO THE DISTRICT.

3. CONTRACTOR SHALL COMPLY WITH OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION STANDARDS AND ANY OTHER FEDERAL, STATE AND LOCAL REGULATIONS REGARDING TRENCH SAFETY SYSTEMS FOR TRENCH EXCAVATION.

4. ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION AND ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO THE SATISFACTION OF THE OWNING AUTHORITY. ALL CONSTRUCTION STORM RUNOFF SHALL COMPLY WITH THE FINAL DRAFT OF STORMWATER MANAGEMENT HANDBOOK FOR CONSTRUCTION ACTIVITIES AS PREPARED BY HARRIS COUNTY/HCFCD, AND THE CITY OF HOUSTON, ALL IN COMPLIANCE WITH THE TEXAS POLLUTANT DISCHARGE ELIMINATION SYSTEM (TPDES) REQUIREMENTS.

5. CONDITION OF THE ROAD AND/OR RIGHT-OF-WAY, UPON COMPLETION OF JOB, SHALL BE AS GOOD OR BETTER THAN CONDITION PRIOR TO STARTING WORK.

6. THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A SEARCH OF AVAILABLE RECORDS. CONTRACTOR IS REQUIRED TO TAKE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINE SHOWN AND ANY OTHER LINES NOT OF RECORD OR NOT SHOWN ON THESE DRAWINGS. EXISTING UTILITIES ARE LOCATED ON THE PLANS ONLY FOR THE CONVENIENCE OF THE CONTRACTOR. EXISTING UTILITY SERVICE LATERALS ARE NOT SHOWN ON THE PLANS AND CONTRACTOR IS ADVISED TO CALL THE APPLICABLE UTILITIES/AGENCIES BEFORE DIGGING.

7. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT EXISTING IMPROVEMENTS WHICH ARE TO REMAIN IN PLACE FROM DAMAGE, AND ALL SUCH IMPROVEMENTS OR STRUCTURES DAMAGED BY CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR RECONSTRUCTED TO THE SATISFACTION OF THE ENGINEER AT THE EXPENSE OF THE CONTRACTOR.

8. THE CONTRACTOR IS TO FIELD VERIFY ALL EXISTING SITE CONDITIONS PRIOR TO CONSTRUCTION. IF A CONFLICT EXISTS BETWEEN WHAT IS SHOWN ON THESE PLANS AND WHAT EXISTS IN THE FIELD, CONTRACTOR IS TO NOTIFY THE ARCHITECT AND ENGINEER IMMEDIATELY. CONTRACTOR SHALL VERIFY THE INVERT AND/OR FLOW LINE ELEVATIONS OF POINTS OF CONNECTIONS PRIOR TO THE COMMENCEMENT OF WORK AND SHALL IMMEDIATELY REPORT ANY DEVIATIONS TO THE ENGINEER.

PRIVATE UTILITY NOTES

NOTICE

THE CONTRACTOR SHALL CONTACT THE UTILITY COORDINATING COMMITTEE AT 713-223-4567 OR TOLL FREE 1-800-344-8377 AND THE HARRIS COUNTY MUNICIPAL UTILITY DISTRICT NO 189, A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE UNDERGROUND LINES FIELD LOCATED.

CAUTION: SBC CABLES

THE LOCATION OF SBC FACILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION BEFORE COMMENCING WORK. HE AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND UTILITIES.

WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF SBC FACILITIES, ALL EXCAVATIONS MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES. WHEN BORING THE CONTRACTOR SHALL EXPOSE THE SBC FACILITIES.

WHEN SBC FACILITIES ARE EXPOSED, THE CONTRACTOR WILL PROVIDE SUPPORT TO PREVENT DAMAGE TO THE CONDUIT DUCTS OR CABLES. WHEN EXCAVATING NEAR TELEPHONE POLES THE CONTRACTOR SHALL BRACE THE POLE FOR SUPPORT.

CAUTION: UNDERGROUND GAS FACILITIES

LOCATION OF CENTERPOINT/ENTEX MAIN LINES (TO INCLUDE UNIT GAS TRANSMISSION AND/OR INDUSTRIAL GAS SUPPLY CORPORATION WHERE APPLICABLE) ARE SHOWN IN AN APPROXIMATE LOCATION ONLY. SERVICE LINES ARE USUALLY NOT SHOWN. THE CONTRACTOR SHALL CONTACT THE UTILITY COORDINATING COMMITTEE AT 223-4567 OR 1-800-669-8344 A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE MAIN AND SERVICE LINES FIELD LOCATED.

WHEN CENTERPOINT/ENTEX PIPE LINE MARKINGS AR NOT VISIBLE, CALL 713-967-8037 (7:00 am to 4:30 pm) FOR STATUS OF LINE LOCATION REQUEST BEFORE EXCAVATION BEGINS.

WHEN EXCAVATION WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF CENTERPOINT/ENTEX FACILITIES, ALL EXCAVATION MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES.

WHEN CENTERPOINT/ENTEX FACILITIES ARE EXPOSED SUFFICIENT SUPPORT MUST BE PROVIDED TO THE FACILITIES TO PREVENT EXCESSIVE STRESS ON THE PIPING.

THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY DAMAGES CAUSED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND FACILITIES.

ANY UTILITY OUTAGES CAUSED BY CONTRACTOR SHALL BE RESTORED WITHIN 4 HOURS OF NOTICE BY TENANT OR OWNER.

CAUTION: OVERHEAD POWER LINES

OVERHEAD LINES EXIST ON THE PROPERTY. WE HAVE NOT ATTEMPTED TO MARK THOSE LINES SINCE THEY ARE CLEARLY VISIBLE, BUT YOU SHOULD LOCATE THEM PRIOR TO BEGINNING ANY CONSTRUCTION. TEXAS LAW, SECTION 752, HEALTH AND SAFETY CODE, FORBIDS ALL ACTIVITIES IN WHICH PERSONS OR THINGS MAY COME WITHIN SIX (6) FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES. PARTIES RESPONSIBLE FOR THE WORK, INCLUDING CONTRACTORS, ARE LEGALLY RESPONSIBLE FOR THE SAFETY OF CONSTRUCTION WORKERS UNDER THIS LAW. THIS LAW CARRIES BOTH CRIMINAL AND CIVIL LIABILITY. TO ARRANGE FOR LINES TO BE TURNED OFF OR REMOVED, CALL RELIANT ENERGY/HL&P AT 713-207-7777.

CONTRACTOR TO NOTIFY THE "UNDERGROUND UTILITY COORDINATING COMMITTEE" (TELEPHONE: 713-223-4567) AND CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS (TELEPHONE: 713-754-0767) 48 HOURS BEFORE STARTING WORK IN STREET RIGHT-OF-WAY OR EASEMENTS.

CONTRACTOR TO NOTIFY THE MUD OPERATOR AND IS RESPONSIBLE FOR SCHEDULING AND COORDINATING ALL NECESSARY INSPECTIONS, REVIEWS OF WORK AND APPROVAL.

PAVING

1. GUIDELINES SET FORTH IN THE TxDOT MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES SHALL BE OBSERVED.

2. EXISTING PAVEMENTS, CURBS, SIDEWALKS AND DRIVEWAYS DAMAGED OR REMOVED DURING CONSTRUCTION SHALL BE REPLACED TO HARRIS COUNTY STANDARDS WITH LATEST ADDENDA AND AMENDMENTS THERETO.

3. PAVING CONSTRUCTION SHALL BE IN ACCORDANCE WITH CITY OF HOUSTON "STANDARD CONSTRUCTION SPECIFICATIONS" DATED OCTOBER, 2002 AND ALL APPLICABLE AMENDMENTS AND REVISIONS THERETO.

4. CONTRACTOR SHALL BLOCK OUT (SQUARE) AROUND ALL INLETS AND MANHOLES IN PROPOSED PAVING AS SHOWN ON TYPE "A" INLET AND TYPE "C" MANHOLE DETAILS.

5. EXPANSION JOINT SHALL BE PLACED AT THE END OF EACH CURB RETURN AND A MAXIMUM 60' SPACING.

6. PROPOSED DRIVEWAYS TO BE CONSTRUCTED PER HARRIS COUNTY DRIVEWAY DETAIL.

7. CONTRACTOR SHALL CONSULT THE SOILS REPORT PREPARED BY THE MURILLO COMPANY, SEPTEMBER 2012, REPORT NO. GOE30112, ENTITLED GEOTECHNICAL INVESTIGATION, DISCOVERY AT VINTAGE PARK APARTMENTS, HARRIS COUNTY, TEXAS.

8. CONTRACTOR SHALL SUBMIT JOINT PLAN TO ENGINEER FOR APPROVAL.

STORM SEWERS

1. STORM SEWER PIPE USED FOR CONNECTION TO STORM SEWER IN PUBLIC RIGHT-OF-WAY SHALL BE REINFORCED CONCRETE PIPE ASTM C-76, CLASS III, AND SHALL EXTEND TO FIRST INLET OR MANHOLE. ALL OTHER PRIVATE STORM SEWERS SHALL BE HDPE AND BEDDED PER CITY OF HOUSTON STANDARDS. PIPE GRADES ARE BASED ON CONCRETE PIPE TO PRODUCE THREE (3) FPS MINIMUM VELOCITY.

2. STORM SEWERS SHALL BE INSTALLED, BEDDED, AND BACKFILLED IN ACCORDANCE WITH CITY OF HOUSTON DRAWINGS NOS. 02317-02, 02317-03, 02317-05, 02317-06, 02317-07, & 02081-07 AS APPLICABLE UNLESS OTHERWISE SHOWN ON DRAWINGS.

3. STORM SEWERS SHALL BE CONSTRUCTED IN ACCORDANCE WITH CITY OF HOUSTON "STANDARD CONSTRUCTION SPECIFICATIONS" OCTOBER, 2002 ISSUE, AS CURRENTLY AMENDED.

4. ALL SEWERS UNDER PROPOSED OR FUTURE PAVEMENT AND TO A POINT ONE (1) FOOT BACK OF ALL PROPOSED OR FUTURE CURBS SHALL BE BACKFILLED WITH 1 1/2 SACK CEMENT/C.Y. STABILIZED SAND TO WITHIN ONE (1) FOOT OF SUBGRADE. THE REMAINING DEPTH OF TRENCH SHALL BE BACKFILLED WITH SUITABLE EARTH MATERIAL IN 8 INCH LIFTS, WITH TESTS TAKEN AT 100 FOOT INTERVALS ON EACH LIFT, AND MECHANICALLY COMPACTED TO A DENSITY OF NOT LESS THAN 95% OF OF THE MAXIMUM DRY DENSITY AS DETERMINED BY THE STANDARD PROCTOR COMPACTION TEST (ASTM DESIGNATION D-698/AASHTO T99). MOISTURE CONTENT OF BACKFILL SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE CEMENT- STABILIZED SAND SPECIFICATION ASTM C33, LATEST EDITION.

5. CONCRETE PIPE SHALL BE INSTALLED USING RUBBER GASKET JOINTS ONLY CONFORMING TO ASTM C443.

6. "STM.S.E." INDICATES "STORM SEWER EASEMENT."

7. ALL PROPOSED PIPE STUB-OUTS FROM MANHOLES OR INLETS ARE TO BE PLUGGED WITH 8" BRICK WALLS UNLESS OTHERWISE NOTED.

SANITARY SEWERS

1. ALL SEWERS SHALL BE CONSTRUCTED IN ACCORDANCE WITH CITY OF HOUSTON "STANDARD CONSTRUCTION SPECIFICATION FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING" OCTOBER, 2002 ISSUE AND ALL CURRENT AMENDMENTS THERETO AND BE SUBJECT TO A STANDARD EXFILTRATION TEST. TESTS ARE TO BE PERFORMED ON THE TOTAL FOOTAGE OF SEWER LINE INCLUDED IN THE PROJECT. REQUIREMENTS OF TEXAS ADMINISTRATIVE CODE, TITLE 30 CHAPTER 317, "DESIGN CRITERIA FOR SEWERAGE SYSTEMS" SHALL GOVERN WHERE CONFLICTS EXIST EXCEPT WHERE CITY REQUIREMENTS ARE OF HIGHER STANDARDS.

2. SANITARY SEWER PIPE TO BE SDR 26 P.V.C. PIPE MEETING ASTM SPECIFICATION D2241 WITH RUBBER GASKET JOINTS, UNLESS OTHERWISE NOTED.

3. SANITARY SEWERS MANHOLES WILL HAVE BEDDING AND BACKFILL PER CITY OF HOUSTON STANDARDS UNLESS OTHERWISE NOTED.

4. ALL SANITARY SEWER LINES UNDER PROPOSED OR FUTURE PAVEMENT AND TO A POINT ONE (1) FOOT BACK OF ALL PROPOSED OR FUTURE CURBS SHALL HAVE BEDDING PER CITY OF HOUSTON STANDARDS AS APPLICABLE, WITH 1 1/2 SACK CEMENT/C.Y. STABILIZED SAND BACKFILL UP TO THE BOTTOM OF THE PAVEMENT SUBGRADE. 100 PSI PERFORMANCE RESULTS ARE STILL REQUIRED.

5. ALL MANHOLES ARE TO BE PER CITY OF HOUSTON STANDARDS.

6. ALL SANITARY SEWERS CROSSING WATER LINES WITH A CLEARANCE BETWEEN 6 INCHES AND 9 FEET SHALL HAVE A MINIMUM OF ONE 18' JOINT OF 150 P.S.I. DUCTILE IRON OR C900 PVC PIPE MEETING ASTM SPECIFICATION D2241 CENTERED ON WATER LINE. WHEN WATER LINE IS BELOW SANITARY SEWER PROVIDE MINIMUM 2 FOOT SEPARATION.

7. CONTRACTOR SHALL PROVIDE FOR A MINIMUM HORIZONTAL CLEARANCE OF 9' FEET BETWEEN WATER LINES AND SANITARY SEWER MANHOLES AND LINES.

8. SANITARY SEWER MANHOLE RIMS OUTSIDE OF PROPOSED PAVING WILL BE SET 3"- 6" ABOVE THE SURROUNDING LEVEL FINISHED GRADE AFTER PAVING WITH SLOPED BACKFILL ADDED FOR STORMWATER DRAINAGE AWAY FROM MANHOLE RIM.

9. "SAN. S. E." INDICATES "SANITARY SEWER EASEMENT"

10. IN WET STABLE TRENCH AREAS USE BEDDING PER CITY OF HOUSTON STANDARDS.

11. ALL SDR P.V.C. PIPE IS TO HAVE D.I.P. SIZE O.D. AND RUBBER GASKET BELL-AND- SPIGOT TYPE JOINT ENDS.

12. SDR 26 P.V.C. PIPE USES "FULL BODIED" SDR 26 P.V.C. FITTINGS WITH APPROPRIATE ADAPTERS. AWWA C-900 DR-18 P.V.C. PIPE USES EITHER AWWA C900 DR-18 P.V.C. FITTINGS OR D.I.P. FITTINGS. SDR-26 P.V.C. PIPE SHALL HAVE A CELL CLASSIFICATION OF 12364-B AS DEFINED IN ASTM D-1784.

13. DEFLECTION TEST: DEFLECTION TESTS SHALL BE PERFORMED ON ALL FLEXIBLE AND SEMI-RIGID SEWER PIPE. THE TEST SHALL BE CONDUCTED AFTER THE FINAL BACKFILL HAS BEEN IN PLACE AT LEAST 30 DAYS. NO PIPE SHALL EXCEED A DEFLECTION OF 5%. IF THE DEFLECTION TEST IS TO BE RUN USING A RIGID MANDREL, IT SHALL HAVE A DIAMETER EQUAL TO 95% OF THE INSIDE DIAMETER OF THE PIPE. THE TEST SHALL BE PERFORMED AS PER 30 TAC 317.2 LATEST AMENDMENT AND WITHOUT MECHANICAL PULLING DEVICES.

14. INFILTRATION, EXFILTRATION OR LOW-PRESSURE AIR TEST: EITHER OF THE FOLLOWING TESTS SHALL BE PERFORMED AS PER TAC, TITLE 30 317.2 WITHIN THE SPECIFIED TOLERANCES ON ALL GRAVITY SEWERS.
A. INFILTRATION OR EXFILTRATION TEST: TOTAL LEAKAGE AS DETERMINED BY A HYDROSTATIC HEAD TEST SHALL NOT EXCEED 50 GALLONS PER INCH DIAMETER PER MILE OF PIPE PER 24 HOURS AT A MINIMUM TEST HEAD OF TWO (2) FEET.

B. LOW-PRESSURE AIR TEST: PERFORM TEST ACCORDING TO UNI-B-6-90 OR OTHER APPROPRIATE PROCEDURES. FOR SECTIONS OF PIPE LESS THAN 36"(INCH) AVERAGE INSIDE DIAMETER, THE MINIMUM ALLOWABLE TIME FOR PRESSURE DROP FROM 3.5 PSIG TO 2.5 PSIG SHALL BE AS FOLLOWS:

6" 340 SECONDS OR 0.855(L) FOR TEST LENGTHS GREATER THAN 398'
8" 454 SECONDS OR 1.520(L) FOR TEST LENGTHS GREATER THAN 298'
10" 567 SECONDS OR 2.374(L) FOR TEST LENGTHS GREATER THAN 239'
12" 680 SECONDS OR 3.419(L) FOR TEST LENGTHS GREATER THAN 199'
15" 850 SECONDS OR 5.342(L) FOR TEST LENGTHS GREATER THAN 159'
18" 1020 SECONDS OR 7.693(L) FOR TEST LENGTHS GREATER THAN 133'

WHERE L = LENGTH OF LINE OF SAME PIPE SIZE IN FEET.

BACKFILL/COMPACTION OF FILL

1. ALL GRADING/BACKFILL/COMPACTION SHALL BE IN ACCORDANCE WITH THE SOILS REPORT AND ANY ADDENDUMS THERETO AS PREPARED BY THE MURILLO COMPANY, SEPTEMBER 2012, REPORT NO. GOE30112, ENTITLED GEOTECHNICAL INVESTIGATION, DISCOVERY AT VINTAGE PARK APARTMENTS, HARRIS COUNTY, TEXAS.

2. ALL AREAS TO BE FILLED ARE TO BE FREE OF VEGETATION, DEBRIS, PONDING WATER, LOOSE SOILS, MUD & MUCK (STRIP 4").

3. ALL FILL OR DISPOSAL OF EXCESS MATERIAL SHALL BE COMPACTED IN 8" LIFTS, 95% STANDARD PROCTOR DENSITY.

4. THE BUILDING AND PAVEMENT AREAS SHOULD BE STRIPPED OF ANY REMAINING TREES AND STUMPS, VEGETATION, ORGANICS, LOOSE TOPSOIL, AND/OR OTHER DEBRIS. CARE SHOULD BE TAKEN TO REPLACE OR RECOMPACT ALL SOIL REMOVED OR LOOSENED BY REMOVAL OF TREE ROOTS AND STUMPS. THE LOOSENED SOILS SHOULD BE MOISTURE CONDITIONED IF NECESSARY AND COMPACTED TO AT LEAST 95 PERCENT MAXIMUM DRY DENSITY TO WITHIN 1% DRY TO 3% WET OF THE OPTIMUM MOISTURE CONTENT AS OUTLINED BELOW.

5. FOLLOWING A PERIOD OF RAIN, THE MOISTURE SENSITIVE SILTY SAND SUBGRADE WILL BE OBVIOUSLY WEAK AND NOT CAPABLE OF SUPPORTING CONSTRUCTION EQUIPMENT. THE SOIL WILL THEN REQUIRE IMPROVEMENT AS OUTLINED IN THE GEOTECHNICAL REPORT. IF THE SUBGRADE IS REASONABLY DRY AND STABLE, THE EXPOSED SOIL SUBGRADE AREA SHOULD BE PROOF ROLLED TO DETECT WEAK AREAS ONCE FINAL SUBGRADE ELEVATIONS HAVE BEEN ACHIEVED THROUGHOUT THE SITE. WEAK AREAS DETECTED DURING PROOF ROLLING, AS WELL AS ZONES OF DEBRIS AND ORGANICS SHOULD BE REMOVED AND REPLACED WITH SOILS EXHIBITING SIMILAR CLASSIFICATION, MOISTURE CONTENT, AND DENSITY AS THE ADJACENT IN-SITU SOILS. SUBSEQUENT TO PROOF ROLLING, AND JUST PRIOR TO PLACEMENT OF FILL, THE EXPOSED SUBGRADE SHOULD BE MOISTURE CONDITIONED AND COMPACTED TO AT LEAST 95 PERCENT OF THE MAXIMUM DENSITY (ASTM D 698) AT 1% DRY TO 3% WET OF THE OPTIMUM MOISTURE CONTENT. THE PURPOSE IS TO PROVIDE SUPPORT FOR COMPACTION OF THE INITIAL FILL LIFT IN THE BUILDING AREA OR FOR CHEMICAL STABILIZATION IN THE PAVEMENT AREAS. FOR WET WEATHER CONSIDERATIONS, SEE GEOTECH REPORT.

6. GRADE ADJUSTMENTS WITHIN THE BUILDING LIMITS SHOULD BE ACCOMPLISHED WITH SELECT, STRUCTURAL FILL COMPOSED OF CLEAN, INACTIVE SANDY CLAY (NOT A SILT) WITH A PLASTICITY INDEX RANGING BETWEEN 10 AND 20. ALL FILL SHOULD BE FREE OF ORGANIC AND DEBRIS. ALL STRUCTURAL FILL SHOULD BE PLACED ON REPAIRED SURFACES IN LIFTS NOT TO EXCEED EIGHT INCHES LOOSE MEASURE, WITH COMPACTED THICKNESS NOT TO EXCEED SIX INCHES. ALL FILL SHOULD BE COMPACTED TO AT LEAST 95 PERCENT (ASTM D 698) MAXIMUM DRY DENSITY AT AT MOISTURE CONTENT WITHIN 1% DRY TO 3% WET OF OPTIMUM MOISTURE CONTENT.

WATERLINE CONSTRUCTION NOTES:

1. WATER MAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH CITY OF HOUSTON, DEPARTMENT OF PUBLIC WORKS AND ENGINEERING STANDARD CONSTRUCTION SPECIFICATIONS DATED OCTOBER 2002 WITH LATEST ADDENDA AND AMENDMENTS THERETO.

2. 4" THRU 12" WATER LINES SHALL BE AWWA C-900 AND 1" THRU 3" WATER LINES SHALL BE SCHEDULE 40 PVC.

3. ALL WATER LINES SHALL BE BEDDED AND BACKFILLED IN ACCORDANCE WITH CITY OF HOUSTON WATER DWG. NO. 02317-04.

4. ALL WATER LINES UNDER PROPOSED OR FUTURE PAVING AND TO A POINT ONE (1) FOOT BACK OF ALL PROPOSED OR FUTURE CURBS SHALL BE ENCASED IN BANK SAND TO 12" OVER PIPE AND BACKFILLED WITH BANK SAND TO THE BOTTOM OF THE PAVEMENT SUBGRADE.

5. CONTRACTOR SHALL PROVIDE FOR A MINIMUM HORIZONTAL CLEARANCE OF 9' (NINE FEET) BETWEEN WATER LINES AND SANITARY SEWER MANHOLES AND LINES.

6. "W.L.E." INDICATES "WATER LINE EASEMENT"

7. ALL WATER LINES TO BE DISINFECTED IN CONFORMANCE WITH AWWA C-651. A MINIMUM OF ONE BACTERIOLOGICAL SAMPLE SHALL BE COLLECTED FOR EACH 1,000 FEET OF COMPLETED WATER LINE, OR FRACTION THEREOF, TO CHECK EFFICIENCY OF DISINFECTION PROCEDURES AND SHALL BE REPEATED IF CONTAMINATION PERSISTS.

8. ALL WATER PIPE AND RELATED PRODUCTS MUST CONFORM TO ANSI/NSF STANDARD 61.

9. 4" THRU 12" FITTINGS SHALL BE CEMENT MORTAR LINED COMPACT DUCTILE IRON PRESSURE FITTINGS PER ANSI A21.53 OR PUSH ON FITTINGS PER ANSI A21.10 PRESSURE RATED AT 250 PSIG CONFORMING TO THE REQUIREMENTS OF CITY OF HOUSTON STANDARD SPECIFICATION SECTION 02501-DUCTILE IRON PIPE AND FITTINGS.

10. HYDROSTATIC TESTING: ALL WATER PIPE SHALL BE TESTED FOR LEAKAGE IN ACCORDANCE WITH AWWA STANDARDS. LEAKAGE SHALL BE DEFINED AS THE QUANTITY OF WATER THAT MUST BE SUPPLIED INTO THE NEWLY LAID PIPE OR ANY VALVED SECTION THEREOF, TO MAINTAIN PRESSURE WITHIN 5 PSI OF THE SPECIFIED TEST PRESSURE AFTER THE PIPE HAS BEEN FILLED WITH WATER AND THE AIR HAS BEEN EXPELLED. THE TEST PRESSURE SHALL BE EITHER A MINIMUM OF 125 PSIG OR 1.5 TIMES THE MAXIMUM DESIGN PRESSURE WHICHEVER IS LARGER. THE MAXIMUM LEAKAGE SHALL BE CALCULATED USING THE FORMULA AS FOLLOWS:

WHERE L = (S)(D)(P^1/2)/133,200

L = ALLOWABLE LEAKAGE IN GAL./HR.
S = LENGTH OF PIPE TESTED IN FEET
D = INSIDE DIAMETER OF PIPE IN INCHES S
P = PRESSURE IN POUNDS PER SQUARE INCH (GAUGE)

11. ALL WATER LINES TO HAVE 4' MINIMUM COVER TO FINISHED GRADE AND MINIMUM 12" CLEAR TO OTHER UTILITIES AT CROSSINGS UNLESS OTHERWISE NOTED ON PLANS.

12. ALL FLANGES BELOW GRADE SHALL BE INSULATED.

13. ALL WATERLINES SHALL BE ENCASED IN BANK SAND AT LEAST 12" ABOVE THE PIPE. COST OF BANK SAND TO BE INCLUDED IN THE UNIT PRICE OF WATERLINE.

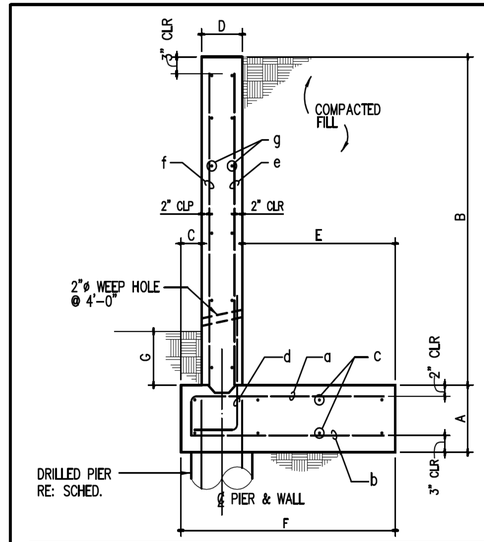
14. CENTER OF FIRE HYDRANT TO BE LOCATED 3'-0" FROM BACK OF CURB.

15. UTILITY CONTRACTOR TO TURN FIRE HYDRANTS AND MAKE ALL FINAL ADJUSTMENTS AFTER COMPLETION OF PAVING. NO SEPARATE PAY.

16. SANITARY PRECAUTIONS MUST BE TAKEN DURING WATER LINE CONSTRUCTION, AS CALLED FOR BY AWWA STANDARDS. PRECAUTIONS INCLUDE KEEPING PIPE CLEAN AND CAPPING OR OTHERWISE EFFECTIVELY SEALING OPEN PIPE ENDS TO EXCLUDE INSECTS, ANIMALS OR OTHER SOURCES OF CONTAMINATION FROM UNFINISHED PIPE LINES AT TIMES WHEN CONSTRUCTION IS NOT IN PROGRESS.

STORM WATER QUALITY PRE-CONSTRUCTION INSPECTION REQUIREMENTS

THE CONTRACTOR SHALL CONTACT THE HARRIS COUNTY STORM WATER QUALITY PERMITTING SECTION AT 713-956-3000 FOR A PRE-CONSTRUCTION INSPECTION PRIOR TO COMMENCING ANY CLEARING OR CONSTRUCTION ACTIVITIES ON THE SITE.



THE FOLLOWING SOIL PARAMETERS ARE USED IN THIS DESIGN:

ENGINEER'S ASSUMPTIONS
ALLOWABLE BEARING CAPACITY:
1. AT CONTINUOUS FOOTING = 1,250 PSF
2. AT 10'-0" BELOW LOWEST = 3,500 PSF EXISTING GRADE

RETAINING WALL DIMENSION SCHEDULE

DEPTH	A	B	C	D	E	F	G	PIERS
3' TO 5'	1'-0"	2'-4'	0'-4"	0'-7"	2'-5"	3'-4"	0'-6"	NOT REQ'D
5' TO 7'	1'-0"	4'-6	0'-6"	0'-10"	3'-4"	4'-8"	0'-8"	12/36 @ 12' O.C.
7' TO 9'	1'-0"	6'-8'	0'-6"	1'-0"	4'-4"	5'-10"	1'-0"	14/42 @ 12' O.C.
9' TO 11'	1'-3"	8'-10'	0'-10"	1'-2"	5'-3"	7'-3"	1'-0"	18/54 @ 12' O.C.
11' TO 13'	1'-4"	10'-12'	1'-0"	1'-3"	6'-3"	8'-6"	1'-3"	21/63 @ 12' O.C.

RETAINING WALL REINFORCEMENT SCHEDULE

DEPTH	a	b	c	d	e	f	g
3' TO 5'	#4 @ 15" 8'	#4 @ 15"	3#4 CONT. TOP & BOTT.	#4 @ 15" FULL HEIGHT	#4 @ 15"	NOT REQ'D	#4 @ 15"
5' TO 7'	#4 @ 15" 8'	#4 @ 15"	4#4 CONT. TOP & BOTT.	#4 @ 15" FULL HEIGHT	#4 @ 15"	#4 @ 18"	#4 @ 18"
7' TO 9'	#4 @ 10" 8'	#4 @ 15"	5#4 CONT. TOP & BOTT.	#4 @ 10" 10' 42"	#4 @ 15"	#4 @ 18"	#4 @ 18"
9' TO 11'	#5 @ 10" 10'	#4 @ 15"	7#4 CONT. TOP & BOTT.	#5 @ 10" 10' 50"	#4 @ 10"	#4 @ 15"	#4 @ 15"
11' TO 13'	#6 @ 10" 11'	#4 @ 14"	9#4 CONT. TOP & BOTT.	#6 @ 10" 12' 60"	#4 @ 10"	#4 @ 15"	#4 @ 15"

TYPICAL RETAINING WALL DETAIL

RSG ENGINEERING
13501 KATY FREEWAY
SUITE 3180
HOUSTON, TEXAS 77079
PH. 713-783-7777
TBPE FIRM #: 15498

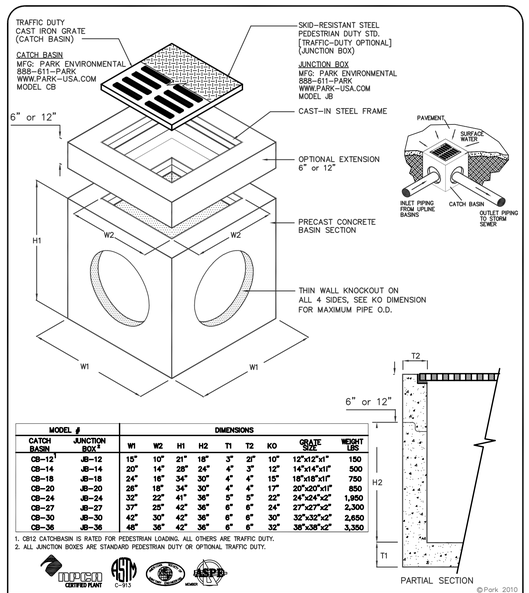
project
TOWNHOMES DEVELOPMENT
@ 13900 BRIARWORTH
at
13900 BRIARWORTH DRIVE
HOUSTON, TEXAS 77077

REVISIONS

STATE OF TEXAS
SALIM NAZIH OBEID
118989
LICENSED
PROFESSIONAL ENGINEER
02.18.2022

CONSTRUCTION NOTES

DRAWN BY:	CHECKED:
BSS	SNO
PROJECT No	SHEET No:
21254.02	C7.0



MODEL #		DIMENSIONS								
CATCH BASIN	JUNCTION BOX[2]	W1	W2	H1	H2	T1	T2	KO	GRATE SIZE	WEIGHT LBS
CB-12[1]	JB-12	15"	10"	21"	18"	3"	2"	10"	12"x12"x1"	150
CB-14	JB-14	20"	14"	28"	24"	4"	3"	12"	14"x14"x11"	500
CB-18	JB-18	24"	16"	34"	30"	4"	4"	15"	18"x18"x1"	750
CB-20	JB-20	26"	18"	34"	30"	4"	4"	17"	20"x20"x1"	850
CB-24	JB-24	32"	22"	41"	36"	6"	5"	22"	24"x24"x2"	1,950
CB-27	JB-27	37"	25"	42"	36"	6"	6"	24"	27"x27"x2"	2,300
CB-30	JB-30	42"	30"	42"	36"	6"	6"	30"	32"x32"x2"	2,650
CB-36	JB-36	48"	36"	42"	36"	6"	6"	32"	36"x36"x2"	3,350

1. CB12 CATCHBASIN IS RATED FOR PEDESTRIAN LOADING. ALL OTHERS ARE TRAFFIC DUTY.
2. ALL JUNCTION BOXES ARE STANDARD PEDESTRIAN DUTY OR OPTIONAL TRAFFIC DUTY.

SPECIFICATIONS

CONCRETE : Class II concrete with of design strength of 4500 PSI at 28 days. Unit is of monolithic construction at floor and first stage of wall with sectional riser to required depth.

REINFORCEMENT: Grade 60 reinforced. Steel rebar conforming to ASTM A615 on required centers or equal.

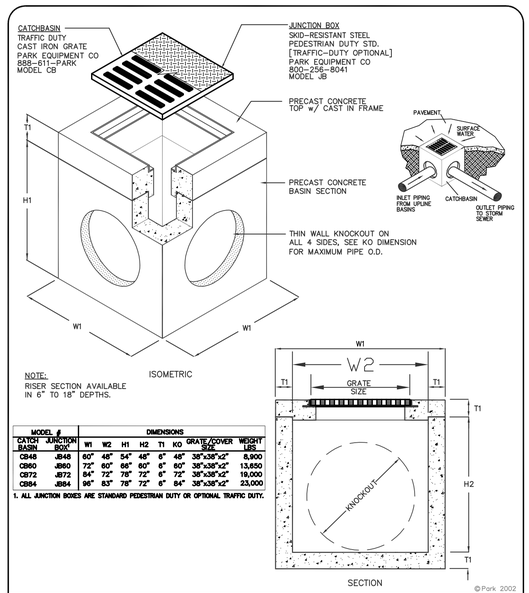
C.I. CASTINGS: Cast iron frames and grates are manufactured of grey cast iron conforming to ASTM A48-76 Class 35.

PARK ENVIRONMENTAL EQUIPMENT 888-611-PARK www.park-USA.com

"Expect the Best"

CATCH BASIN MODEL CB – 12" THRU 36"
JUNCTION BOX MODEL JB – 12" THRU 36"

SCALE	NONE	DWG. NO.	REV.
DATE	2010	CBJB36	A



NOTE:
RISER SECTION AVAILABLE IN 6" TO 18" DEPTHS.

MODEL #		DIMENSIONS								
CATCH BASIN	JUNCTION BOX	W1	W2	H1	H2	T1	KO	GRATE/COVER SIZE	WEIGHT LBS
CB48	JB48	60"	48"	54"	48"	8"	48"	38"x38"x2"	8,900
CB60	JB60	72"	60"	66"	60"	8"	60"	38"x38"x2"	13,650
CB72	JB72	84"	72"	78"	72"	6"	72"	38"x38"x2"	19,000
CB84	JB84	96"	83"	78"	72"	6"	84"	38"x38"x2"	23,000

1. ALL JUNCTION BOXES ARE STANDARD PEDESTRIAN DUTY OR OPTIONAL TRAFFIC DUTY.

SPECIFICATIONS

CONCRETE : Class 1 concrete with of design strength of 4500 PSI at 28 days. Unit is of monolithic construction at floor and first stage of wall with sectional riser to required depth. Rated for H-20 Loading.

REINFORCEMENT: Grade 60 reinforced. Steel rebar conforming to ASTM A615 on required centers or equal.

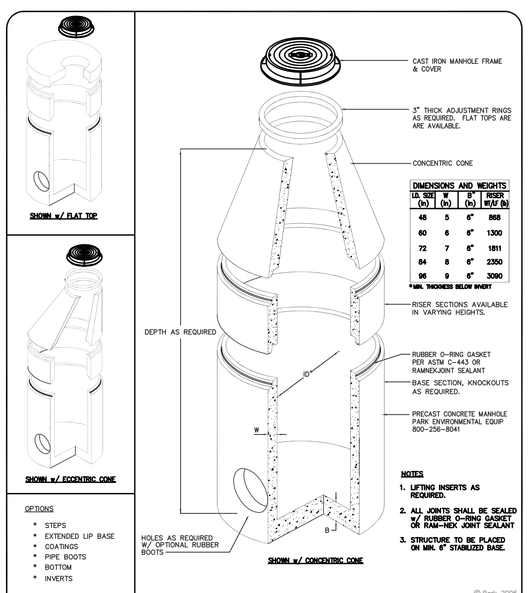
C.I. CASTINGS: Cast iron frames and grates are manufactured of grey cast iron conforming to ASTM A48-76 Class 35.

PARK ENVIRONMENTAL EQUIPMENT 888-611-PARK www.park-USA.com

"Expect the Best"

CATCHBASIN MODEL CB – 48" THRU 84"
JUNCTION BOX MODEL JB – 48" THRU 84"

SCALE	NONE	DWG. NO.	REV.
DATE	01/02	CB4884	A



DIMENSIONS AND WEIGHTS			
I.D. SIZE (in)	W (in)	B* (in)	RISER W.A.F (lb)
48	5	6"	868
60	6	6"	1300
72	7	6"	1811
84	8	6"	2350
96	9	6"	3090

*MIN. THICKNESS BELOW INVERT

OPTIONS
* STEPS
* EXTENDED LIP BASE
* COATINGS
* PIPE BOOTS
* BOTTOM
* INVERTS

NOTES
1. LIFTING INSERTS AS REQUIRED.
2. ALL JOINTS SHALL BE SEALED w/ RUBBER O-RING GASKET OR RAM-NEK JOINT SEALANT
3. STRUCTURE TO BE PLACED ON MIN. 6" STABILIZED BASE.

Specifications

CONCRETE : Class 1 concrete with of design strength of 4500 PSI at 28 days. Rated for H-20 loading.

REINFORCEMENT: Structural reinforcement conforming to ASTM-C-478.

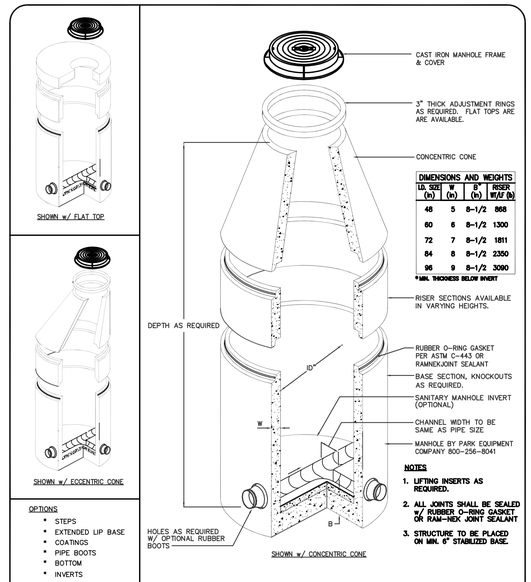
C.I. CASTINGS: Cast iron frames and grates are manufactured of grey cast iron conforming to ASTM A48-76 Class 35.

PARK ENVIRONMENTAL EQUIPMENT 888-611-PARK www.park-USA.com

"Expect the Best"

PRECAST CONCRETE MANHOLE
FOR STORM SEWER

SCALE	NONE	DWG. NO.	REV.
DATE	10/06	PCMHST-1	A



DIMENSIONS AND WEIGHTS			
I.D. SIZE (in)	W (in)	B* (in)	RISER W.A.F (lb)
48	5	8-1/2	868
60	6	8-1/2	1300
72	7	8-1/2	1811
84	8	8-1/2	2350
96	9	8-1/2	3090

*MIN. THICKNESS BELOW INVERT

OPTIONS
* STEPS
* EXTENDED LIP BASE
* COATINGS
* PIPE BOOTS
* BOTTOM
* INVERTS

NOTES
1. LIFTING INSERTS AS REQUIRED.
2. ALL JOINTS SHALL BE SEALED w/ RUBBER O-RING GASKET OR RAM-NEK JOINT SEALANT
3. STRUCTURE TO BE PLACED ON MIN. 6" STABILIZED BASE.

Specifications

CONCRETE : Class 1 concrete with of design strength of 4500 PSI at 28 days. Rated for H-20 loading.

REINFORCEMENT: Structural reinforcement conforming to ASTM-C-478.

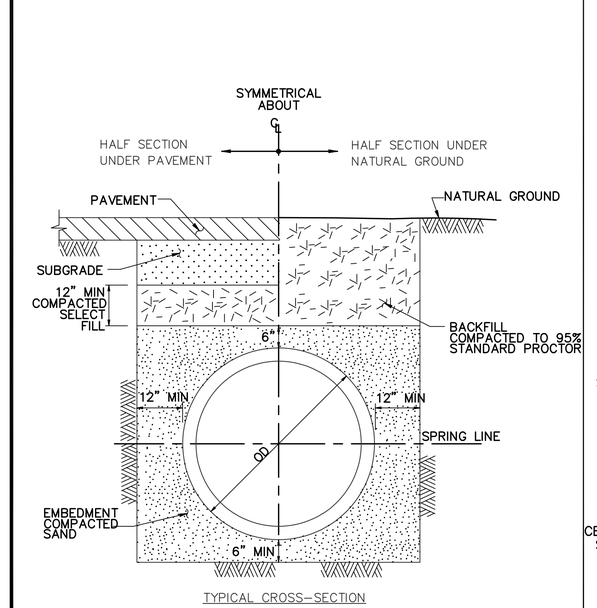
C.I. CASTINGS: Cast iron frames and grates are manufactured of grey cast iron conforming to ASTM A48-76 Class 30.

PARK ENVIRONMENTAL EQUIPMENT 888-611-PARK www.park-USA.com

"Expect the Best"

PRECAST CONCRETE MANHOLE
FOR SANITARY SEWER

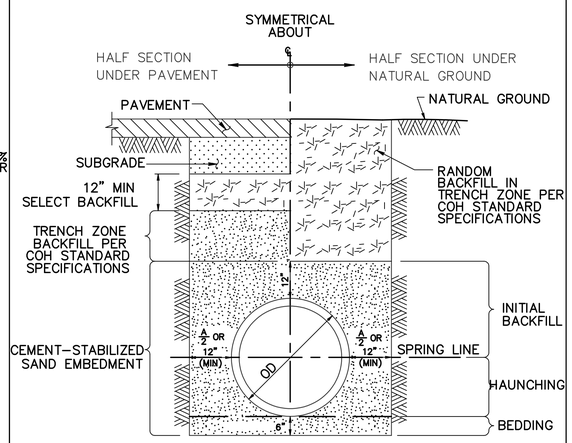
SCALE	NONE	DWG. NO.	REV.
DATE	10/06	PCMHIN-6	A



TYPICAL CROSS-SECTION

STORM SEWER BEDDING DETAIL

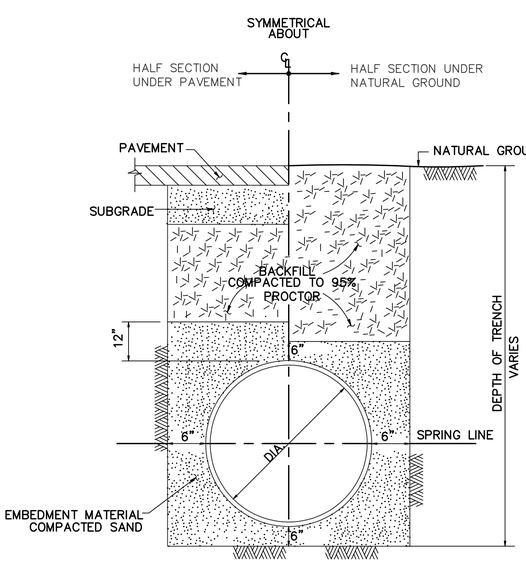
(NOT TO SCALE)



TYPICAL CROSS-SECTION

SANITARY SEWER BEDDING DETAIL

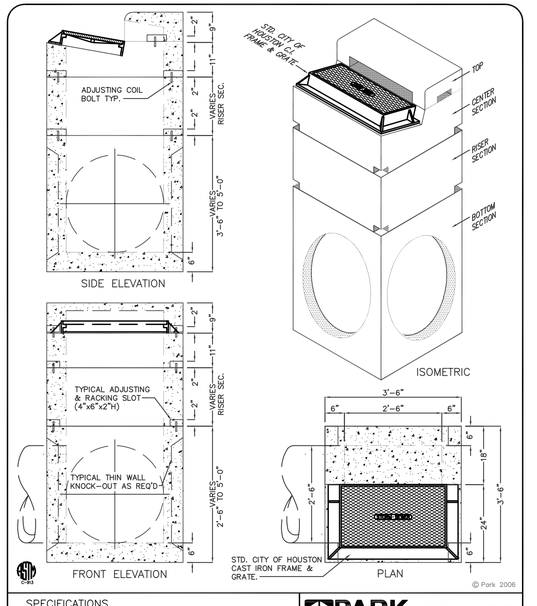
(NOT TO SCALE)



TYPICAL CROSS-SECTION

WATER BEDDING DETAIL

(NOT TO SCALE)



SPECIFICATIONS

CONCRETE : Class 1 concrete with of design strength of 4500 PSI at 28 days. Unit is of monolithic construction at floor and first stage of wall with sectional riser to required depth. Rated for H-20 Loading.

REINFORCEMENT: Grade 60 reinforced. No. 4 steel rebar to conform to ASTM A615 on required centers or equal.

C.I. CASTINGS: Cast iron frames and grates are manufactured of grey cast iron conforming to ASTM A48-76 Class 30.

PARK ENVIRONMENTAL EQUIPMENT 888-611-PARK www.park-USA.com

"Expect the Best"

TYPE "B" CURB INLET
CITY OF HOUSTON

SCALE	NONE	DWG. NO.	REV.
DATE	10/06	COHBI-2	A

RSG ENGINEERING
13501 KATY FREEWAY
SUITE 3180
HOUSTON, TEXAS 77079
PH. 713-783-7777
TBPE FIRM #: 15498

project
TOWNHOMES DEVELOPMENT
@ 13900 BRIARWORTH
at
13900 BRIARWORTH DRIVE
HOUSTON, TEXAS 77077

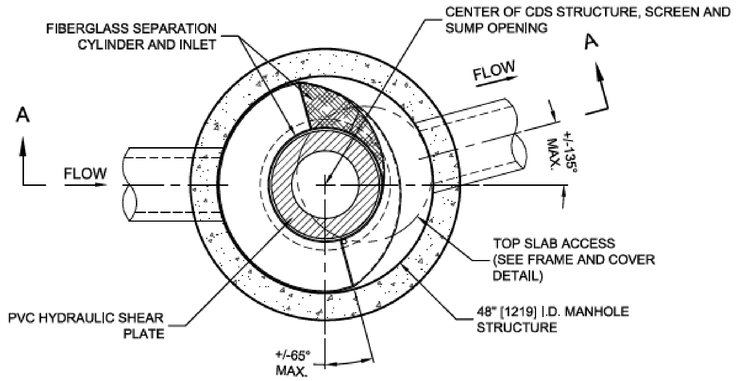
REVISIONS

STATE OF TEXAS
SALIM NAZIH OBEID
118989
LICENSED
PROFESSIONAL ENGINEER
02.18.2022

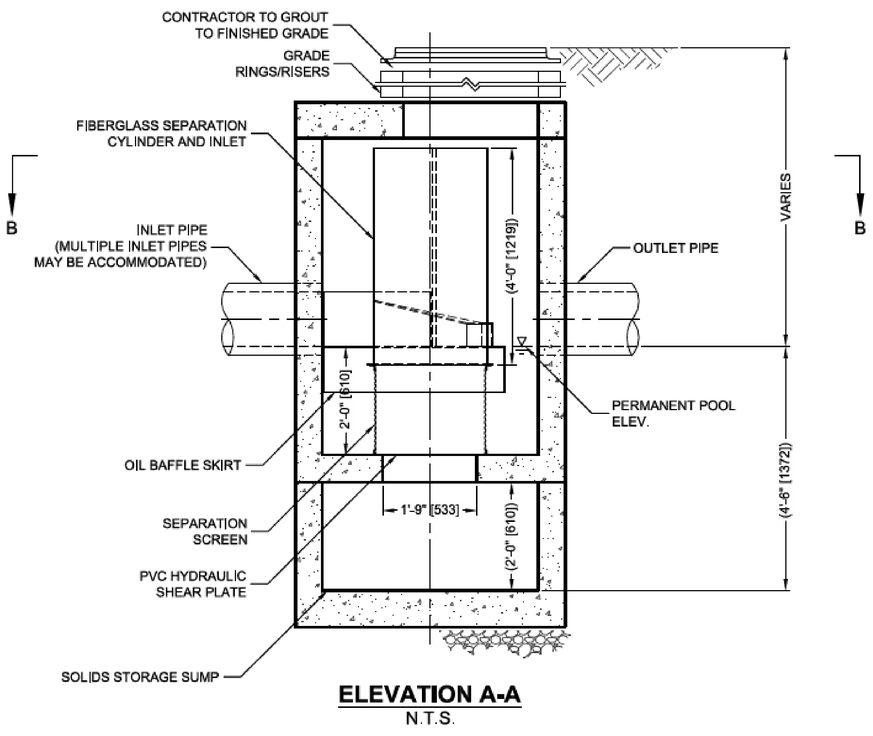
CONSTRUCTION DETAILS

DRAWN BY:	CHECKED:
BSS	SNO

PROJECT No	SHEET No:
21254.02	C7.1



PLAN VIEW B-B
N.T.S.

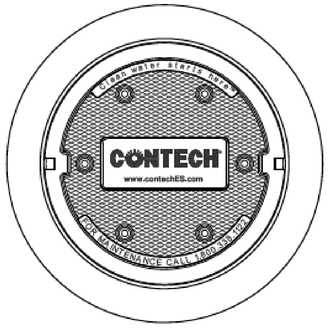


ELEVATION A-A
N.T.S.

CDS2015-4-C DESIGN NOTES

THE STANDARD CDS2015-4-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES
SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION)
SEDIMENT WEIR FOR NJDEP / NJCAT CONFORMING UNITS



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (CFS OR L/s)	*
PEAK FLOW RATE (CFS OR L/s)	*
RETURN PERIOD OF PEAK FLOW (YRS)	*
SCREEN APERTURE (2400 OR 4700)	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*

RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.contechES.com
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET HS20 (AASHTO M 306) LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

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

CDS2015-4-C
INLINE CDS
STANDARD DETAIL

RSG ENGINEERING
13501 KATY FREEWAY
SUITE 3180
HOUSTON, TEXAS 77079
PH. 713-783-7777
TBPE FIRM #: 15498

project
TOWNHOMES DEVELOPMENT
@ 13900 BRIARWORTH
at
13900 BRIARWORTH DRIVE
HOUSTON, TEXAS 77077

REVISIONS

STATE OF TEXAS
SALIM NAZIH OBEID
118989
LICENSED
PROFESSIONAL ENGINEER
02.18.2022

CONSTRUCTION DETAILS

DRAWN BY:	CHECKED:
BSS	SNO
PROJECT No	SHEET No:
21254.02	C7.2