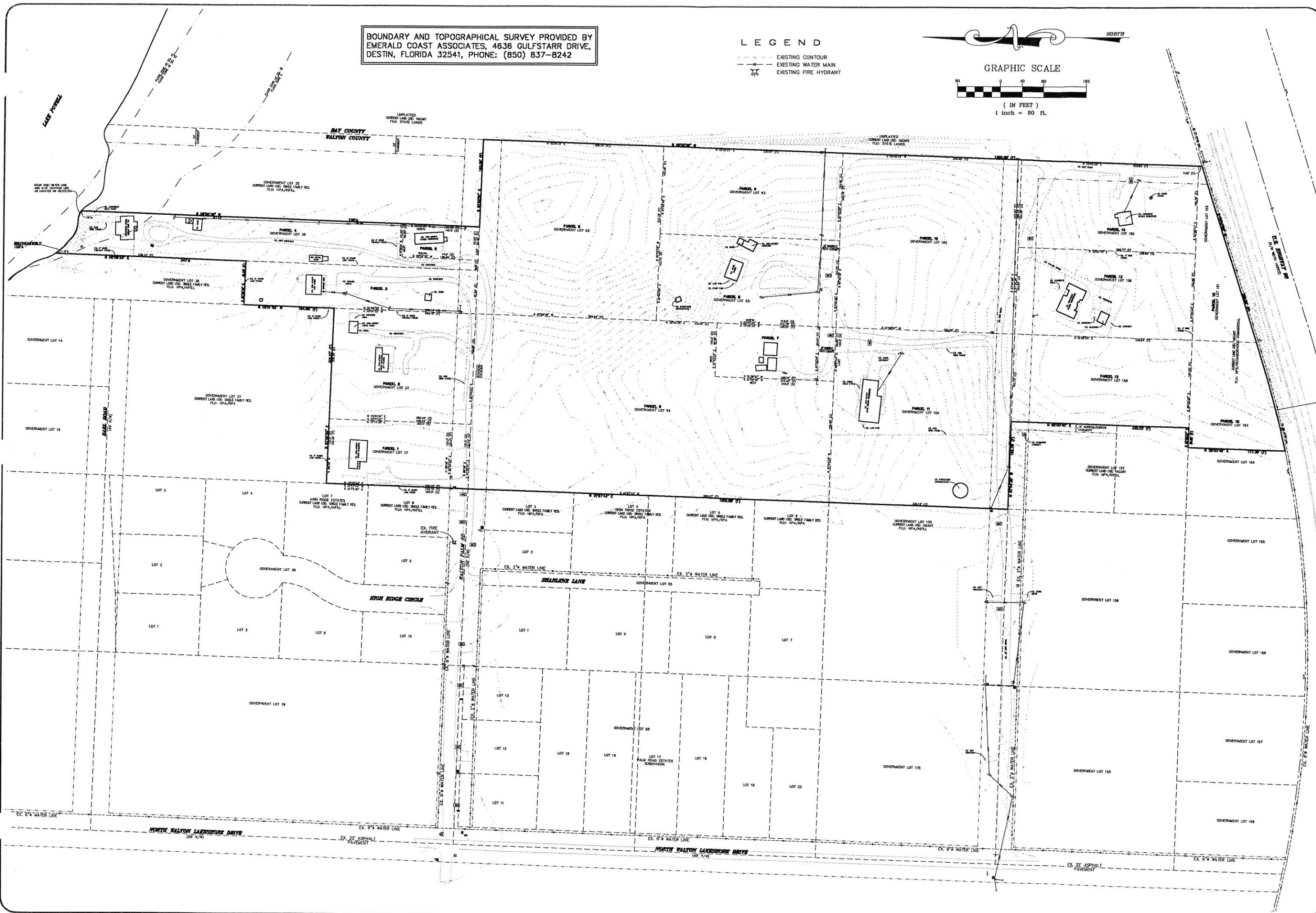
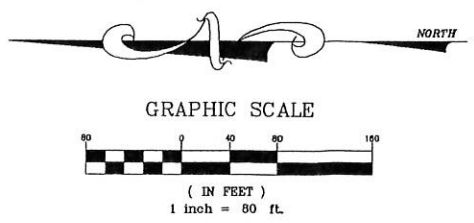


BOUNDARY AND TOPOGRAPHICAL SURVEY PROVIDED BY
EMERALD COAST ASSOCIATES, 4636 GULFSTARR DRIVE,
DESTIN, FLORIDA 32541, PHONE: (850) 837-8242

- LEGEND
- EXISTING CONTOUR
 - EXISTING WATER MAIN
 - EXISTING FIRE HYDRANT



JENKINS, STANFORD & ASSOCIATES, INC.
CIVIL & ENVIRONMENTAL ENGINEERING
1234 AIRPORT ROAD
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PHONE: (850) 837-3330
FAX: (850) 837-4848
WEB: JSAENGINEERING.COM
CERTIFICATE OF AUTHORIZATION NO. 9927

Revisions:

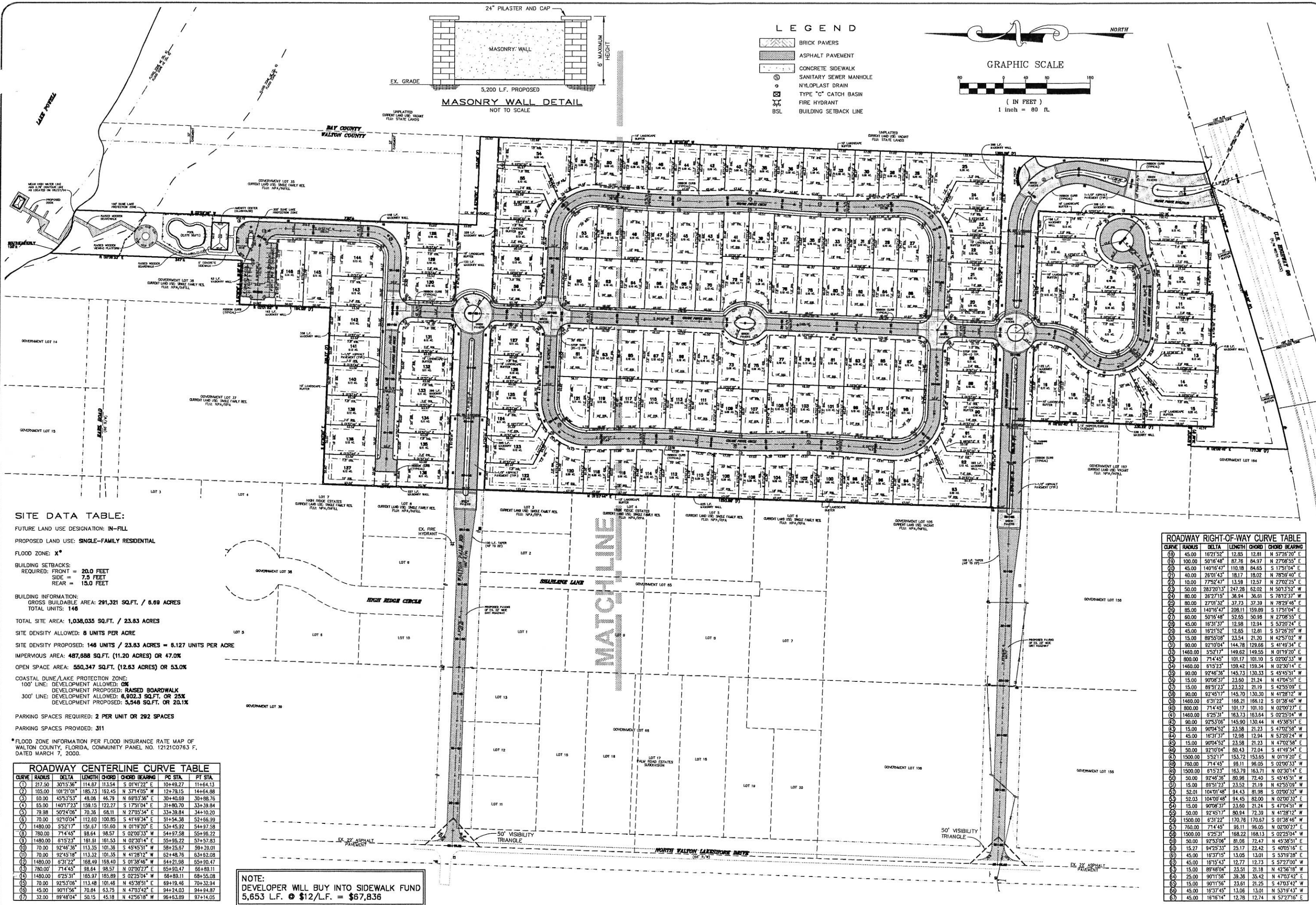
Seal:

M. SCOTT JENKINS, P.E.
FL REG. NO. 58073

**GRANDE POINTE
AT INLET BEACH**

EXISTING CONDITIONS
Not valid unless bearing Engineer's embossed seal

Job No.: 0510.04.001
Date: 04 OCT 04
Scale: 1" = 80'
Designed: MSJ
Drawn: MPF
Checked: MSJ
Sheet: 2 of 27
C-1



SITE DATA TABLE:

FUTURE LAND USE DESIGNATION: IN-FILL
PROPOSED LAND USE: SINGLE-FAMILY RESIDENTIAL
FLOOD ZONE: X*
BUILDING SETBACKS:
REQUIRED: FRONT = 20.0 FEET
SIDE = 7.5 FEET
REAR = 15.0 FEET
BUILDING INFORMATION:
GROSS BUILDABLE AREA: 291,321 SQ.FT. / 6.69 ACRES
TOTAL UNITS: 146
TOTAL SITE AREA: 1,036,035 SQ.FT. / 23.83 ACRES
SITE DENSITY ALLOWED: 6 UNITS PER ACRE
SITE DENSITY PROPOSED: 146 UNITS / 23.83 ACRES = 6.127 UNITS PER ACRE
IMPERVIOUS AREA: 487,888 SQ.FT. (11.20 ACRES) OR 47.0%
OPEN SPACE AREA: 550,347 SQ.FT. (12.63 ACRES) OR 53.0%
COASTAL DUNE/LAKE PROTECTION ZONE:
100' LINE: DEVELOPMENT ALLOWED: 0%
DEVELOPMENT PROPOSED: RAISED BOARDWALK
300' LINE: DEVELOPMENT ALLOWED: 0.023 SQ.FT. OR 25%
DEVELOPMENT PROPOSED: 5,548 SQ.FT. OR 20.1%
PARKING SPACES REQUIRED: 2 PER UNIT OR 292 SPACES
PARKING SPACES PROVIDED: 311

*FLOOD ZONE INFORMATION PER FLOOD INSURANCE RATE MAP OF
WALTON COUNTY, FLORIDA, COMMUNITY PANEL NO. 12121C0763 F,
DATED MARCH 7, 2000.

ROADWAY CENTERLINE CURVE TABLE									
CURVE	RADIUS	DELTA	LENGTH	CHORD	CHORD BEARING	PC STA.	PT STA.	PT STA.	PT STA.
1	217.50	30°15'36"	114.87	113.54	S 01°41'22" E	10+49.27	11+64.13		
2	105.00	101°21'01"	185.73	162.45	N 37°14'05" W	12+79.15	14+64.88		
3	60.00	45°53'53"	48.06	46.79	N 69°03'36" E	30+40.69	30+88.76		
4	65.00	140°17'23"	159.15	122.27	S 17°51'04" E	31+80.70	33+39.84		
5	79.98	50°24'06"	70.36	68.11	N 27°05'34" E	33+39.84	34+10.20		
6	70.00	92°10'04"	112.60	100.85	S 41°49'34" E	34+10.20	35+54.38		
7	1480.00	5°52'17"	151.67	151.60	N 01°19'20" E	53+45.92	54+97.58		
8	780.00	7°14'45"	98.64	98.57	S 02°00'33" W	54+97.58	55+86.22		
9	1480.00	6°15'23"	161.51	161.53	N 02°30'14" E	55+86.22	57+47.83		
10	70.00	92°46'36"	113.35	101.35	S 45°45'51" W	58+25.67	59+38.01		
11	70.00	92°45'18"	113.32	101.33	N 41°28'12" W	62+48.76	63+82.08		
12	1480.00	6°31'22"	168.49	168.40	S 01°38'46" W	64+21.98	65+90.47		
13	780.00	7°14'45"	98.64	98.57	N 02°00'33" W	65+90.47	66+89.11		
14	1480.00	6°25'31"	165.97	165.89	S 02°25'04" W	66+89.11	68+55.08		
15	70.00	92°53'06"	113.48	101.46	N 45°38'51" E	69+19.46	70+32.94		
16	45.00	90°11'56"	70.84	63.75	N 47°03'42" E	94+24.03	94+94.87		
17	32.00	89°48'04"	50.15	45.18	N 42°56'18" W	96+63.89	97+14.05		

NOTE:
DEVELOPER WILL BUY INTO SIDEWALK FUND
5,653 L.F. @ \$12/L.F. = \$67,836

ROADWAY RIGHT-OF-WAY CURVE TABLE									
CURVE	RADIUS	DELTA	LENGTH	CHORD	CHORD BEARING	PC STA.	PT STA.	PT STA.	PT STA.
18	45.00	162°15'2"	12.85	12.81	N 57°26'20" E				
19	100.00	50°16'48"	87.76	84.37	N 27°08'55" E				
20	45.00	140°16'47"	110.18	84.85	S 17°51'04" E				
21	40.00	26°31'43"	18.17	18.02	N 78°59'40" E				
22	10.00	77°52'47"	13.59	12.57	N 27°02'25" E				
23	50.00	283°20'13"	247.28	62.02	N 50°13'52" W				
24	80.00	26°27'15"	36.94	36.51	S 78°12'37" W				
25	80.00	27°01'32"	37.73	37.39	N 78°29'46" E				
26	85.00	140°16'47"	208.11	159.89	S 17°51'04" E				
27	60.00	50°16'48"	52.65	50.98	N 27°08'55" E				
28	45.00	163°31'37"	12.98	12.94	S 53°20'24" E				
29	45.00	162°15'2"	12.85	12.81	N 57°26'20" W				
30	15.00	89°55'08"	23.54	21.20	N 42°57'02" W				
31	90.00	92°10'04"	144.78	129.66	S 41°49'34" E				
32	1460.00	5°52'17"	149.62	149.55	N 01°19'20" E				
33	800.00	7°14'45"	101.17	101.10	S 02°00'33" W				
34	1460.00	6°15'23"	159.42	159.34	N 02°30'14" E				
35	90.00	92°46'36"	145.73	130.33	S 45°45'51" W				
36	15.00	90°08'37"	23.80	21.24	N 47°04'51" E				
37	15.00	89°51'23"	23.52	21.19	S 42°55'09" E				
38	90.00	92°45'17"	145.70	130.30	N 41°28'12" W				
39	1460.00	6°31'22"	166.21	166.12	S 01°38'46" W				
40	800.00	7°14'45"	101.17	101.10	N 02°00'33" W				
41	1460.00	6°25'31"	163.73	163.64	S 02°25'04" W				
42	90.00	92°53'06"	145.90	130.44	N 45°38'51" E				
43	15.00	90°04'52"	23.58	21.23	S 47°02'58" W				
44	45.00	163°31'37"	12.98	12.94	N 53°20'24" W				
45	15.00	90°04'52"	23.58	21.23	N 47°02'58" E				
46	50.00	92°10'04"	80.43	72.94	S 41°49'34" E				
47	1500.00	5°52'17"	153.72	153.65	N 01°19'20" E				
48	760.00	7°14'45"	96.11	96.05	S 02°00'33" W				
49	1500.00	6°15'23"	163.73	163.71	N 02°30'14" E				
50	50.00	92°46'36"	80.98	72.40	S 45°45'51" W				
51	15.00	89°51'23"	23.52	21.19	N 42°55'09" W				
52	52.01	104°01'48"	94.43	81.98	S 02°00'32" W				
53	52.03	104°00'48"	94.45	82.00	N 02°00'32" E				
54	15.00	90°08'37"	23.60	21.24	S 47°04'51" W				
55	50.00	92°45'17"	80.94	72.39	N 41°28'12" W				
56	1500.00	6°31'22"	170.78	170.67	S 01°38'46" W				
57	760.00	7°14'45"	96.11	96.05	N 02°00'33" E				
58	1500.00	6°25'31"	168.22	168.13	S 02°25'04" W				
59	50.00	92°53'06"	80.95	72.47	N 45°38'51" E				
60	15.27	94°25'33"	25.17	22.42	S 40°05'16" E				
61	45.00	163°31'37"	13.05	13.01	S 53°19'28" E				
62	45.00	163°31'37"	12.77	12.73	S 57°27'00" W				
63	15.00	89°48'04"	23.51	21.18	N 42°56'18" W				
64	25.00	90°11'56"	39.36	35.42	N 47°03'42" E				
65	15.00	90°11'56"	21.61	21.25	N 47°03'42" W				
66	45.00	163°31'37"	13.06	13.01	N 53°19'43" W				
67	45.00	163°31'37"	12.78	12.74	N 57°27'16" E				

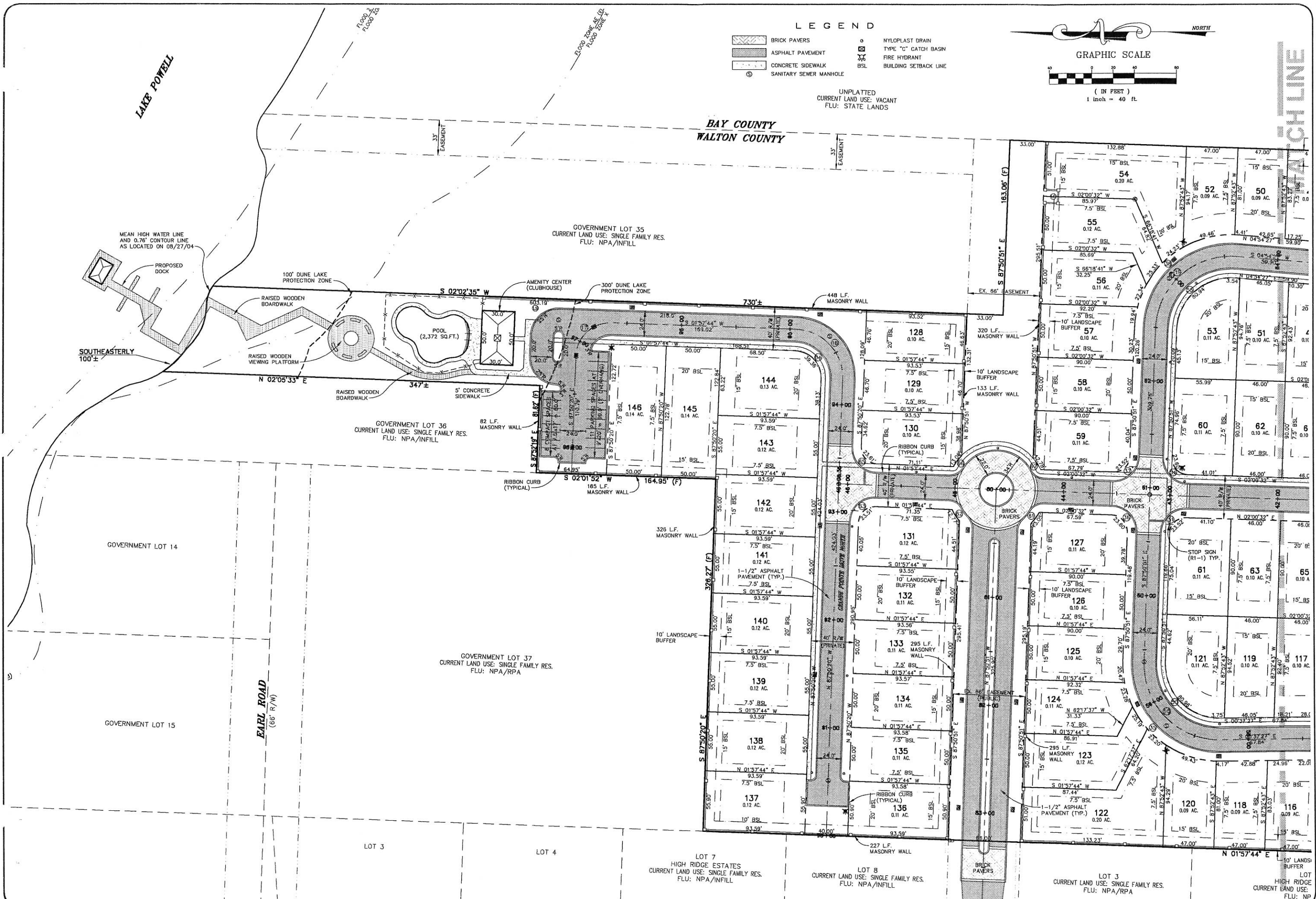
JENKINS, STANFORD & ASSOCIATES, INC.
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FAX: (850) 837-4848
WEB: JSAENGINEERING.COM
CERTIFICATE OF AUTHORIZATION NO. 9927

**GRANDE POINTE
AT INLET BEACH**

OVERALL SITE PLAN

Job No.: 0510.04.001
Date: 04 OCT 04
Scale: 1" = 80'
Designed: MSJ
Drawn: MPF
Checked: MSJ
Sheet: 4 of 27

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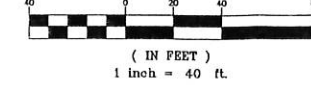


PLATLINE

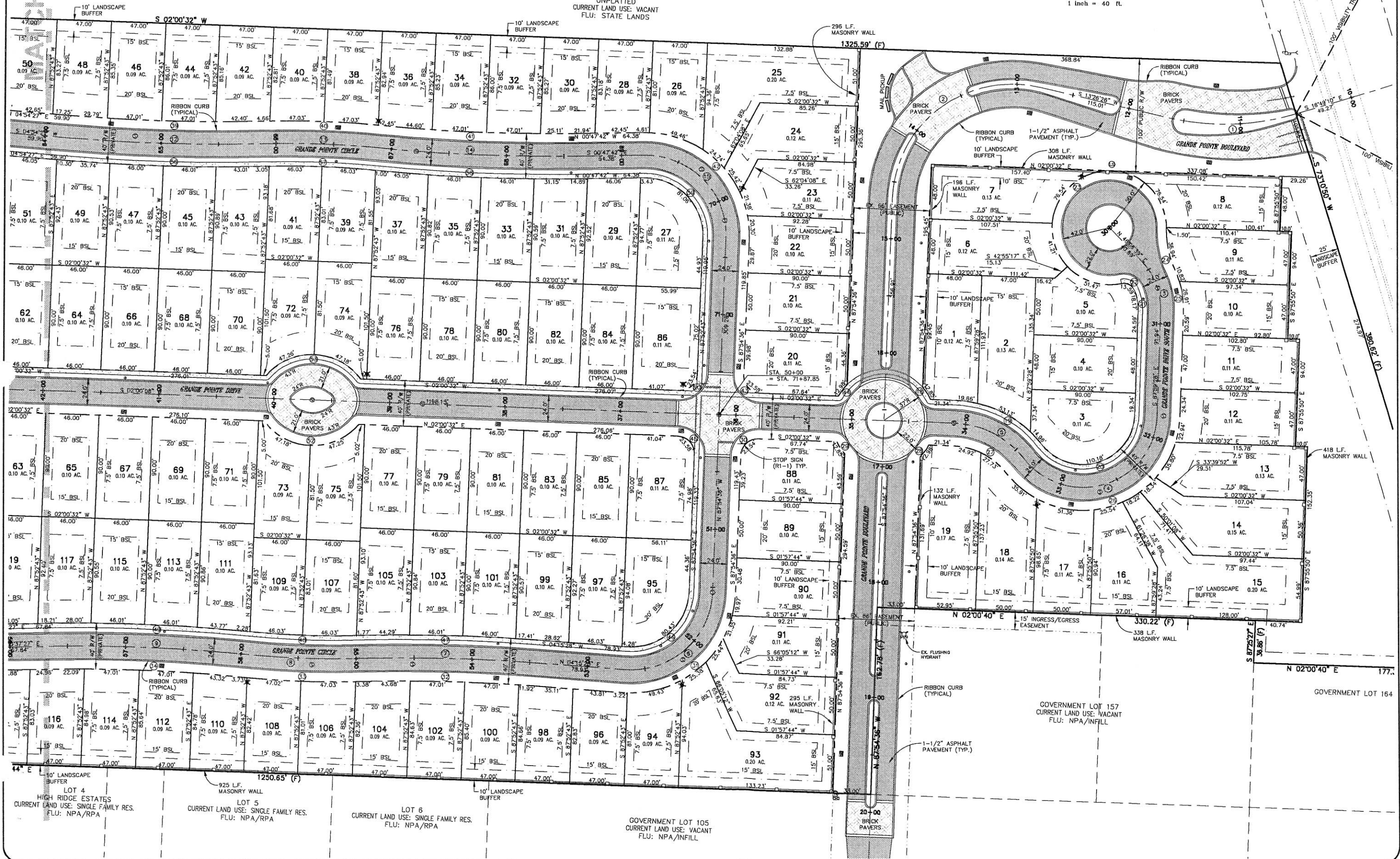
LEGEND

- BRICK PAVERS
ASPHALT PAVEMENT
CONCRETE SIDEWALK
SANITARY SEWER MANHOLE
NYLOPLAST DRAIN
TYPE "C" CATCH BASIN
FIRE HYDRANT
BUILDING SETBACK LINE

GRAPHIC SCALE



UNPLATTED
CURRENT LAND USE: VACANT
FLU: STATE LANDS



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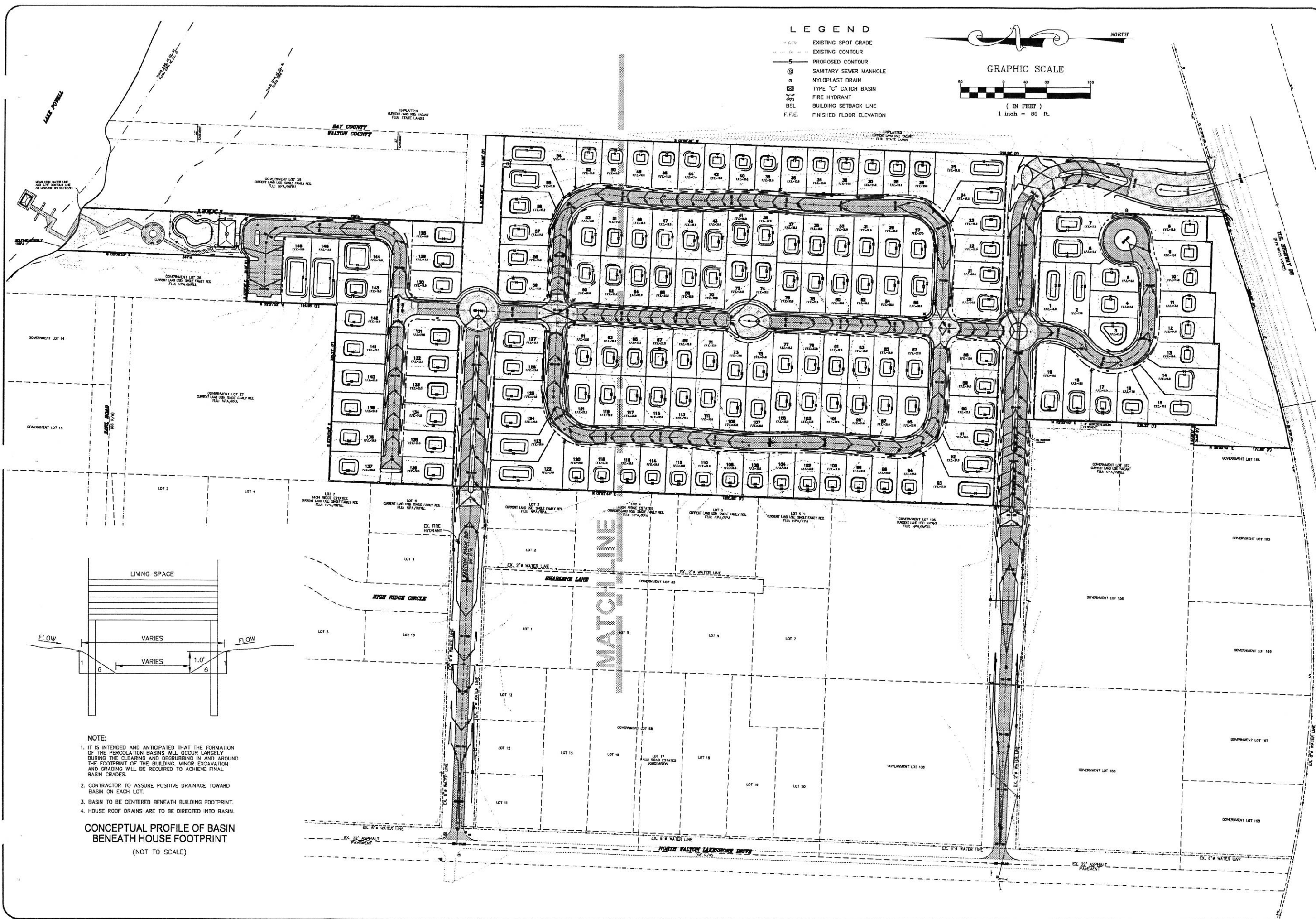
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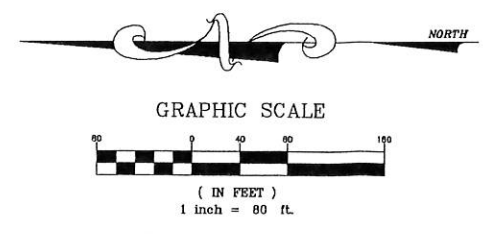
GRANDE POINTE
AT INLET BEACH
SITE PLAN (2 OF 2)
Not valid unless bearing Engineer's embossed seal

Job No.: 0510.04.001
Date: 04 OCT 04
Scale: 1" = 40'
Designed: MSJ
Drawn: MPF
Checked: MSJ
Sheet: 6 of 27

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- LEGEND
- EXISTING SPOT GRADE
 - EXISTING CONTOUR
 - PROPOSED CONTOUR
 - SANITARY SEWER MANHOLE
 - NYLOPLAST DRAIN
 - TYPE "C" CATCH BASIN
 - FIRE HYDRANT
 - BSL BUILDING SETBACK LINE
 - F.F.E. FINISHED FLOOR ELEVATION



NOTE:

- IT IS INTENDED AND ANTICIPATED THAT THE FORMATION OF THE PERCOLATION BASINS WILL OCCUR LARGELY DURING THE CLEARING AND DEBRUDDING IN AND AROUND THE FOOTPRINT OF THE BUILDING. MINOR EXCAVATION AND GRADING WILL BE REQUIRED TO ACHIEVE FINAL BASIN GRADES.
- CONTRACTOR TO ASSURE POSITIVE DRAINAGE TOWARD BASIN ON EACH LOT.
- BASIN TO BE CENTERED BENEATH BUILDING FOOTPRINT.
- HOUSE ROOF DRAINS ARE TO BE DIRECTED INTO BASIN.

CONCEPTUAL PROFILE OF BASIN BENEATH HOUSE FOOTPRINT (NOT TO SCALE)

JENKINS, STANFORD & ASSOCIATES, INC.

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CERTIFICATE OF AUTHORIZATION NO. 9927

Revisions:

Seal:

M. SCOTT JENKINS, P.E.

FL REG. NO. 56073

GRANDE POINTE AT INLET BEACH

OVERALL GRADING PLAN

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Job No.: 0510.04.001

Date: 04 OCT 04

Scale: 1" = 80'

Designed: MSJ

Drawn: MPF

Checked: MSJ

Sheet: 7 of 27

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LAKE POWELL

LEGEND

- | | |
|------------------------|---------------------------------|
| EXISTING SPOT GRADE | TYPE "C" CATCH BASIN |
| EXISTING CONTOUR | FIRE HYDRANT |
| PROPOSED CONTOUR | BSL BUILDING SETBACK LINE |
| SANITARY SEWER MANHOLE | F.F.E. FINISHED FLOOR ELEVATION |
| NYLOPLAST DRAIN | |

UNPLATTED
CURRENT LAND USE: VACANT
FLU: STATE LANDS

GRAPHIC SCALE

(IN FEET)
1 inch = 40 ft.

NORTH

BAY COUNTY
WALTON COUNTY

GOVERNMENT LOT 35
CURRENT LAND USE: SINGLE FAMILY RES.
FLU: NPA/INFILL

GOVERNMENT LOT 36
CURRENT LAND USE: SINGLE FAMILY RES.
FLU: NPA/INFILL

GOVERNMENT LOT 14

GOVERNMENT LOT 15

EARL ROAD
(66' R/W)

GOVERNMENT LOT 37
CURRENT LAND USE: SINGLE FAMILY RES.
FLU: NPA/RPA

LOT 3

LOT 4

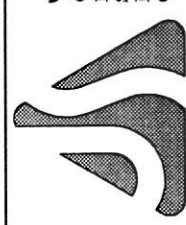
LOT 7
HIGH RIDGE ESTATES
CURRENT LAND USE: SINGLE FAMILY RES.
FLU: NPA/INFILL

LOT 8
CURRENT LAND USE: SINGLE FAMILY RES.
FLU: NPA/INFILL

LOT 3
CURRENT LAND USE: SINGLE FAMILY RES.
FLU: NPA/RPA

LOT
HIGH RIDGE
CURRENT LAND USE:
FLU: NP

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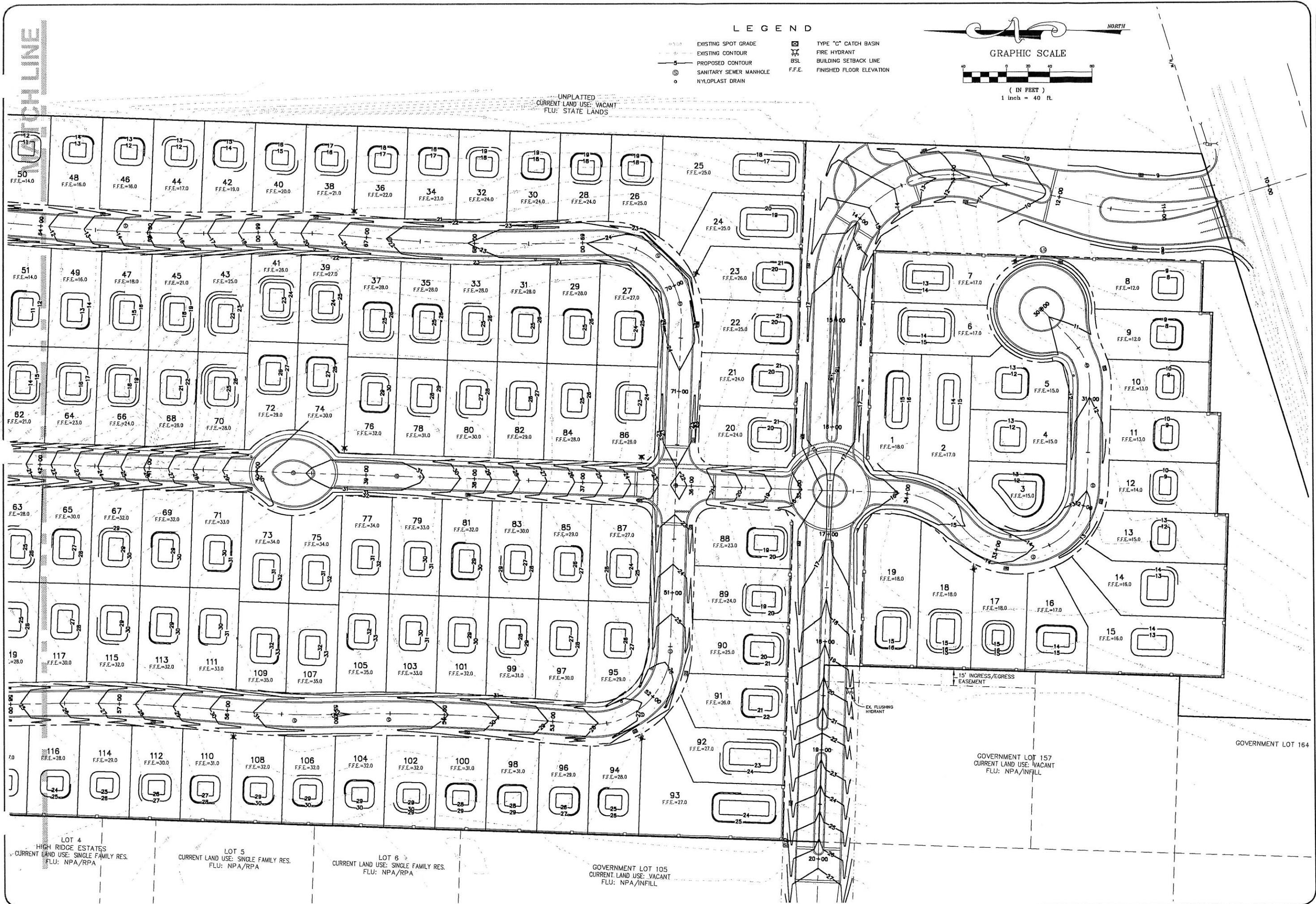
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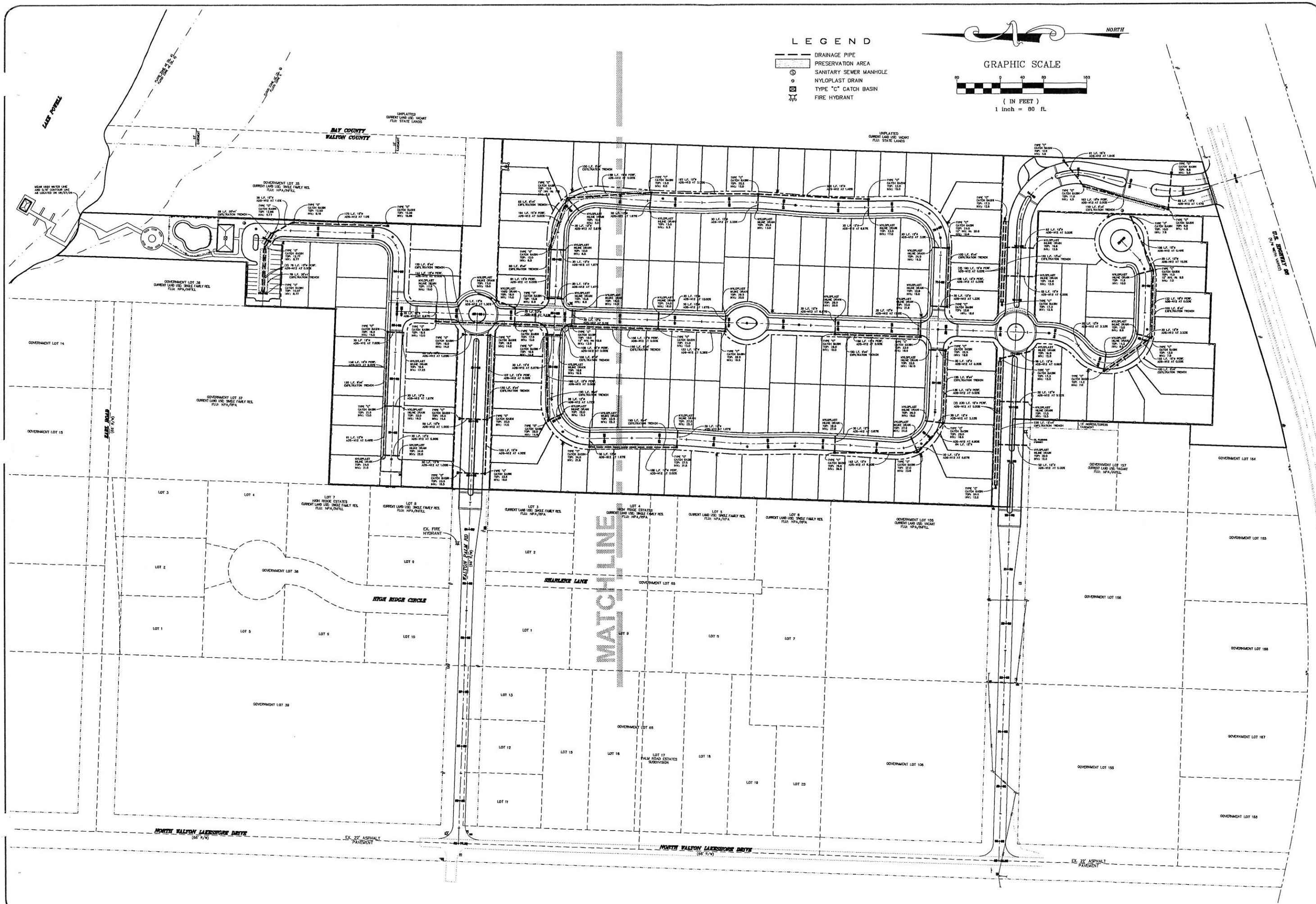
M. SCOTT JENKINS, P.E.
FL REG. NO. 58073

GRANDE POINTE
AT INLET BEACH
GRADING PLAN (1 OF 2)
Not valid unless bearing Engineer's embossed seal

Job No.: 0510.04.001
Date: 04 OCT 04
Scale: 1" = 40'
Designed: MSJ
Drawn: MPF
Checked: MSJ
Sheet: 8 of 27

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Revisions:

Seal:

M. SCOTT JENKINS, P.E.
FL REG. NO. 58073

**GRANDE POINTE
AT INLET BEACH**

OVERALL DRAINAGE PLAN
Not valid unless bearing Engineer's embossed seal.

Job No.: 0510.04.001
Date: 04 OCT 04
Scale: 1" = 80'
Designed: MSJ
Drawn: MPF
Checked: MSJ
Sheet: 10 of 27

C-9

Lake Powell

FLOOD ZONE
FLOOD ZONE 2
FLOOD ZONE 1

FLOOD ZONE 2
FLOOD ZONE 1

BAY COUNTY
WALTON COUNTY

LEGEND

- DRAINAGE PIPE
- PRESERVATION AREA
- SANITARY SEWER MANHOLE
- NYLOPLAST DRAIN
- TYPE "C" CATCH BASIN
- FIRE HYDRANT

UNPLATTED
CURRENT LAND USE: VACANT
FLU: STATE LANDS

GRAPHIC SCALE



(IN FEET)
1 inch = 40 ft.

NORTH

MEAN HIGH WATER LINE
AND 0.76' CONTOUR LINE
AS LOCATED ON 08/27/04

GOVERNMENT LOT 36
CURRENT LAND USE: SINGLE FAMILY RES.
FLU: NPA/INFILL

GOVERNMENT LOT 35
CURRENT LAND USE: SINGLE FAMILY RES.
FLU: NPA/INFILL

GOVERNMENT LOT 14

GOVERNMENT LOT 15

EARL ROAD
(66' R/W)

GOVERNMENT LOT 37
CURRENT LAND USE: SINGLE FAMILY RES.
FLU: NPA/RPA

LOT 3

LOT 4

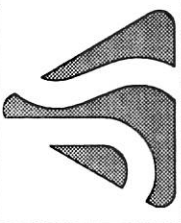
LOT 7
HIGH RIDGE ESTATES
CURRENT LAND USE: SINGLE FAMILY RES.
FLU: NPA/INFILL

LOT 8
CURRENT LAND USE: SINGLE FAMILY RES.
FLU: NPA/INFILL

LOT 3
CURRENT LAND USE: SINGLE FAMILY RES.
FLU: NPA/RPA

LOT
HIGH RIDGE
CURRENT LAND USE:
FLU: NP

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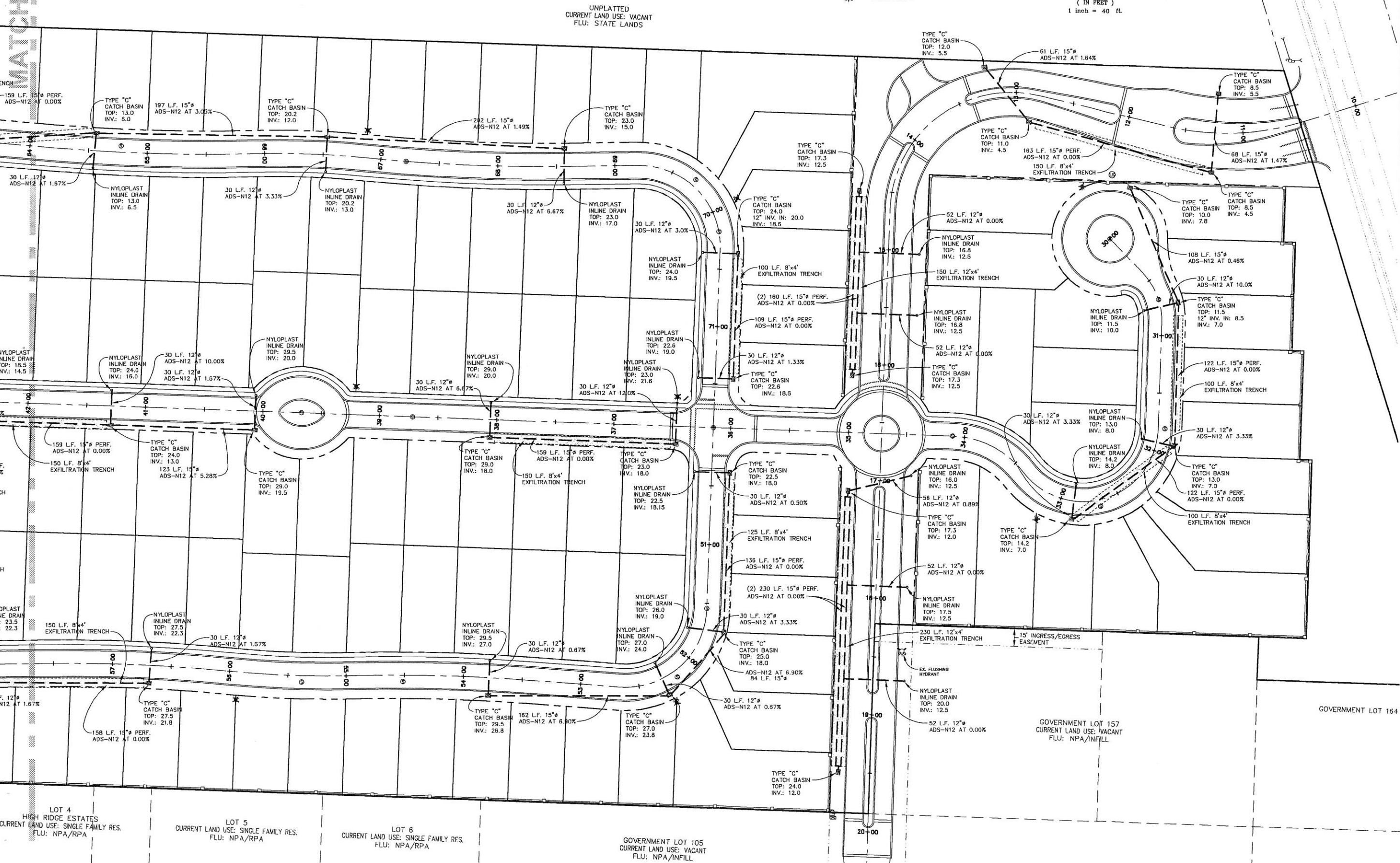
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FL REG. NO. 58073

GRANDE POINTE
AT INLET BEACH
DRAINAGE PLAN (1 OF 2)
Not valid unless bearing Engineer's embossed seal

Job No.: 0510.04.001
Date: 04 OCT 04
Scale: 1" = 40'
Designed: MSJ
Drawn: MPF
Checked: MSJ
Sheet: 11 of 27

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MATCHLINE



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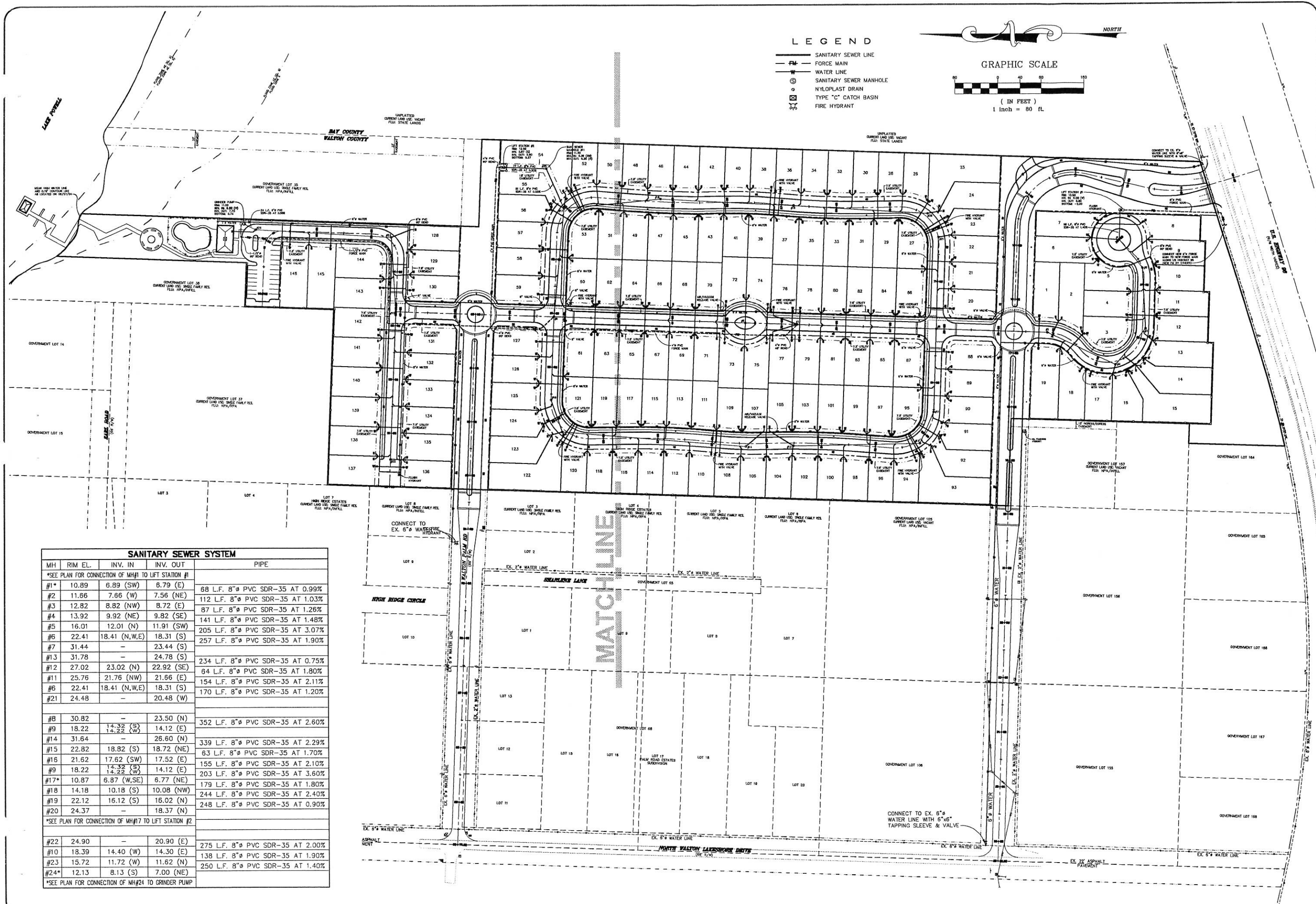
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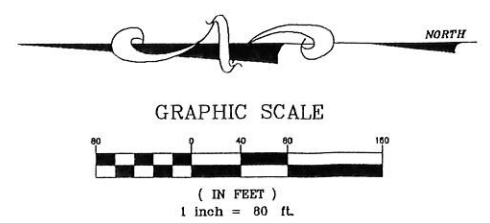
M. SCOTT JENKINS, P.E.
FL REG. NO. 58073

GRANDE POINTE
AT INLET BEACH
DRAINAGE PLAN (2 OF 2)
Not valid unless bearing Engineer's embossed seal

Job No.: 0510.04.001
Date: 04 OCT 04
Scale: 1" = 40'
Designed: MSJ
Drawn: MPF
Checked: MSJ
Sheet: 12 of 27
C-11



- LEGEND
- SANITARY SEWER LINE
 - FORCE MAIN
 - WATER LINE
 - SANITARY SEWER MANHOLE
 - NYLOPLAST DRAIN
 - TYPE "C" CATCH BASIN
 - FIRE HYDRANT



SANITARY SEWER SYSTEM				
MH	RIM EL.	INV. IN	INV. OUT	PIPE
*SEE PLAN FOR CONNECTION OF MH#1 TO LIFT STATION #1				
#1*	10.89	6.89 (SW)	6.79 (E)	88 L.F. 8" PVC SDR-35 AT 0.99%
#2	11.66	7.66 (W)	7.56 (NE)	112 L.F. 8" PVC SDR-35 AT 1.03%
#3	12.82	8.82 (NW)	8.72 (E)	87 L.F. 8" PVC SDR-35 AT 1.26%
#4	13.92	9.92 (NE)	9.82 (SE)	141 L.F. 8" PVC SDR-35 AT 1.48%
#5	16.01	12.01 (N)	11.91 (SW)	205 L.F. 8" PVC SDR-35 AT 3.07%
#6	22.41	18.41 (N,W,E)	18.31 (S)	257 L.F. 8" PVC SDR-35 AT 1.90%
#7	31.44	-	23.44 (S)	
#13	31.78	-	24.78 (S)	
#12	27.02	23.02 (N)	22.92 (SE)	234 L.F. 8" PVC SDR-35 AT 0.75%
#11	25.76	21.76 (NW)	21.66 (E)	64 L.F. 8" PVC SDR-35 AT 1.80%
#6	22.41	18.41 (N,W,E)	18.31 (S)	154 L.F. 8" PVC SDR-35 AT 2.11%
#21	24.48	-	20.48 (W)	170 L.F. 8" PVC SDR-35 AT 1.20%
#8	30.82	-	23.50 (N)	
#9	18.22	14.32 (S)	14.12 (E)	352 L.F. 8" PVC SDR-35 AT 2.60%
#14	31.64	-	26.60 (N)	
#15	22.82	18.82 (S)	18.72 (NE)	339 L.F. 8" PVC SDR-35 AT 2.29%
#16	21.62	17.62 (SW)	17.52 (E)	63 L.F. 8" PVC SDR-35 AT 1.70%
#9	18.22	14.32 (S)	14.12 (E)	155 L.F. 8" PVC SDR-35 AT 2.10%
#17*	10.87	6.87 (W,SE)	6.77 (NE)	203 L.F. 8" PVC SDR-35 AT 3.60%
#18	14.18	10.18 (S)	10.08 (NW)	179 L.F. 8" PVC SDR-35 AT 1.80%
#19	22.12	16.12 (S)	16.02 (N)	244 L.F. 8" PVC SDR-35 AT 2.40%
#20	24.37	-	18.37 (N)	248 L.F. 8" PVC SDR-35 AT 0.90%
*SEE PLAN FOR CONNECTION OF MH#17 TO LIFT STATION #2				
#22	24.90	-	20.90 (E)	
#10	18.39	14.40 (W)	14.30 (E)	275 L.F. 8" PVC SDR-35 AT 2.00%
#23	15.72	11.72 (W)	11.62 (N)	138 L.F. 8" PVC SDR-35 AT 1.90%
#24*	12.13	8.13 (S)	7.00 (NE)	250 L.F. 8" PVC SDR-35 AT 1.40%
*SEE PLAN FOR CONNECTION OF MH#24 TO GRINDER PUMP				

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CERTIFICATE OF AUTHORIZATION NO. 9927

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Seal:

**GRANDE POINTE
AT INLET BEACH**

OVERALL UTILITY PLAN
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Job No.: 0510.04.001
Date: 04 OCT 04
Scale: 1" = 80'
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Checked: MSJ
Sheet: 13 of 27
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Lake Powell

BAY COUNTY
WALTON COUNTY

LEGEND

- SANITARY SEWER LINE
- FORCE MAIN
- WATER LINE
- SANITARY SEWER MANHOLE
- NYLOPLAST DRAIN
- TYPE "C" CATCH BASIN
- FIRE HYDRANT

UNPLATTED
CURRENT LAND USE: VACANT
FLU: STATE LANDS

GRAPHIC SCALE



(IN FEET)
1 inch = 40 ft

MATCH LINE

MEAN HIGH WATER LINE
AND 0.76' CONTOUR LINE
AS LOCATED ON 08/27/04

GOVERNMENT LOT 35
CURRENT LAND USE: SINGLE FAMILY RES.
FLU: NPA/INFILL

GRINDER PUMP
RIM: 11.00
INV. IN: 6.50 (W)
INV. OUT: 7.70
BOTTOM: 0.74

GOVERNMENT LOT 36
CURRENT LAND USE: SINGLE FAMILY RES.
FLU: NPA/INFILL

GOVERNMENT LOT 14

GOVERNMENT LOT 15

EARL ROAD
(66' R/W)

GOVERNMENT LOT 37
CURRENT LAND USE: SINGLE FAMILY RES.
FLU: NPA/RPA

LOT 3

LOT 4

LOT 7
HIGH RIDGE ESTATES
CURRENT LAND USE: SINGLE FAMILY RES.
FLU: NPA/INFILL

LOT 8
CURRENT LAND USE: SINGLE FAMILY RES.
FLU: NPA/INFILL

LOT 3
CURRENT LAND USE: SINGLE FAMILY RES.
FLU: NPA/RPA

LOT
HIGH RIDGE
CURRENT LAND USE:
FLU: NP

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Revisions:

Seal:

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FL REG. NO. 58073

GRANDE POINTE
AT INLET BEACH
UTILITY PLAN (1 OF 2)
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Job No.: 0510.04.001
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Drawn: MPF
Checked: MSJ
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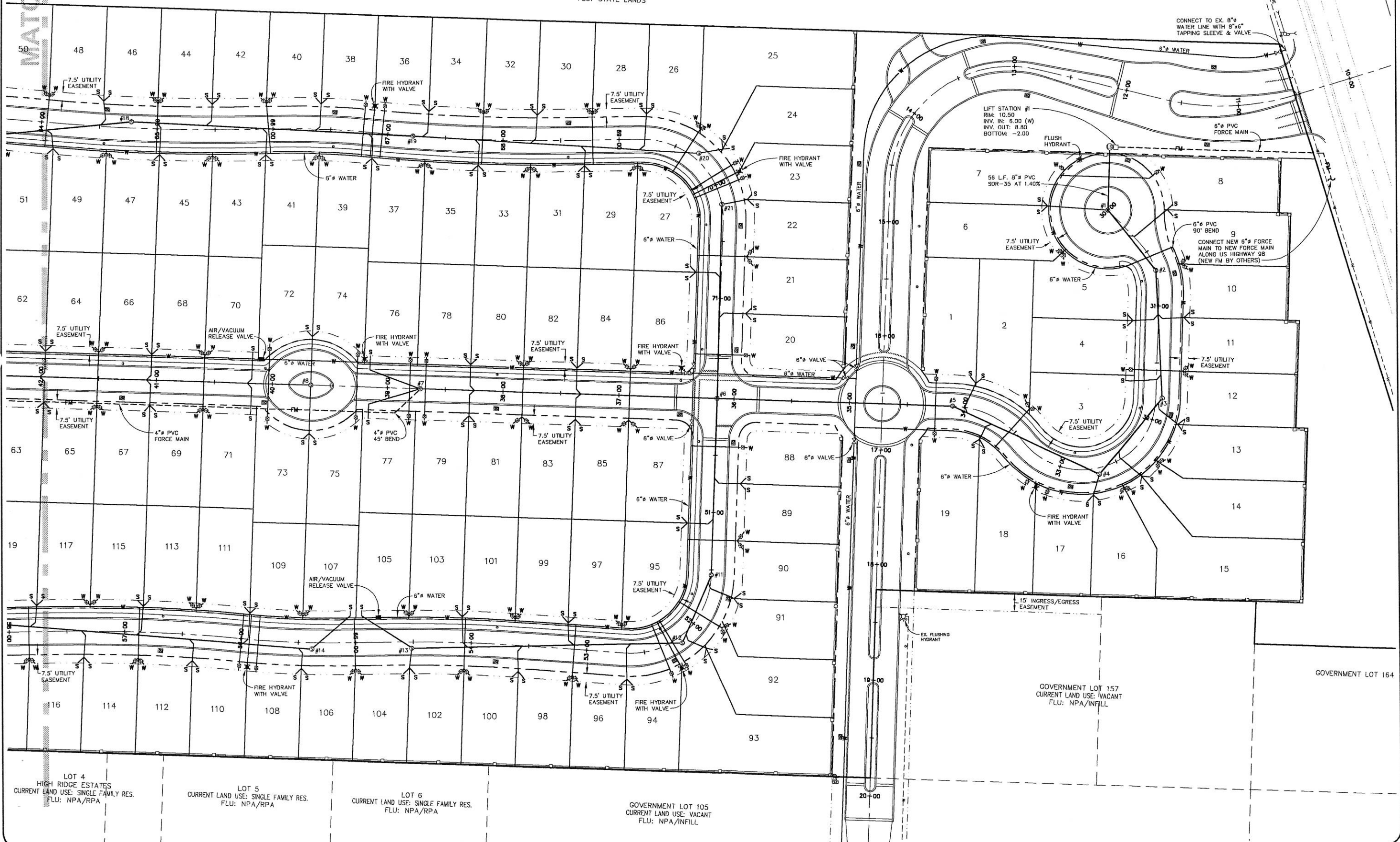
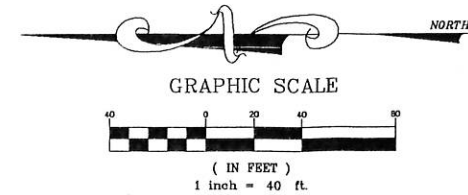
C-13

MATCHLINE

UNPLATTED
CURRENT LAND USE: VACANT
FLU: STATE LANDS

LEGEND

- SANITARY SEWER LINE
- FORCE MAIN
- WATER LINE
- SANITARY SEWER MANHOLE
- NYLOPLAST DRAIN
- TYPE "C" CATCH BASIN
- FIRE HYDRANT



LOT 4
HIGH RIDGE ESTATES
CURRENT LAND USE: SINGLE FAMILY RES.
FLU: NPA/RPA

LOT 5
CURRENT LAND USE: SINGLE FAMILY RES.
FLU: NPA/RPA

LOT 6
CURRENT LAND USE: SINGLE FAMILY RES.
FLU: NPA/RPA

GOVERNMENT LOT 105
CURRENT LAND USE: VACANT
FLU: NPA/INFILL

GOVERNMENT LOT 157
CURRENT LAND USE: VACANT
FLU: NPA/INFILL

GOVERNMENT LOT 164

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GRANDE POINTE
AT INLET BEACH
UTILITY PLAN (2 OF 2)
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ELECTRICAL SECTION:

This section applies to Lift Station discharging 300 gallons per minute or less. All others shall be submitted to Inlet Beach Water for approval.

A. CONTROL PANEL:

Shall be built by TAEK FORCE, INC. according to INLET BEACH WATER specifications for rated horsepower of pump.

B. POWER SUPPLY AND MAIN DISCONNECT:

Power supply to the control panel shall be either 240 volt, 3 phase, 4 wire or 480 volt, 3 phase, 4 wire. Minimum service shall be 100 AMP. Single phase will not be accepted.

Fusible safety disconnect of rated incoming amperage shall be used as manufactured by SQUARE D. All disconnects shall be installed between meter and Double Throw Switch.

C. DOUBLE THROW SAFETY SWITCH:

A 200 amp double throw safety switch shall be provided as manufactured by SQUARE D. It shall be installed between the fusible disconnect and control panel.

D. EMERGENCY POWER RECEPTACLE:

This receptacle will be a KILARC RW64/SU39 with a 12" x 12" box and a 45-degree angle cover. It will be connected to the bottom terminals of the DOUBLE THROW SWITCH.

E. SURGE PROTECTOR:

Surge protector will be as manufactured by INNOVATIVE TECHNOLOGY INC. 240 VOLTS MODEL P3DI20/240P+, 480 VOLTS MODEL P480N+. It will be connected to the center terminals of the DOUBLE THROW SWITCH.

F. CONDUIT:

All conduit will be 2" rigid schedule 40. Where the conduit connects the wetwell to control panel for the motor leads and float controls a sealoff as manufactured by CROUSE-HINDS #ESUF, will be filled with APPLETON duc seal nonhardening compound. All conduit will enter control panel directly under each motor starter and terminal board #2 & #3

G. CONTROL STAND:

The control stand will be constructed of 4" x 4" x 3/8" aluminum angle. Maximum height of 7' (feet). The base plate is made of a 8" x 8" x 3/8" aluminum flat stock to be mounted with 4 (four) 3/8" stainless steel anchor bolts 3" (inches) in length. It will be mounted on a concrete pad so that with the control panel mounted on the stand that the front of panel will be no closer than 12" (inches) from the outside diameter of wetwell. Location and orientation to be coordinated with Destin Water Users.

H. PUMP CONTROLS:

Pump control unit (PCU) will be accomplished by use of a DATA FLOW SYSTEMS INC. PCU. It will be mounted in a box as manufactured by TAEK FORCE, INC. for Inlet Beach Water. 5 (five) normally open mercury float switches is required as manufactured by ANCHOR SCIENTIFIC INC. model SM30NO MINI-FLOAT.

WETWELL SECTION:

This section applies to Lift Stations discharging 300 gallons per minute or less. All Lift Stations will be a Duplex Pump Style. All others must be submitted for approval.

A. WETWELL:

Minimum inside diameter of 6' (feet) and shall not have less than 7' (feet) of depth below lowest invert. The Wetwell floor shall be filled with grout up to bottom of the base Ells. A 1 to 1 slope shall be poured for Chamfer (rolloc) on floor but is not to interfere with pump operation. All inside seams will be filled with non-shrink grout and coated with two coats of KOP-COAT COAL TAR EPOXY 300-M.

B. PIPING:

All piping shall be 4" Ductile Iron. All connections will be made by means of flat flange type. Discharge pipes will be one continuous piece from the base ell to the 90 degree that exits wetwell. For discharge pipes that have a length greater than 17' (feet) a solid sleeve coupling will be used.

C. BASE ELLS:

Base Ells will be as manufactured by DAVIS/EMU. It will be a high pressure coupling style that utilizes a single stainless steel 2" Tee-rail system. The Tee-rail will be continuous from base ell to 6" above 90 degree elbow. They will be mounted to a I-beam by 3/4" stainless steel all thread made into J-bolts. Two nuts and a flat washer is to be used on bottom of I-beam. One flat washer and Nylock nut on top of base ell. The bottom section of the J-bolt will be of sufficient length to act as an anchor, when grout is poured.

D. AIR RELEASE VALVE:

The air release valve will be mounted to the discharge pipe between the 90 degree elbow and inside wall of wetwell. A 4" x 2" saddle for ductile iron with a 1" hole drilled into discharge pipe for venting. The valve as manufactured by WATERMANN model AV 150 C 2". The valve will be mounted to the saddle with a 2" close nipple.

E. FLOAT HANGER:

As manufactured by DAVIS/EMU. 3/16" stainless steel round stock with 6 hooks. Location to be coordinated with Inlet Beach Water.

F. AIR VENT:

A 2" aluminum air vent is required. It is to be stub on same line as the conduit from wetwell under the control panel. A minimum of 18" above elevation of wetwell.

G. CROSS BRACE:

A cross brace made of 3" x 3" x 1/2" angle aluminum shall be used to brace the discharge pipes to the wetwell. It will be mounted behind the pipes. The base plate will 6" x 9" x 1/4" aluminum flat stock, secured to wall with two 3/8" anchor bolts stainless steel. The brace to be connected to the discharge pipes with 3/16" U-bolts stainless steel.

H. ACCESS COVER:

A 36" x 48" single door access hatch with recessed handle and slam lock, no padlock tab. As manufactured by ELECTRIC SPECIALTY INC. for Inlet Beach Water will be used.

DRYWELL SECTION:

This section applies to Lift Stations discharging 300 gallons per minute or less. All others will be submitted for approval.

A. DRYWELL:

A precast concrete utility box with inside dimension of 5' x 4' x 3' is required. Minimum clearance of 6" from inside wall or floor and any assembly is required. A 48" x 42" double door access hatch with recessed handle and slam lock, no padlock tab. As manufactured by ELECTRIC SPECIALTY INC. for Inlet Beach Water will be used.

B. PIPE:

All piping will be 4" Ductile Iron. All connections will be of the flat flange type. Pipe from wetwell to check valve will be continuous and will terminate a minimum of 6" from inside wall.

C. CHECK VALVE:

Check valves will be outside spring and lever 4" flat flange style as manufactured by M&H.

D. PLUG VALVE:

Plug valves will be 1/4 turn plug valves flat flange style as manufactured by CLOW.

E. BYPASS:

A 4" female quick disconnect with dust plug as manufactured by APG. It will be mounted to a 4" flat flange female adapter cast iron with a close nipple 6" in length.

F. ELLS:

Three 4" cast iron 90 degree Ells are required for connections of discharge pipes and bypass connection to 4" cast iron cross. Ells are to be flat flange style.

G. CROSS:

A 4" cast iron cross flat flange style is required.

H. FORCEMAIN:

Ductile iron pipe will be used to exit drywell to a point of 18" past outside wall. A mechanical joint transition coupling will be used to connect to the PVC forcemain.

I. PRESSURE GAUGE:

One stainless steel pressure gauge, liquid filled, with 3-1/2" face, 0 to 100 psi will be used on each discharge pipe.

J. DRAIN:

The drain from drywell to wetwell will be a 3" PVC on 1/2" fall per foot, to extend a minimum of 8" into wetwell. A PVC check valve with removable top shall be used. Check valve by Plastic Oddities.

PUMPS:

Authorized pumps for Inlet Beach Water are DAVIS/EMU or HYDROMATIC. Hydromatics must be able to receive a pump adapter made by Davis/Emu without any field modifications to the pump or adapter.

WATER SERVICE:

A 3/4" water service will be supplied. Location to be coordinated with Inlet Beach Water.



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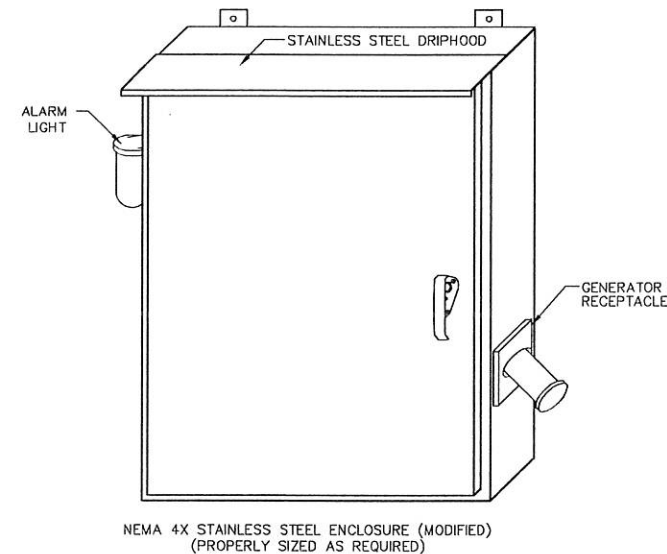
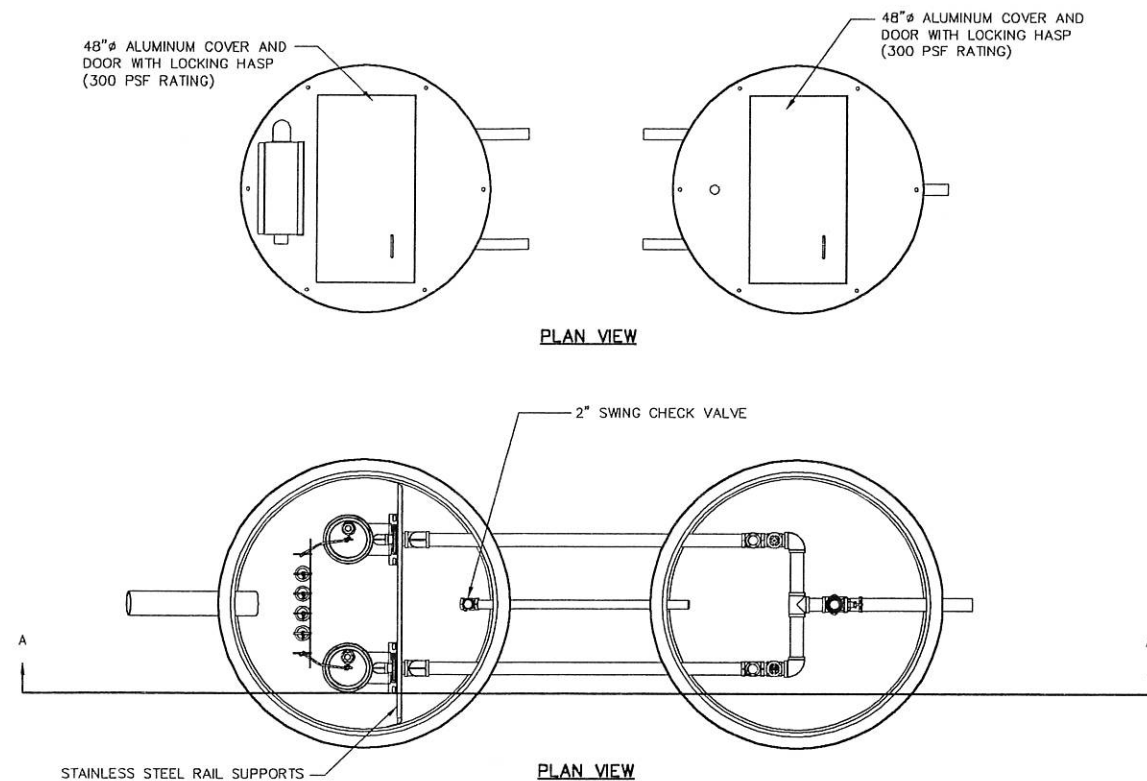
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FL REG. NO. 55073

**GRANDE POINTE
AT INLET BEACH**

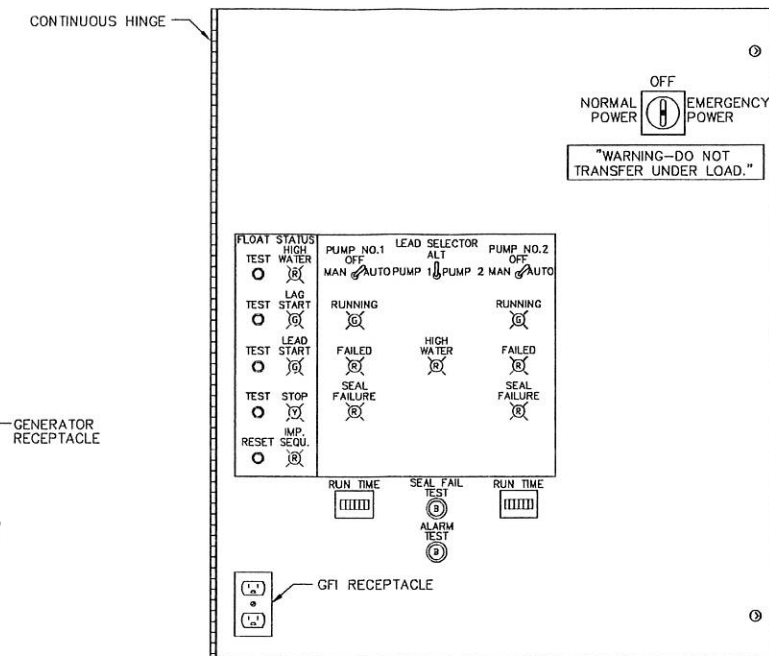
LIFT STATION SPECIFICATIONS
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Job No.: 0510.04.001
Date: 04 OCT 04
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Sheet: 17 of 27

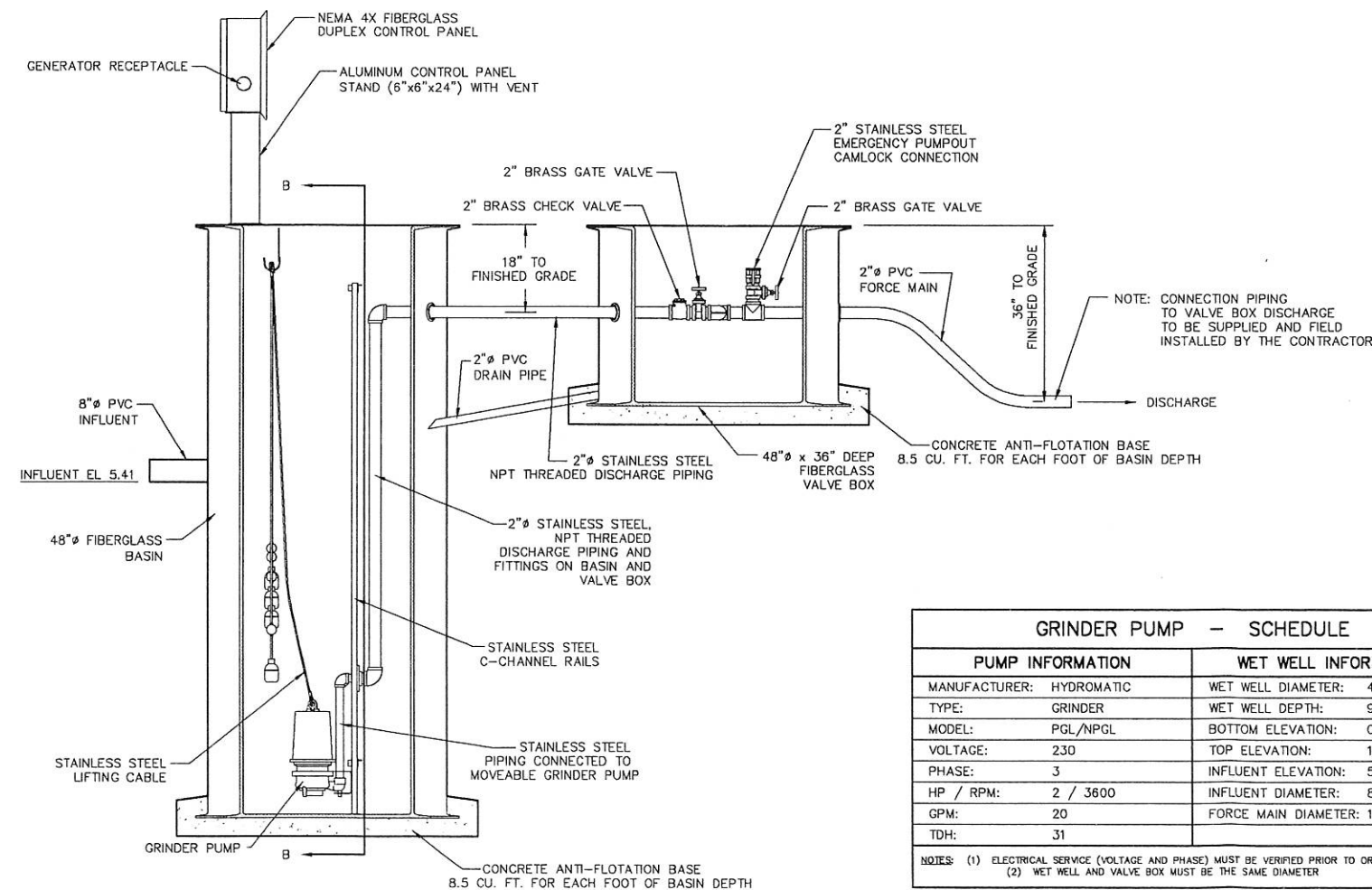
C-16



DUPLEX CONTROL PANEL
PHYSICAL LAYOUT



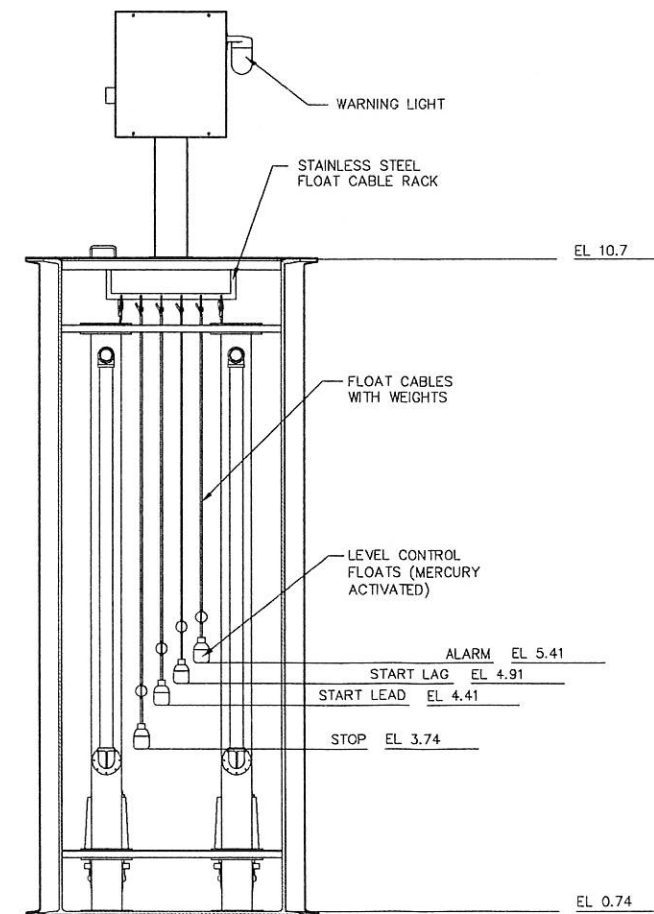
DUPLEX CONTROL PANEL
DEADFRONT DETAIL



SECTION A-A
N.T.S.

GRINDER PUMP - SCHEDULE	
PUMP INFORMATION	WET WELL INFORMATION
MANUFACTURER: HYDROMATIC	WET WELL DIAMETER: 4 FEET
TYPE: GRINDER	WET WELL DEPTH: 9.96 FEET
MODEL: PGL/NPGL	BOTTOM ELEVATION: 0.74
VOLTAGE: 230	TOP ELEVATION: 10.7
PHASE: 3	INFLUENT ELEVATION: 5.41
HP / RPM: 2 / 3600	INFLUENT DIAMETER: 8"
GPM: 20	FORCE MAIN DIAMETER: 1-1/2"
TDH: 31	

NOTES: (1) ELECTRICAL SERVICE (VOLTAGE AND PHASE) MUST BE VERIFIED PRIOR TO ORDERING EQUIPMENT
(2) WET WELL AND VALVE BOX MUST BE THE SAME DIAMETER



SECTION B-B
N.T.S.



Revisions:

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GRANDE POINTE
AT INLET BEACH
GRINDER PUMP DETAILS
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1.0 GENERAL

The contractor shall furnish all labor, materials, equipment and incidentals required to provide 2 submersible grinder pump(s). Each pump shall be capable of delivering the following performance points, 12 U.S. gpm at 90 tdh; 25 U.S. gpm at 80 tdh; 48 U.S. gpm at 50 tdh, with a shut off head of 100 tdh (minimum). The pump motor speed shall be 3450 rpm, 2 hp, 3 phase, 60 hertz, 230 volts. The pump(s) shall be manufactured in North America by a company regularly engaged in the manufacture and assembly of similar units for a minimum of five (5) years. The pump shall be Barnes Pumps model SGV or approved equal.

A centrifugal submersible grinder pump designed to reduce all material found in normal domestic and light industrial sewage, including plastics, rubber, sanitary napkins, and disposable diapers into a finely ground slurry. The resultant slurry is then pumped through small diameter piping into a gravity interceptor or treatment facility. The temperature limitation of the liquid being pumped is 104°F continuous, 160°F intermittent and shall be capable of running dry for extended periods.

2.0 PUMP CONSTRUCTION

The volute, seal plates and motor housing shall be constructed of high quality ASTM A-48 class 30 cast iron. The pump(s) shall be painted with a water based air dry enamel of 2.0 mil minimum thickness. All exposed hardware shall be 300 series stainless steel.

The pump impeller shall be of the recessed vortex design. Pumps with standard centrifugal semi-open impeller designs shall not be acceptable. The impeller shall be of 85-5-5-5 bronze construction and machined for threading to the motor shaft. The impeller shall be capable of being trimmed to meet specific performance characteristics.

The grinder mechanism shall consist of a radial cutter threaded and locked on the motor shaft by a washer in conjunction with a countersunk flat head cap screw, and a shredding ring containing a minimum of fifteen flow passages with cutting edges. The shredding ring shall be reversible to provide twice the cutting edge life. Both the shredding ring and radial cutter shall be constructed of 440C stainless steel hardened to a min. Rockwell C55 and shall be finish ground for a fine cutting edge. Two-stage cutter mechanisms requiring external adjustment for proper clearance are not acceptable.

The unit shall utilize a tandem mechanical shaft seal arrangement and shall operate in an oil atmosphere. The materials of construction shall be carbon for the rotating face and ceramic for the stationary face, lapped and polished to a tolerance of one light band, 300 series stainless steel hardware, and all Elastomer parts to be BUNA-N. The seal shall be commercially available and not a proprietary design of the manufacture.

Single phase motors shall be of the capacitor start, capacitor run design and the three phase motors shall be of the dual-voltage 230/460 design. The pump shall be designed to be non-overloading throughout the entire pump curve. The rotor and stator assembly shall be of the standard frame design and secured to the pump seal plate by four threaded fasteners allowing for easy serviceability. Motor designs incorporating shrink or press fit assembly between the stator and motor housing shall not be acceptable. The motor shall be constructed with the windings operating in a sealed environment containing clean dielectric oil, making it capable of operating in a totally, partially or non-submerged condition for extended periods of time without damage due to the heat being generated. Air-filled motors shall not be acceptable. The motor windings shall be of Class B insulation. The motor shall meet the standard NEMA design L for single phase and NEMA design B for three phase. The motor shaft shall be of 415 stainless steel. Protection against excessive temperature shall be provided by heat sensor thermostat attached to the stator windings and connected in series with cantor coil in the control panel. The pump shall have a three bearing design consisting of an upper ball bearing, an intermediate ball bearing restrained for the purpose of carrying the thrust loads, and a lower bronze sleeve bearing to carry radial loads and prevent shaft deflection imposed by the pump impeller and grinder operation.

Bearing shall operate in an oil bath atmosphere for superior life. Permanently lubricated bearings are not acceptable.

The pump shall be equipped with 30 ft. of type 10/4 SQ. power cable. Heat shrink tubes shall be used to connect power cord leads with motor leads. A master heat shrink tube shall be provided and filled with epoxy to seal the outer cable jacket and the individual strands to prevent water from entering the motor housing. A secondary rubber pressure grommet shall be provided as an additional sealing point and strain relief at the point of cable entry. Cable entry designs utilizing terminal boards to connect power cord leads with motor leads shall not be acceptable.

3.0 PUMP TEST

The pump manufacturer shall perform the following inspections and tests in accordance with Hydraulic Institute Type B standards before shipment from the factory:

1. A check of the motor voltage and frequency shall be made as shown on the name plate.
2. A motor and cable insulation test of moisture content or insulation defects shall be made per U.L. criteria.
3. The pump shall be completely submerged and run to determine that the unit meets three pre-determined hydraulic performance points.
4. A written report shall be available showing the aforementioned tests have been performed in accordance with the specifications.

4.0 START-UP

The pump(s) shall be tested at start-up by a qualified representative of the manufacturer. A start-up report as provided by the manufacturer shall be completed before final acceptance of the pump(s).

5.0 DOCUMENTATION

The manufacturer, if requested, will supply a minimum of 5 sets of standard submittal data; Standard submittal data consist of:

1. Pump catalog data
2. Pump performance curve
3. Break Away Fitting (BAF) data
4. Access frame data
5. Typical installation drawing
6. Control panel data
7. Installation & Operation Manuals with Parts List

6.0 BASIN

6.1 GENERAL

Furnish and install a complete factory-built, Duplex Stainless Steel "C" Channel Non-Sparking Rail Package as shown on the plans. The package shall consist of a fiberglass basin, a cover with 2" vent, Non-sparking "C" channel rail assembly, discharge piping and fittings, check valves, true union ball valves, level controls, and control panel.

Construction shall be custom molded fiberglass reinforced polyester resin. The wall thickness shall be sufficient to withstand a water-saturated sand load of 120 lbs per cubic foot, as shown on plans. The flexible pipe fitting or pipe adapter and gasket material shall be shipped loose for field installation. A ballast support flange shall be provided as an integral part of the basin assembly, which shall extend a minimum of three inches (3") on the radius of the basin. Three electrical couplings shall be bolted to the basin wall, two for the pump cables and one for the float cables. The float coupling shall be a minimum of 2" from the pump couplings.

The basin cover shall be of steel construction with a minimum thickness of three-eighths inch (3/8"), and shall have a minimum diameter four inches (4") greater than the basin. Both inside and outside surfaces of the cover shall be sandblasted to remove rust and scale and shall be completely coated with air dry asphalt bituminous coating for corrosion resistance. A hinged door shall be an integral part of the cover, and shall have locking provisions. The cover shall be securely mounted to the basin with a minimum of six (6) stainless steel bolts threaded into stainless steel inserts in the top collar of the basin. All hardware shall be stainless steel. The cover shall have a 2" screened bug-free vent that is corrosion resistant.

6.2 RAIL ASSEMBLIES

The slide rail assemblies shall consist of 304 stainless steel upper pump guide brackets, lower pump guide brackets of brass and "C" channel rail assembly of 14 gauge 304 stainless steel. The stationary portion of the hydraulically sealed discharge coupling assembly shall be machined cast iron and the moveable of 85-5-5-5 brass. The upper rail bracket shall mount to the basin wall and position the upper end of the stainless steel guide rail while the lower rail bracket positions the lower end of the guide rail. The stainless steel rail shall support the pump at the required distance from the basin floor to provide unrestricted flow of material into the pump. The guide brackets shall be attached to the pump for positioning of the unit on the guide rail during installation or removal of the unit within the basin. The stationary fitting shall have a Neoprene diaphragm clamped between the stainless steel rail and the stationary cast iron discharge. The brass moveable fitting, when in position, shall be held against the stationary fitting by the construction of the stainless steel rail, aligning the moveable fitting to the flexible diaphragm for proper sealing of the two surfaces under pressure. The flexible diaphragm shall also serve as an anti-siphon device. A polypropylene rope with a minimum breaking strength of 2440 pounds shall be provided for each pumps installation and removal.

6.3 DISCHARGE PIPING

The discharge piping shall consist of schedule 40 stainless steel pipe. A ball check valve shall be installed in the vertical position between the pump discharge and the moveable fitting. Each valve shall consist of three major components; body, access plug, and ball. The design of the valve shall be such that it keeps solids, stringy material, grit, rags, etc., moving without the need for back flushing.

6.4 CHECK VALVE

In the operating mode, the ball shall not impede flow through the check valve. The operating flow area shall be equal to the nominal size of the valve. The ball shall clear the waterway providing "full flow" equal to the nominal size. It shall be non-clog in design. There shall not be outside levers, weights, springs, dash pots or other accessories required for a swing (clapper) type check valve. The ball shall be natural rubber and be resistant to material normally found in sewage. The body shall be gray cast iron, ASTM Class 30, the plug shall be Sch. 40 PVC.

6.5 SHUT OFF VALVE

A PVC true union ball valve shall be installed in the discharge piping for each pump to provide shut-off capabilities during pump removal. The ball valve shall be full ported with a minimum rated pressure of 100 PSI WOG and shall be fitted with an integral stainless steel extension handle. The extension handle shall extend up to within six (6) inches of the top of the basin for ease of access and operation, and shall be secured to the rail support bracket with a stainless steel bracket.

Pump and control wiring shall run continuously to the control panel through conduit and sealed fittings as required by state and local codes. All incoming power and control wires must pass through cord grips and sealed fittings with sealing compound as required by Underwriters Laboratories.

6.6 LEVEL CONTROL

A quantity of four (4) liquid level controls with SJOW-A cable, shall be provided to control operation of the pumps and high-water alarm. The level sensors shall be mercury type pilot duty devices mounted in a corrosion resistant polypropylene housing. The level controls shall be mounted to a one-half (1/2) inch PVC support pole attached to the stainless steel rail assembly as shown in the plans. Sufficient cable shall be supplied to reach the control panel with no splices in the basin. Level controls shall be set at the elevations indicated on the plans.

7.0 CONTROL PANEL

7.1 GENERAL

Enclosure shall be constructed of stainless steel, shall have a means for padlocking, and shall be rated NEMA 4X as manufactured by Hoffman, Electromate or approved equal.

All power and control wires shall be stranded copper type MTW. All wiring shall be in covered plastic wireway.

All points necessary for external connection in the controller, whether power or control, shall be wired to a terminal strip located at the top or bottom of the enclosure as directed by the engineer. The terminal strip shall be permanently marked with the same designation as the wire connected to it.

All power and control wires shall be marked at both ends using self-adhering wire markers. No two wires having different functions within the control panel shall have the same markings.

All circuit breakers, starters, and other control devices mounted within the controller panel shall be labeled for identification both within the panel and on the wiring schematic with corresponding designations.

Control Panel shall be 120 volts and shall be protected by a correctly sized circuit breaker. If required, provide a properly sized control power transformer with primary over current protection.

Control Panel shall be furnished with a 120 volt, 15 amp, weatherproof, duplex GFI receptacle mounted on side of panel.

Each starter shall be provided with overload protection in all three phases and each individual starter shall have phase failure protection.

All circuit breakers, selector switches, pilot lights and control device shall be visible and operable from interior deadfront panel. The deadfront panel shall be constructed of anodized aluminum and shall have a continuous aluminum hinges.

The quality establishing brand for the control panel shall be that as manufactured by Control Systems, Inc., Jackson, MS.

All approval drawings shall be prepared per J.I.C. standards for engineers review prior to any fabrication of control equipment. The Controller shall be produced by a UL 508 listed shop. Proof of label availability shall be submitted with above drawing.

The Controller manufacturer shall provide a written warranty with approval drawings covering all control materials and parts furnished for a period ending one year after final acceptance of the project. This warranty shall cover all material replacement, all labor, and all travel expenses.

7.2 MISCELLANEOUS CONTROLS

Manual Transfer Switch - Provide a properly sized manual double throw transfer switch as shown on the drawings. The transfer switch shall be American Solenoid KG series with auxiliary position contacts, padlockable handle door clutch with interlock and properly sized operator shaft.

Generator Receptacle - Provide a properly sized Generator receptacle as shown on the drawings. The Generator Receptacle shall be Crouse Hinds Arktype series with type AJ back box and angle adapter.

Lightning Arrestor - Provide a Lightning Arrestor (LA), per component specifications.

Pump No. 1 - Provide a properly sized circuit breaker combination starter with NEMA Class 10, ambient compensated overload protection and individual phase failure protection.

1. The pump shall be controlled by a Duplex Controller (DC1-2) and Float Test/Improper Sequence module (QIU), both per component specifications. The pump shall be controlled based upon level in the station wetwell as sensed by the Float Switches (FS), also per component specifications.

2. Provide an elapsed time meter (ETM), per component specifications to indicate pump total run time.

Pump No. 2 - Provide the same equipment as provided for Pump No. 1.

Common Alarm Light - Provide a red high water alarm pilot light and common weatherproof exterior alarm light (AL), per component specifications, with red Lexan lens. The exterior alarm light shall be activated during high water level, pump failure, or seal failure. A normally open common alarm output contact shall be energized by these alarm conditions.

7.3 COMPONENT SPECIFICATIONS

Lightning Arrestor - Arrestor shall be silicon oxide varistor type, having current rating of 60,000 amperes and 1500 joules. The case material shall be PVC and the arrestor shall be designed for panel service entrance voltage.

TAG	SERVICE
LA	Lightning Arrestor

Duplex Controller - Provide a duplex controller including the following control functions and auxiliaries:

1. Manual-Off-Automatic selector switch, green running pilot light, red failure pilot light, and red seal failure pilot light for each motor.

2. A Motor No. 1 Lead-Alternate-Pump No. 2 Lead sequence selector switch to select either motor as lead motor or to select that the motors alternate as lead motor on each call for cycle.

3. Signal inputs for: stop, lead motor start, lag motor start and high/low alarm. The power applied to the sensors shall be a maximum of 24 VAC with a current of less than 30 ma for intrinsic safety and shall be optically isolated.

4. Pilot light indicators for each level input.

5. A field adjustable failure time delay for each motor to start the lag motor at the lead motor start point if the lead motor fails or if the lead motor selector switch is placed in the off position. If a motor fails, the remaining functional motor shall remain the lead motor on future cycles. The failed motor shall only be called to operate at the lag motor operating point. Normal motor alternation shall resume when failure condition is corrected and motor has been reset.

6. Soft stop feature to require the motors to stop three (3) seconds apart during the condition that both motors are running when signaled to stop. Soft start feature to require the motors to start three (3) seconds apart during conditions that the lead and lag motors are called for simultaneously.

7. Individual field adjustable time controls to delay starting each motor in the automatic mode after power failure or during initial startup.

8. Motor failure, motor seal failure and high/low alarm red pilot lights shall flash when activated.

9. Provide motor running, motor failure and seal failure (if required) alarm contacts for each motor. Also, provide high/low alarm contact.

10. Duplex Controller shall be solid state and easily replaceable. Conventional relay and time construction or PLC control is not acceptable.

TAG	SERVICE
DC1-2	Pump Controller

Duplex Controller Float Test/Improper Sequence Module - Provide input indicator and test module with improper input sequence indicator and controls. The following controls and equipment shall be supplied:

1. Four deadfront panel mounted input pilot light indicators: One for each of the following level control points: Stop, Lead Start, Lag Start and High Level Alarm.

2. Four deadfront panel mounted pushbuttons to test each pump level control input.

3. Automatic input sequence monitoring, such that if the inputs do not occur in proper order (stop, lead start, lag start), a red pilot light indicator shall be activated.

4. If stop input fails, followed by lead input activation, lead pump shall operate and continue until lead pump input is removed and a field adjustable time delay has expired.

5. If stop input fails, followed by lead and lag input activation, both motors shall operate and continue until their respective input is removed and an individual field adjustable time delay for each pump has expired.

6. If stop, lead and lag inputs fail, followed by high level input activation, both motors shall operate and continue until the high level input is removed and a field adjustable time delay for each pump has expired.

7. Improper sequence activation shall also activate the common external alarm controls.

8. Improper sequence alarm shall require a reset button activation to remove the alarm light.

TAG	SERVICE
QIU	Float test/improper sequence module

Running Time Meters - Running time meters shall register up to 99,999.9 hours and be of the non reset type. The unit shall have a self-extinguishing plastic case with large white numbers on black background. Units shall be flush mounted type and be U.L. recognized.

TAG	SERVICE
ETM	Pump Run Time

Common Alarm Light - Provide an Alarm Light mounted as indicated on drawings. The light shall be PERFECT LINE catalog number B-100/PVG-1R or equal. The alarm light shall burn dim and steady during normal conditions to indicated electrical power "ON" and lamp good. During any alarm condition the alarm light shall flash brightly.

TAG	SERVICE
AL	Common Alarm Light

Float Switch - The float switch shall be a direct acting switch and contain a single pole mercury switch which actuates when the longitudinal axis of the float is horizontal and deactuates when the liquid level falls 1" below the actuation elevation. The float shall have a chemical resistant polypropylene casing with a firmly bonded electrical cable protruding. One end of the cable shall be permanently connected to the enclosed mercury switch and the entire assembly shall be encapsulated to form a completely water tight and impact resistance unit. Float shall include a bracket for support pipe mounting.

TAG	SERVICE
FS	Float Switch

JENKINS, STANFORD & ASSOCIATES, INC.
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PHONE: (850) 837-5330
FAX: (850) 837-4848
WEB: JSAENGINEERING.COM
CERTIFICATE OF AUTHORIZATION NO. 9927

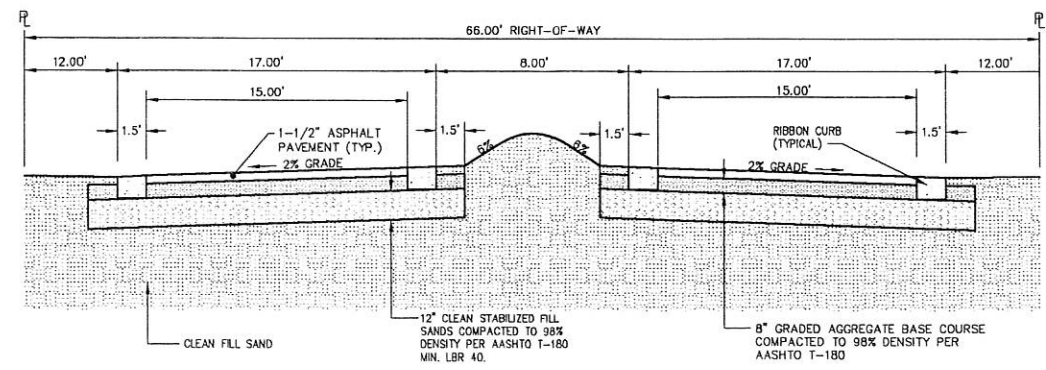
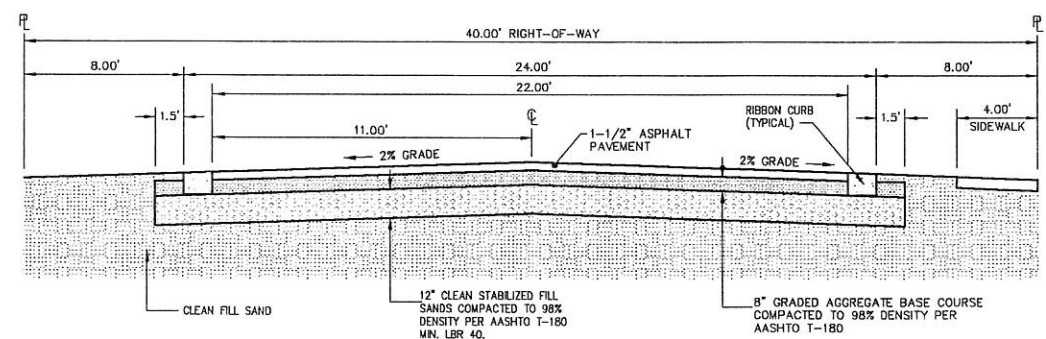
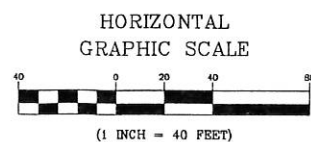
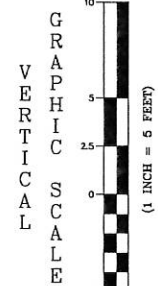
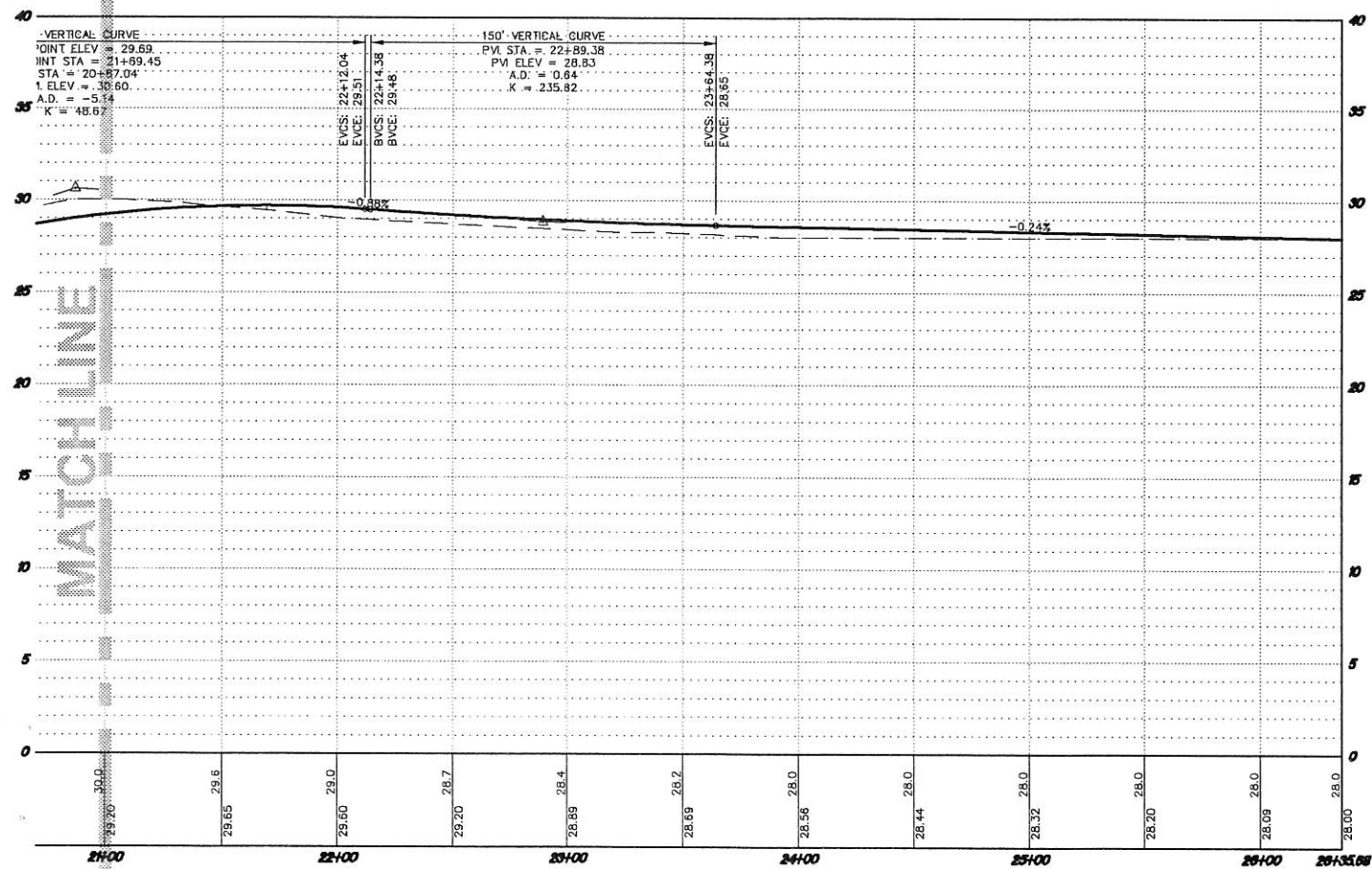
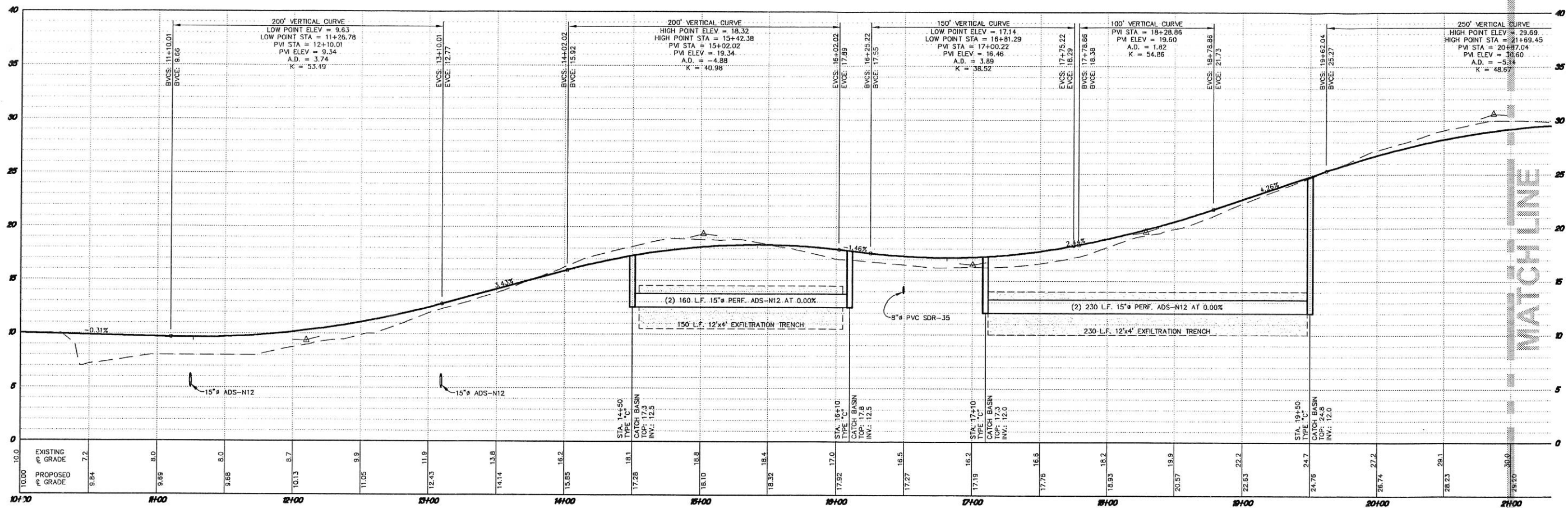


Revisions:

Seal: M. SCOTT JENKINS, P.E.
FL REG. NO. 58073

GRANDE POINTE
AT INLET BEACH
GRINDER PUMP SPECIFICATIONS
Not valid unless bearing Engineer's embossed seal

Job No.: 0510.04.001
Date: 04 OCT 04
Scale: N/A
Designed: MSJ
Drawn: MPF
Checked: MSJ
Sheet: 19 of 27
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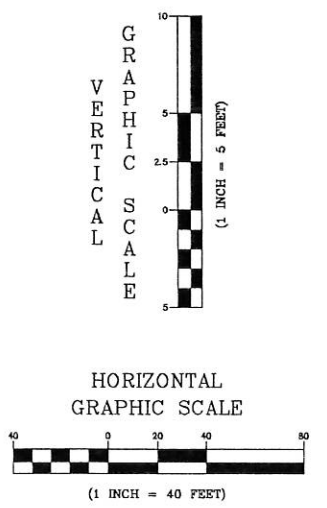
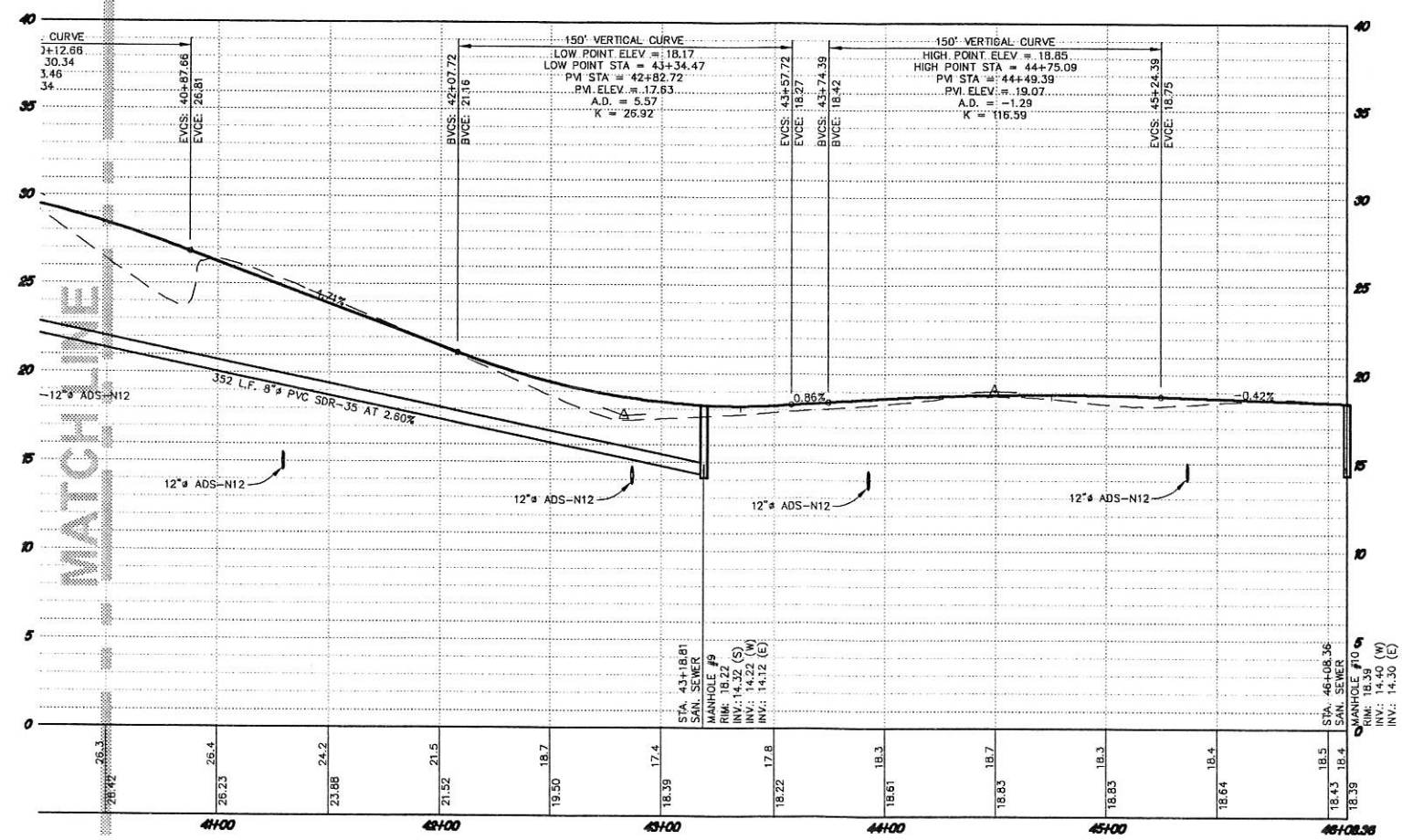
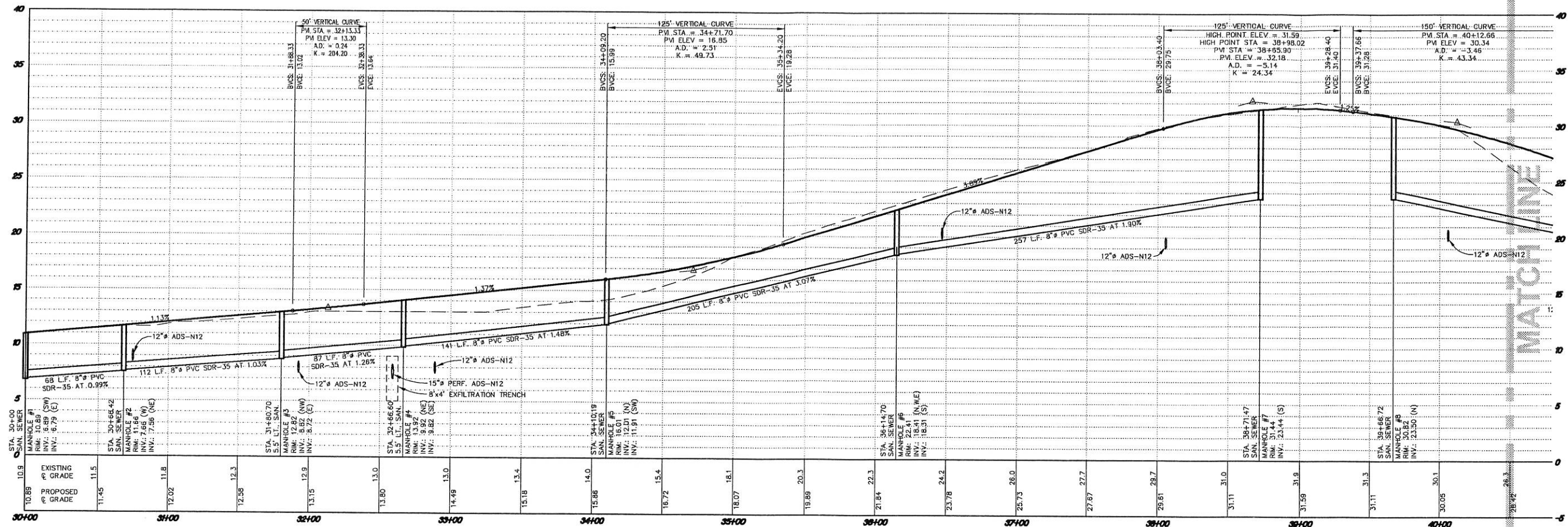


Revisions:

Seal: **M. SCOTT JENKINS, P.E.**
 FL REG. NO. 58073

GRANDE POINTE AT INLET BEACH
ROADWAY PROFILES
 Not valid unless bearing Engineer's embossed seal

Job No.: 0510.04.001
 Date: 04 OCT 04
 Scale: AS SHOWN
 Designed: MSJ
 Drawn: MPF
 Checked: MSJ
 Sheet: 20 of 27
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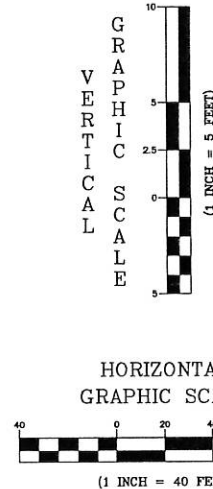
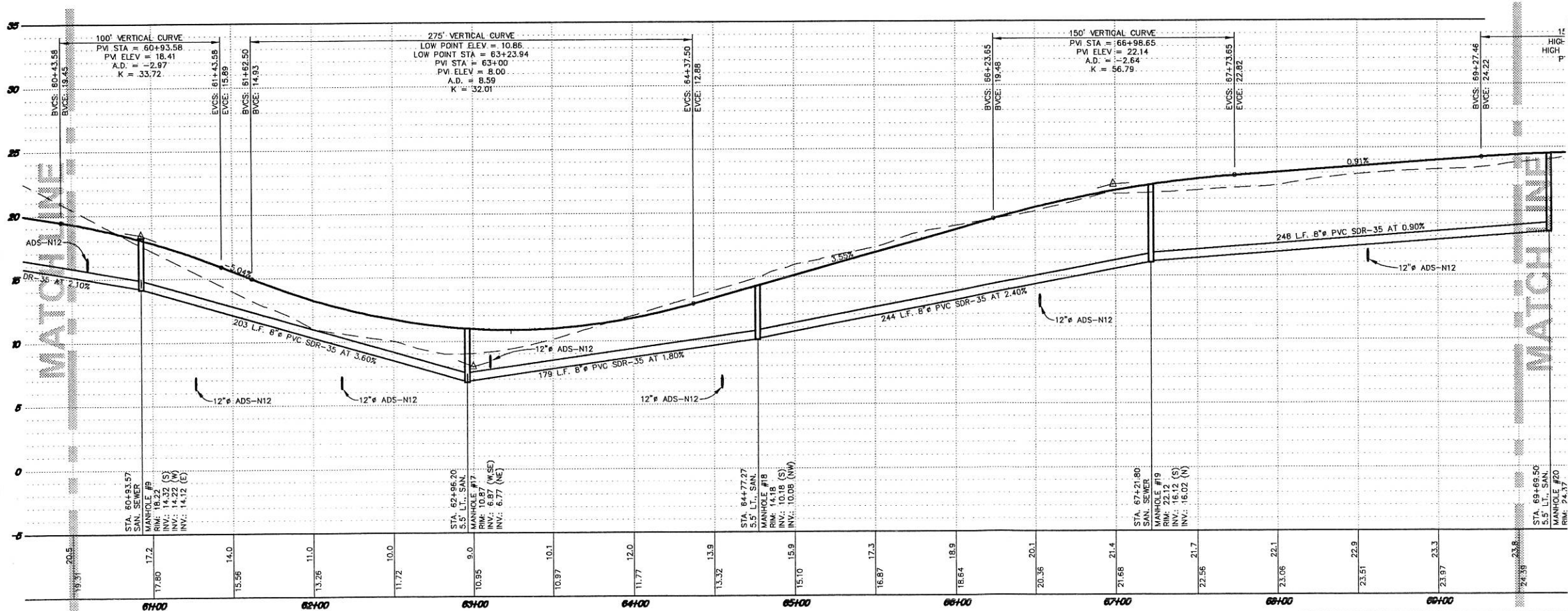
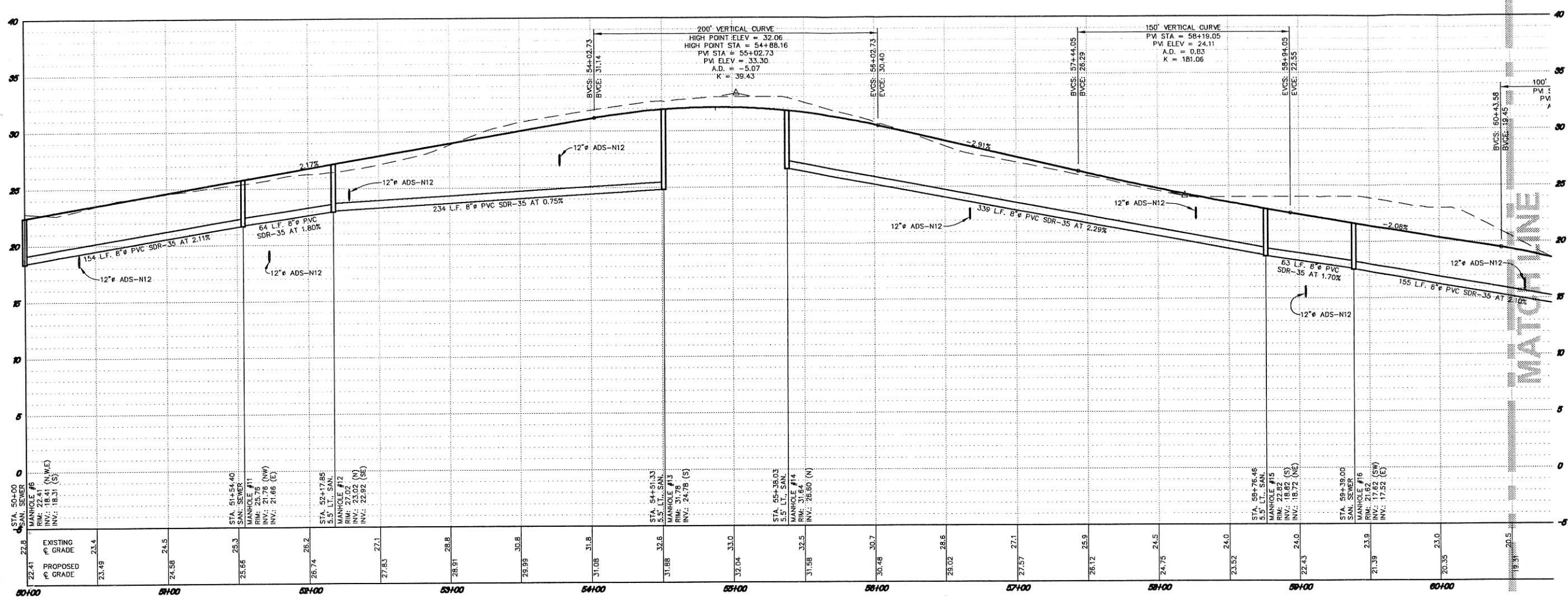
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**GRANDE POINTE
AT INLET BEACH**

ROADWAY PROFILES

Job No.: 0510.04.00
 Date: 04 OCT 04
 Scale: AS SHOWN
 Designed: MSJ
 Drawn: MPF
 Checked: MSJ
 Sheet: 21 of 27

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 CERTIFICATE OF AUTHORIZATION NO. 9927

Revisions:

Seal:

M. SCOTT JENKINS, P.E.
 FL REG. NO. 58073

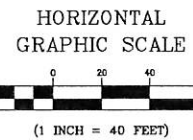
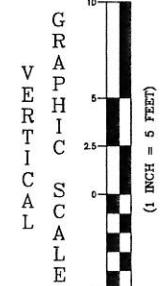
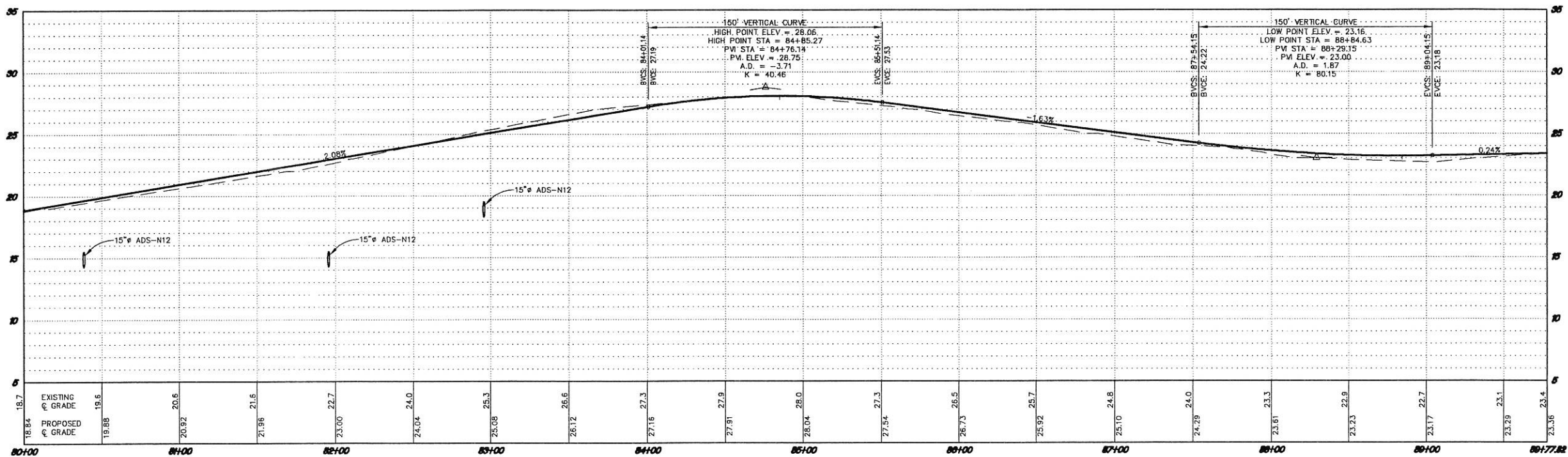
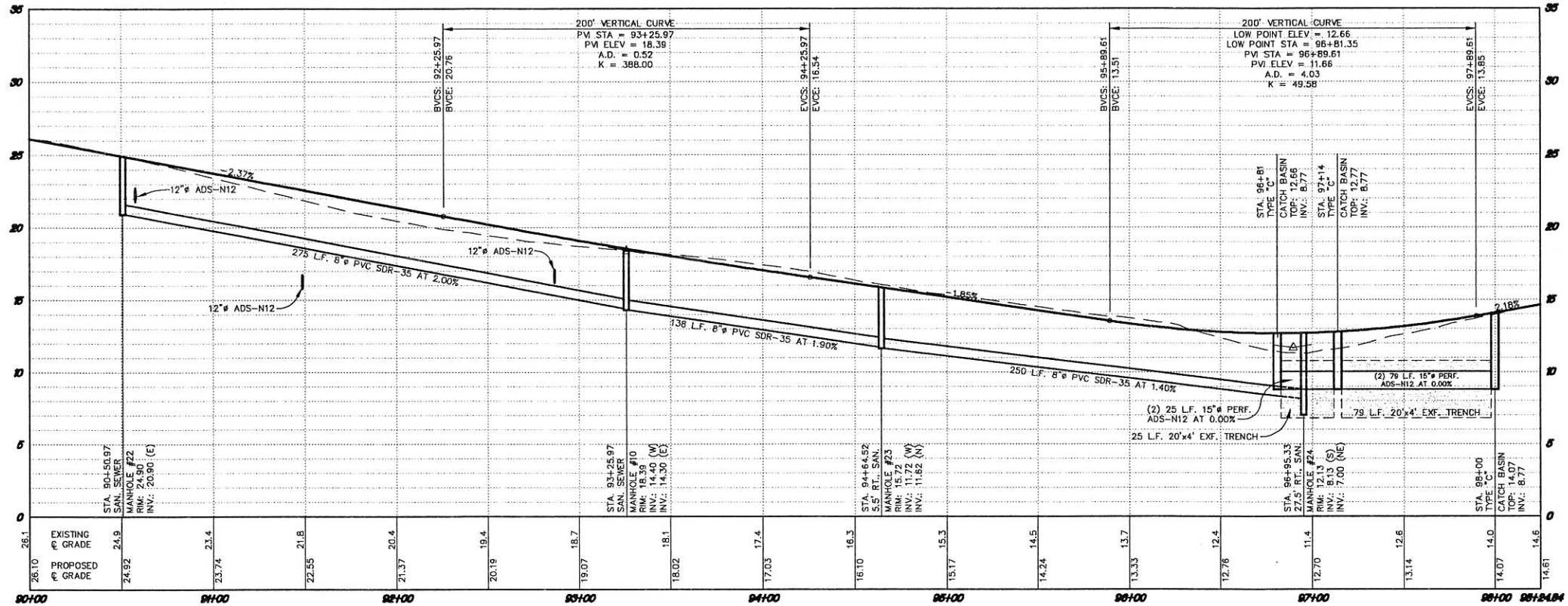
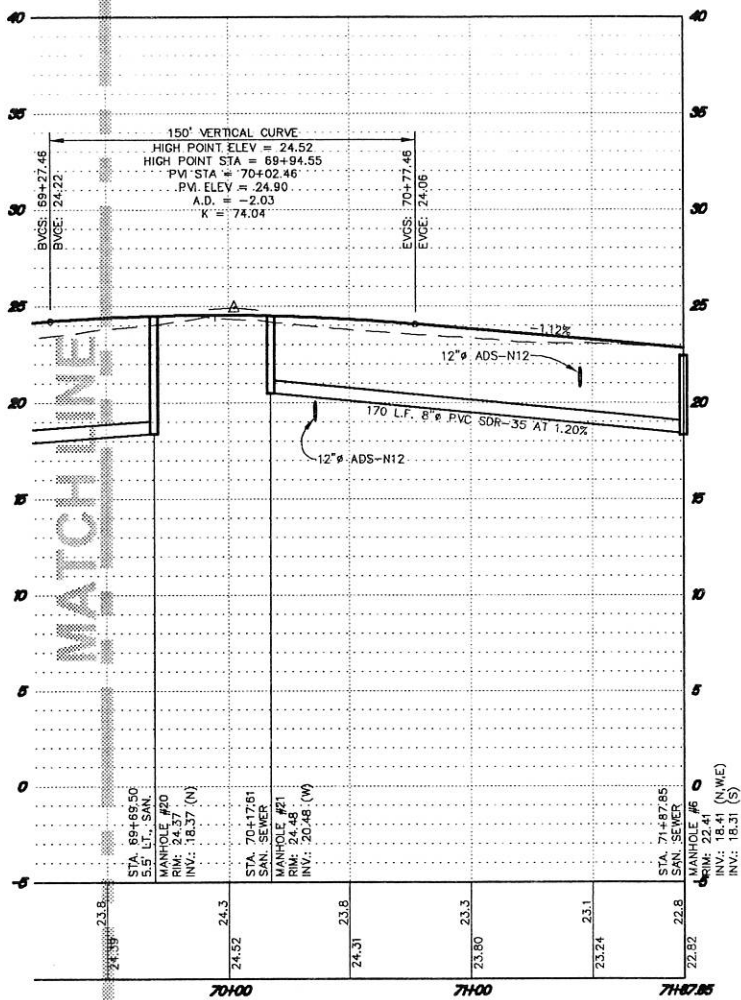
**GRANDE POINTE
 AT INLET BEACH**

ROADWAY PROFILES

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Job No.: 0510.04.001
 Date: 04 OCT 04
 Scale: AS SHOWN
 Designed: MSJ
 Drawn: MPF
 Checked: MSJ
 Sheet: 22 of 27

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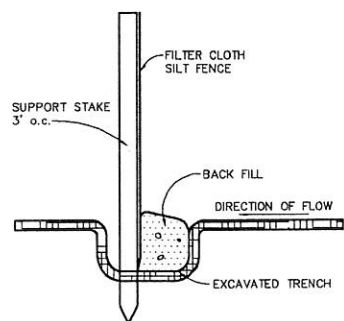
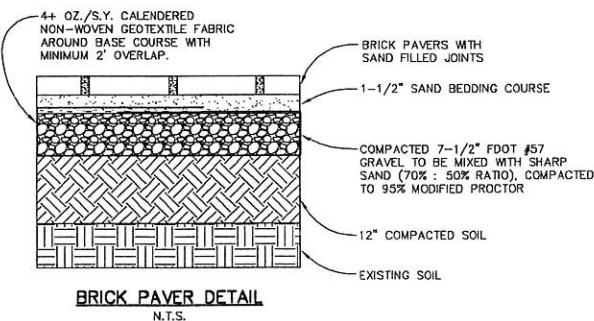
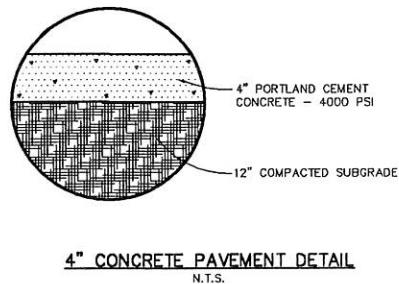
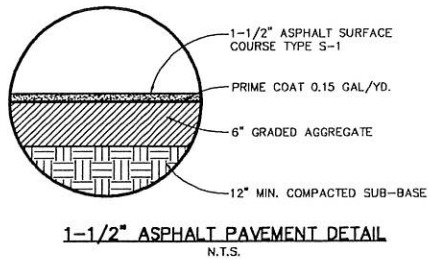
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FL REG. NO. 58073

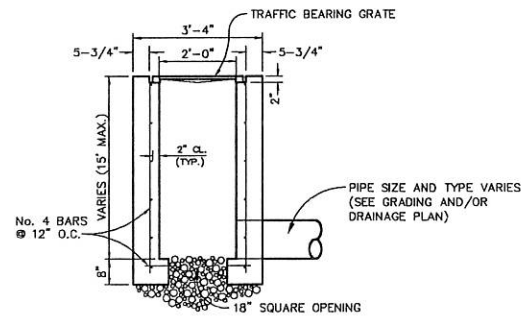
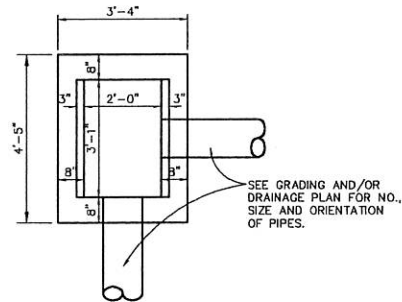
**GRANDE POINTE
AT INLET BEACH**
ROADWAY PROFILES
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Job No.: 0510.04.001
Date: 04 OCT 04
Scale: AS SHOWN
Designed: MSJ
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Sheet: 23 of 27

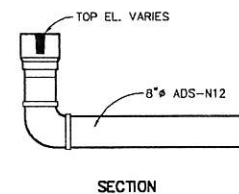
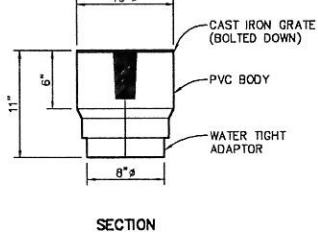
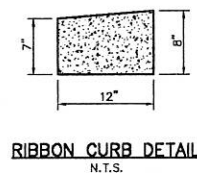
C-22



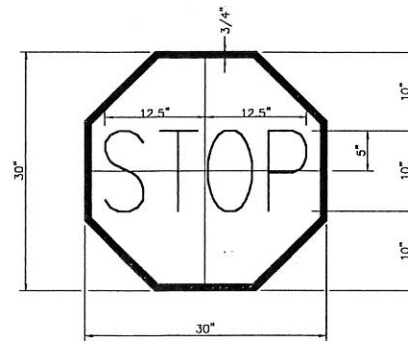
- EROSION NOTES:**
1. EROSION PROTECTION: SOIL EROSION SEDIMENTATION MUST BE CONTROLLED AND RETAINED ON SITE DURING CONSTRUCTION. THEREFORE, EROSION PROTECTION, SUCH AS STAKED BALED HAY AND SILT FENCE BARRIERS, MUST BE INSTALLED PRIOR TO START OF CONSTRUCTION.
 2. SILT FENCE BARRIER SHALL BE INSTALLED AS SHOWN ON PLANS, AND IN ALL AREAS SUBJECT TO SOIL EROSION SEDIMENTATION.
 3. STORMWATER DETENTION AREA SLOPES SHALL BE COVERED WITH PINE STRAW.
 4. GRADES AT CURBS ARE AT FLOWLINE.



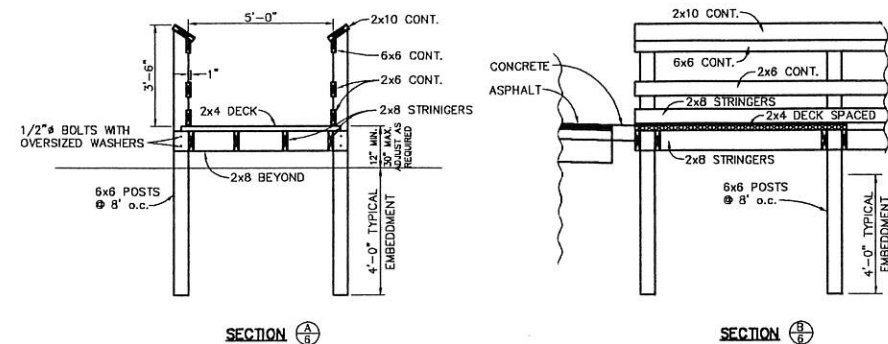
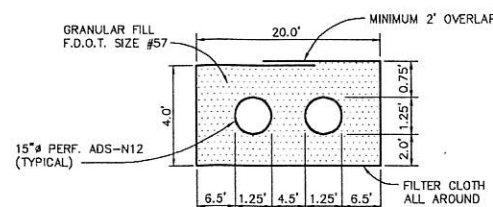
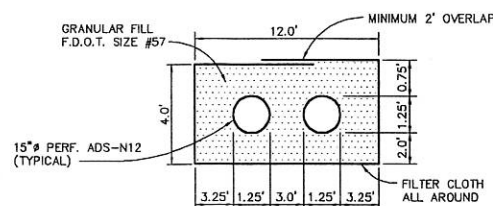
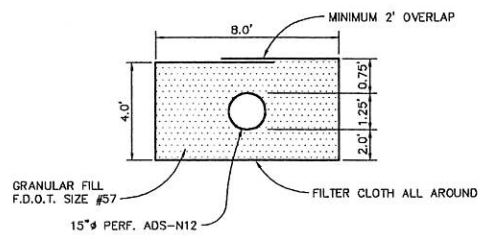
TYPE "C" CATCH BASIN DETAIL
(F.D.O.T. INDEX No. 232)
N.T.S.



NYLOPLAST INLINE DRAIN DETAIL
N.T.S.

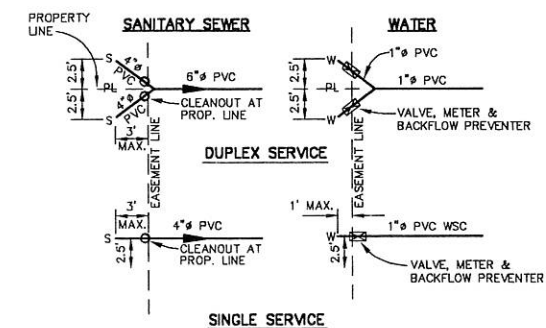


- NOTE:**
- SIGN DESIGNATION: R1-1 (REFL.)
RELECTORIZATION: LEGEND, BORDER (REFL.)
SIGN COLORS: LEGEND, BORDER (WHITE)
BACKGROUND (RED)



BOARDWALK DETAIL
N.T.S.

- NOTES:**
1. ALL FERROUS METALS TO BE PAINTED, GALVANIZED OR OTHERWISE TREATED FOR RUST.
 2. ALL PAINTS AND SIMILAR FINISHES MUST MEET CURRENT CSPSC REGULATIONS FOR LEAD IN PAINT. NO LEAD IS PERMITTED ON THIS PROJECT.
 3. ALL WOOD TO BE TREATED TO RESIST ROT OF INSECTS.
 4. ALL HARDWARE TO BE INSTALLED SO THAT IT DOESN'T LOOSEN OR IS NOT ALLOWED TO BE REMOVED WITHOUT THE USE OF TOOLS. LOCK WASHERS, SELF-LOCKING NUTS OR OTHER LOCKING MEANS ARE TO BE PROVIDED TO PREVENT DETACHMENT.
 5. NO SHARP POINTS, CORNERS OR EDGES ON ANY COMPONENT WILL BE ALLOWED. ALL WOOD MEMBERS AND EDGES ARE TO BE SANDED SMOOTH. ALL METAL EDGES ARE TO BE GROUNDED SMOOTH.
 6. NO PROTRUSIONS OR DANGEROUS PROJECTIONS ON FACILITY WILL BE PERMITTED IF A POSSIBILITY OF ENTANGLEMENT OF CHILDREN'S CLOTHING EXISTS.
 7. NO CONDITIONS ARE TO EXIST THAT PRESENT POSSIBLE PINCHING, CRUSHING OR SHEARING POINTS, OR HEAD, LEG OR HAND ENTRAPMENT. NO CONDITIONS ARE TO BE ALLOWED THAT MAY ENTRAP THE BODY OR ANY OF ITS PARTS.



NOTE:
ALL WATER SERVICES UNDER PAVEMENT TO BE ENCASED IN PVC SLEEVE, WIDTH OF PAVEMENT.



Revisions:

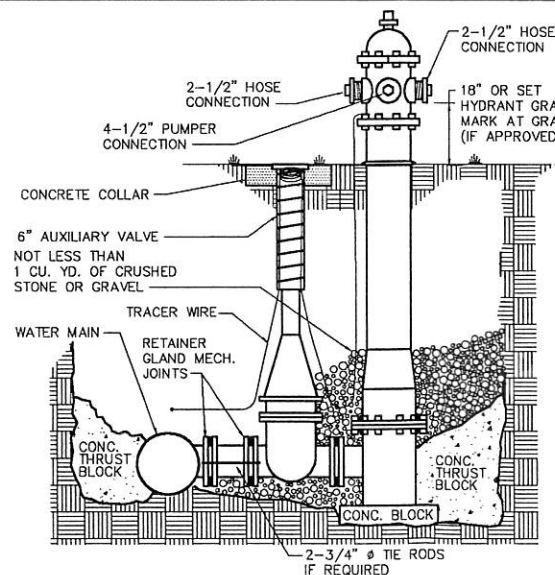
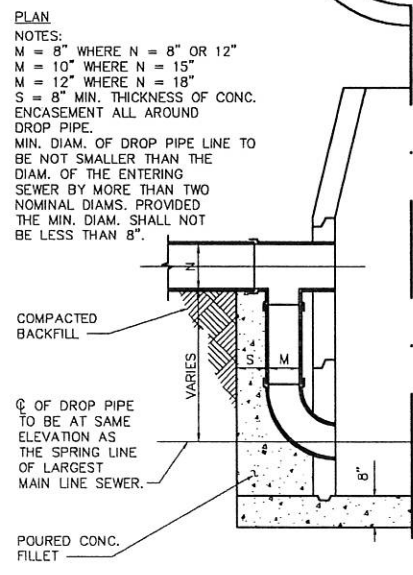
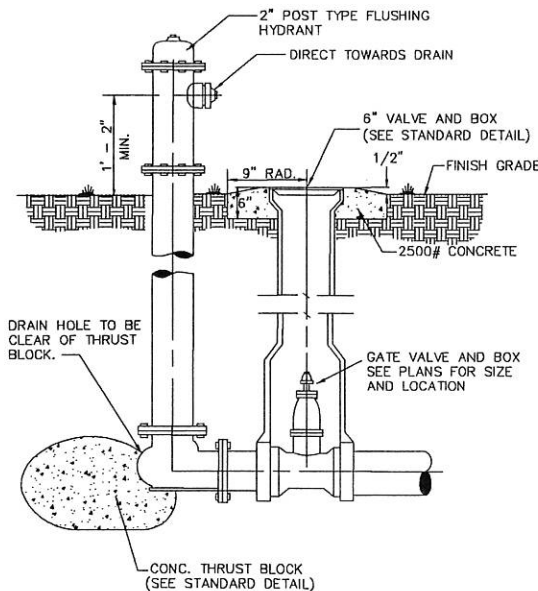
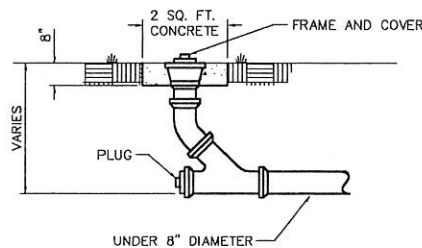
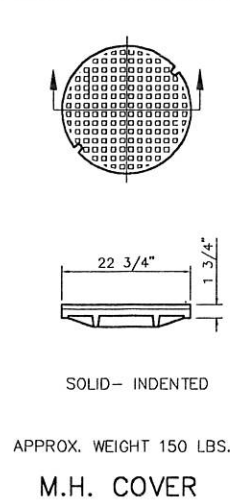
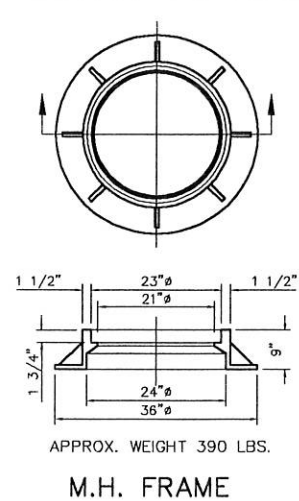
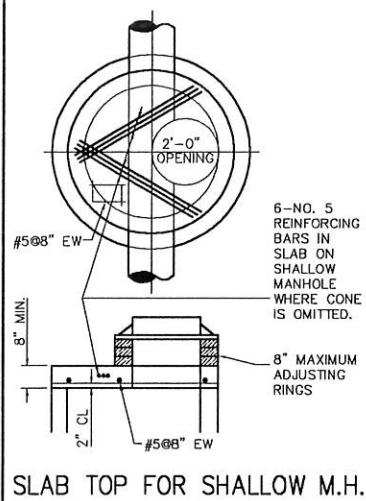
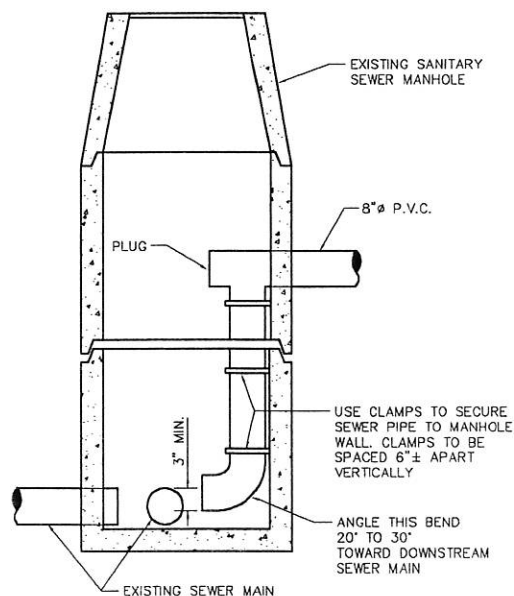
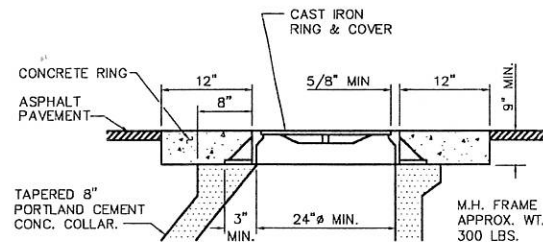
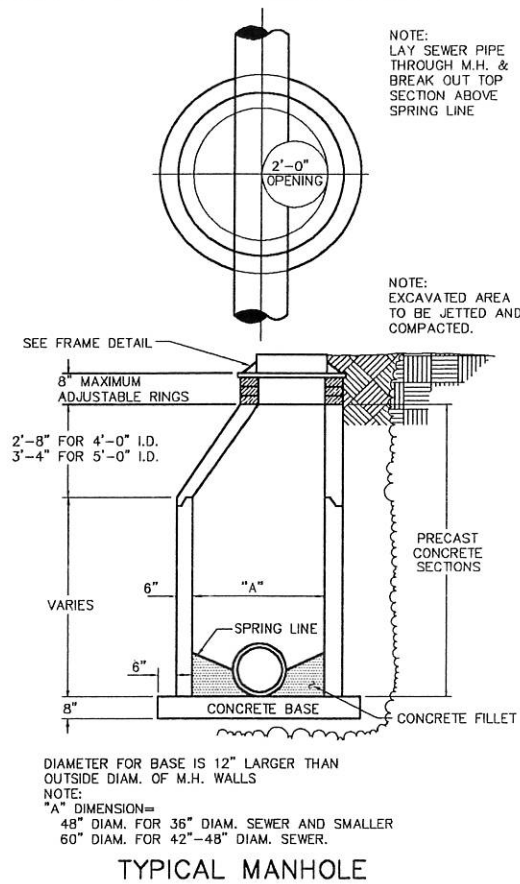
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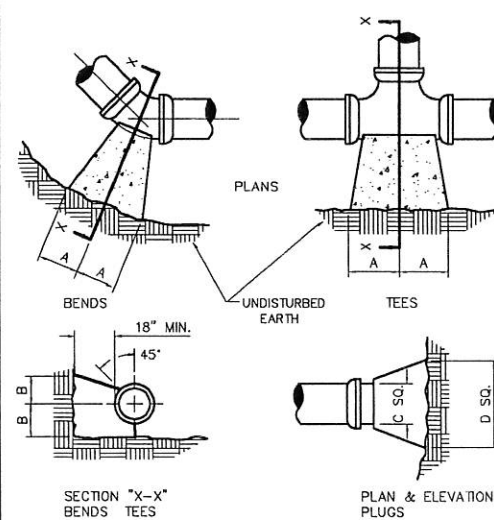
M. SCOTT JENKINS, P.E.
FL REG. NO. 58073

**GRANDE POINTE
AT INLET BEACH**

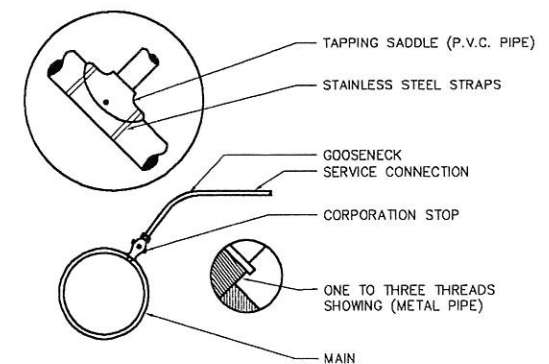
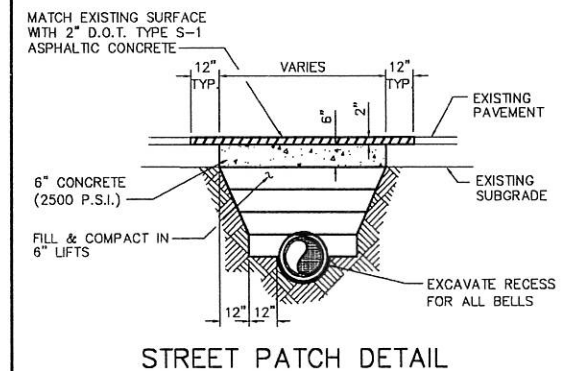
MISCELLANEOUS DETAILS
Not valid unless bearing Engineer's embossed seal.



- NOTES:
1. ALL JOINTS FROM THE HYDRANT TO AND INCLUDING THE TEE AT THE MAIN SHALL BE RESTRAINED IF REQUIRED BY UTILITY.
 2. ROTATE FIRE HYDRANT, 4-1/2" PUMPER CONNECTION TO FACE STREET.
 3. ALL HYDRANTS SHALL HAVE A STANDARD PENTAGON 1-1/2" OPERATING NUT.
 4. ALL HYDRANTS SHALL HAVE A TAMPER PROOF BONNET INSTALLED.
 5. ALL HYDRANT SERVICES MUST BE TAPPED OFF DEDICATED FIRELINE (UNLESS APPROVED OTHERWISE BY THE GENERAL MANAGER OR A DESIGNATED REPRESENTATIVE OF DESTIN WATER USERS).
 6. THREADED RODS SHALL NOT BE ALLOWED BETWEEN THE HYDRANT AND THE ISOLATION VALVE. THRUST BLOCKS SHALL BE UTILIZED INSTEAD.
- HYDRANT SETTING DETAIL**



SIZE	45° BENDS		ELLS		TEES		PLUGS	
	A	B	A	B	A	B	C	D
4"	12"	8"	8"	8"	8"	8"	10"	10"
6"	16"	10"	12"	12"	9"	12"	12"	20"
8"	22"	13"	16"	16"	13"	16"	12"	29"
10"	26"	17"	20"	20"	16"	20"	14"	36"
12"	29"	21"	24"	24"	18"	24"	16"	41"



GENERAL WATER MAIN NOTES

1. THE CONTRACTOR SHALL OBTAIN BACTERIOLOGICAL EXAMINATIONS ON ALL NEW WATER MAIN AS REQUIRED BY ALL MUNICIPAL, COUNTY, AND STATE AGENCIES PRIOR TO PLACING A WATERLINE INTO SERVICE.
2. INSTALLATION OF WATER MAINS AND SERVICE SHALL COMPLY WITH ALL MUNICIPAL, COUNTY AND STATE REQUIREMENTS.
3. THE CONTRACTOR SHALL VERIFY ALL FIELD DIMENSIONS AND REPORT ANY DISCREPANCIES (INCLUDING ING FIELD STAKE OUT) PRIOR TO COMMENCING WORK.
4. ALL PIPE SHALL BE P.V.C. UNLESS OTHERWISE NOTED OR REQUIRED. FITTINGS SHALL BE CAST IRON WITH RETAINER GLAND MECHANICAL JOINTS.
5. THRUST BLOCKS SHALL BE SIZED TO RESIST HYDRAULIC TEST PRESSURES AGAINST UNDISTURBED SOILS (150 P.S.I.)
6. CONTRACTOR SHALL PROVIDE 30" OF COVER OVER THE CROWN OF ALL MAINS IN THE RIGHT-OF-WAY; 24" OVER SERVICE CONNECTIONS IN THE RIGHT-OF-WAY; AND A MINIMUM OF 18" ON SERVICE CONNECTIONS OUTSIDE THE RIGHT-OF-WAY.
7. FIRE HYDRANTS SHALL BE INSTALLED ON OR NEAR PROPERTY CORNERS.
8. CONTRACTOR SHALL PROVIDE AS-BUILT DRAWINGS TO THE ENGINEER.
9. CONTRACTOR SHALL COORDINATE WITH UTILITY COMPANIES 48 HOURS PRIOR TO CONSTRUCTION.

GENERAL SANITARY SEWER NOTES

1. CONCRETE STRENGTH SHALL BE 4,000 P.S.I. AT 28 DAYS.
2. PRECAST REINFORCED CONCRETE MANHOLE TOP, BASE, AND SECTIONS SHALL CONFORM TO ASTM SPECIFICATIONS C-478.
3. GROUT ALL RISER JOINTS AND ENTRY PIPES.
4. INVERT GROUTING SHALL BE UNIFORM AND SMOOTH-SLOPED TO CENTER LINE OF PIPE.
5. MINIMUM RADIUS 20".
6. USE COUPLINGS OR BELLS FOR ALL PIPES ENTERING OR EXITING M.H.
7. INSTALL 45° BEND AND EXTEND ALL SEWER SERVICE LATERALS 18" ABOVE GROUND.
8. ALL MANHOLES PLACED IN PAVED AREAS SHALL BE PROTECTED WITH 9"x1' WIDE CONCRETE RING.
9. CONTRACTOR SHALL PROVIDE AS-BUILT DRAWINGS TO THE ENGINEER.
10. CONTRACTOR SHALL COORDINATE WITH UTILITY COMPANIES 48 HOURS PRIOR TO CONSTRUCTION.

JENKINS, STANFORD & ASSOCIATES, INC.
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CERTIFICATE OF AUTHORIZATION NO. 9927

Revisions:

Seal:

M. SCOTT JENKINS, P.E.
FL REG. NO. 58073

**GRANDE POINTE
AT INLET BEACH**
WATER & SANITARY DETAILS
Not valid unless bearing Engineer's embossed seal

Job No.: 0510.04.001
Date: 04 OCT 04
Scale: N/A
Designed: MSJ
Drawn: MPF
Checked: MSJ
Sheet: 25 of 27
C-24

1. **Precast Concrete Manholes:** All manholes shall be of precast concrete construction and shall meet the requirements of ASTM C-4, except as modified herein. The concrete used shall be Type II or approved equivalent with a 28-day strength of 4000 lbs. per sq. inch.

The vertical walls shall have a minimum thickness of five-inches and shall be reinforced a minimum of 0.12 sq. inch per linear foot. The flat tops on shorter manholes shall be reinforced with No. 6 bars on six-inch centers both ways or as shown on the drawings.

The inside diameter shall be 48 inches on the riser sections with an eccentric cone section that narrows to 24 inches inside diameter at the top. The cone section shall be used on manholes with a depth of 5 feet or more and flat top used on manholes less than 5 feet.

4. The bottom section shall be of monolithic design with a minimum bottom thickness of six-inches.

The joints between the sections shall be tongue and groove with the tongue up and the groove down and shall be sealed with round or other flexible type natural rubber joint rings. In addition to the rubber ring gaskets, the interior and exterior voids in the pipe joints shall be sealed with "RAM-NEK" flexible plastic gasket manufactured by K.T. Snyder Company. "RAM-NEK" shall be installed in strict accordance with the manufacturer's recommendations.

2. **Manhole Accessories:** Manhole steps shall be constructed of 1/2-inch steel rod completely encased in a corrosion-resistant rubber capable of resisting chemicals and gasses encountered in manholes. Each step shall have a vertical load resistance of 400 lbs. and a pull out resistance of 500 lbs. per leg. Each step shall be a minimum of 12 inches wide and each leg shall extend 5 inches from the manhole face and have a 4-inch wall penetration. Steps shall have foot guide lugs and traction cleats and shall be installed on 16-inch centers. The manhole frames and covers shall be Vulcan Foundry No. VM-37, Nenech Foundry No. R-1600 series or equivalent. Solid covers shall be marked "SEWER". Frames for the covers shall be set to grade in a bed of cement mortar. Frames and covers shall be machined or ground at bearing surfaces to seat firmly and prevent rocking. Any set not matching perfectly shall be removed and replaced at no additional cost.

3. **Water-Proofing:** Both concrete and pre-cast sections below grade shall be painted on the outside with either two coats of bitumastic paint or a heavy layer of emulsified asphalt to water-proof completely. Manholes shall be inspected for water tightness prior to being placed in service. All incoming and outgoing sewer lines shall be plugged and the manhole filled with water to a level to create a minimum positive head of two feet or above the highest section joint. If the water level drop exceeds 1/8" per vertical foot of manhole depth in 5 minutes, the manhole shall have failed the test.

4. **Manhole Invert Channels:** The manhole invert channels shall be smooth and accurately shaped to a semicircular bottom conforming to the connecting sewer section. Invert channels and manhole bottoms shall be shaped and smoothed with one to two (1:2) cement-sand mortar of stiff consistency. Changes in size and grade shall be made gradually and evenly.

- F. **Submittals:** The Contractor shall submit a minimum of four (4) copies of catalog data for approval by the Engineer for materials to be used. This submittal shall include but not be limited to the following:

1. Pipe
2. Fittings
3. Manholes
4. Manhole steps
5. Frames and covers
6. Coatings

PRESSURE PIPING

This section includes furnishing and installing all pressure pipework and appurtenances for potable and non-potable water systems complete and fully operable in all respects.

- A. **Materials:** All material shall be free from defects impairing strength and durability and be of the best commercial quality for the purpose specified. It shall have structural properties sufficient to safely sustain or withstand strains and stresses to which it is normally subjected and be true to detail.

Certified records of material tests made by the manufacturer or by a reliable commercial laboratory shall be submitted to the Engineer if requested.

All pipework will be inspected upon delivery and such as does not conform to the requirements of these specifications shall be rejected and must be immediately removed from the site by the Contractor. The Contractor shall furnish and provide all labor necessary to assist the Engineer in inspecting the material.

The basis of rejection shall be as specified in applicable ASTM Specifications.

- K. **Unplasticized Polyvinyl Chloride (PVC) Pressure Pipes:** PVC pressure pipe shall have a bell-type joint designed for conveying potable water under pressure. Ring-type neoprene gasket shall be provided in recesses in the bells to make the joints watertight for all slip joint piping. Only where specifically called for on the construction plans shall solvent-weld or flanged connections be used. All fittings shall be of the same joint design as recommended by the manufacturer. PVC pipe shall meet or exceed the minimum requirements of Commercial Standard CS-256063 for Type 1120 material made to SDR-21 dimensions. PVC compounds used shall be as specified in ASTM D-1784. Dimensions and specifications for PVC pipe shall be as required in ASTM D-2241, Class Designation 12454-B. PVC joints shall meet ASTM D-3139, for Bell End Pipe. PVC pipe shall be as manufactured by the Johns-Manville Co., the Ethyl Corp., the Certol-Tesd Products Corp., the Clow Corporation or approved equivalent.

All fittings for PVC pressure pipe shall be cast iron mechanical joint meeting ANSI Standard Specification A21.10, latest, Cast Iron Fittings, 2 inch through 48 inch for Water and Other Liquids unless indicated otherwise on the construction plans. Minimum pressure rating shall be equal to that of the pipe specified. Linings and coatings shall be as specified on the next page under "Linings and Coatings for Ductile Iron Pipe".

Unless otherwise indicated on the drawings all PVC pressure pipe shall be SDR-21 type. All pressure piping shall be supplied in the following colors:

1. Potable water - White
2. Non-potable water - Purple
3. Sewer force main - Brown

Standard laying lengths shall be 20 feet and randoms shall not be less than 10 feet.

Pipe for potable water use must be certified as suitable by the National Sanitation Foundation (N.S.F.) and marked as follow: NSF-PW.

Each length of pipe shall be clearly marked with the following information at intervals of not more than five feet:

1. Nominal pipe size
2. Material designation code
3. Standard pipe dimension ratio and pressure class
4. ASTM Designation D-2241
5. Manufacturer's name (or trademark)
6. NSF approval seal, if applicable.

- C. **Ductile Iron Pipe:** Ductile iron pipe shall meet the requirements of ANSI A21.51, including Addenda A21.51a. Pipe dimensions shall conform to Federal Specification WW-P-421, Class 150. Each pipe shall be conspicuously marked on the outside of the barrel to readily identify it from cast-iron. Meta thickness shall conform to ANSI A21.51, Table 51.1, 2-1/2 to 5 feet cover.

1. **Mechanical Joints:** ANSI Standard Specification A21.11, Rubber Gasket Joints for Cast-Iron Pressure Pipe and Fittings.

2. **Push-on Joints:** ANSI Standard Specification A21.11, Rubber Gasket Joints for Cast-Iron Pressure Pipe and Fittings, Single gasket push-on type.

3. **Flanged Joints:** ANSI Standard Specifications B16.1, Cast-Iron Pipe Flanges and Flanged Fittings, 125 pounds. Screwed on flanges, faced and drilled to ANSI Class 125 pound template. The flanged joints shall be assembled by threading plain end pipe and screwing on long hub flanges. The connection shall then be power tightened and refaced across both face of flange and end of pipe. Provide one-sixteen inch ring gaskets of red sheet rubber meeting the requirements of Grade 1, Table 1 of ASTM Specification D-1330, Sheet Rubber Gaskets. Connections shall be made with machine bolts and hexagonal nuts.

4. **Fittings:** Fittings shall meet ANSI Standard Specification A-21.10, latest, Cast-Iron Fittings, 2 inch through 48 inch for Water and Other Liquids. Minimum pressure rating shall be equal to that of the pipe specified.

- D. **Linings and Coatings for Ductile Iron Pipe:** All pipe, valves and fittings for potable water shall be thin cement lined, the lining shall comply with ANSI Standard A21.4 (AWWA C104) Cement-Mortar Lining for Cast Iron Pipe and Fittings for Water. All ductile iron pipe and fittings for non-potable and sewer force mains to be installed underground shall be coated on the interior with hot-dip coal-tar. All ductile iron pipe and fittings to be installed underground shall be coated on the exterior with hot-dip coal-tar. The exterior of all above ground pipe shall receive a coat of rust inhibitor prime compatible with the finish paint schedule. All bolts, nuts, studs and other uncoated parts of joints for underground installation shall be coated with asphalt or coal-tar prior to backfilling.

- E. **Copper Locator Wire:** Number 12 copper wire is to be installed with each joint of PVC pipe. Strap copper wire to top of pipe. Attach wire to all metal fittings with good electrical connection. Leave enough wire in valve boxes to extend two (2) feet above final grade.

The Contractor shall submit a minimum of four (4) copies of catalog data for

- F. **Submittals:** approval by the engineer for materials to be used. This submittal shall include but not be limited to the following:

1. Pipe
2. Fittings
3. Interior coating
4. Exterior coating

VALVES, HYDRANTS AND MISCELLANEOUS APPURTENANCES

This section includes furnishing and installing complete all equipment and materials necessary for a complete and fully operable system.

- A. **Materials:** All materials shall be free from defects impairing strength and durability and be of the best commercial quality for the purpose specified. It shall have structural properties sufficient to safely sustain or withstand strains and stresses to which it is normally subjected and be true to detail.

All pipework will be inspected upon delivery and such as does not conform to the requirements of these specifications shall be rejected and must be immediately removed from the site by the Contractor. The Contractor shall furnish and provide all labor necessary to assist the Engineer in inspecting the material.

The basis of rejection shall be as specified in applicable ASTM Specifications.

B. Valves:

1. **Gate Valves:** All gate valves shall conform to AWWA Specifications for a working pressure of 200 psi. All valves shall open counterclockwise. Valves installed below ground shall be fitted with hub-type hand operators and shall have a cast-iron valve box installed concentrically over the valve. The top of the valve box shall be set flush with the ground and shall have a cast-iron cover. Valves installed above ground shall be fitted with wheel-type hand operators. Valves used for ties to existing pressure system shall be mechanical joint.

- a. **Valves Three Inches and Over:** Valves shall be manufactured in accordance with AWWA Specification C-509. They shall be iron body, resilient-seated gate valves with nonrising stems with wide flanged, mechanical joint or spigot ends depending on installation. Flanged gate valves shall be provided with 125 lb. American Standard flanges.

- b. **Valves Under Four inches:** Gate Valves under four inches shall be iron or bronze body, resilient wedge valves equipped with nonrising stem and 2" operating nuts.

2. **Check Valves:** Provide check valves meeting the following requirements:

- a. **Over Three-Inches:** The check valves over three-inches (3") shall be iron-body, bronze-mounted, horizontal-swing check valves with flanged ends. All working parts shall be spring-loaded to prevent slamming. The check valves shall be M&H Fig. 250F, American Darling 50 Line or approved equivalent.

- b. **Under Three-Inches:** Check valves under three-inches (3") shall be screwed-and, bronze-body, silent check valves as manufactured by Crane Co., No 34 or approved equivalent.

3. **Air Release and Vacuum Valves:** The combination air release and vacuum valve shall be furnished with both a large and small orifice. The valve shall automatically function to release to atmosphere both large and small amounts of air that accumulate in the pipeline. Once the air has been exhausted both the large and small valves shall seat tightly to prevent water leakage. The valve shall also function to admit air into the line, tank or chamber under emergency conditions, or when it is being drained. The valve body and cover shall be of semi-steel; floats of stainless steel; levers of bronze and resilient seats. The air and vacuum valve shall be manufactured by G-A Industries, Inc. Type 1-AV or approved equivalent.

4. **Butterfly Valves:** Provide valves conforming to AWWA C-504 (latest) with lug wafers type body suitable for use between ANSI 125 or 150 lb. flanges. Disc shall be 316 stainless steel or have a welded nickel edge. Valve shaft shall be supported on three permanently lubricated bronze or on IFE coated stainless steel bearings. The valve seat shall be of Hycar or equivalent. Disc-to-shaft connections shall be 316 stainless steel and securely locked in position. Valves 8-inches and larger shall have a thrust collar of stainless steel. Three shaft seals shall protect bearings from internal and external corrosion. Infinite position levers shall provide manual throttling and locking in any position from open to closed. Butterfly valves and actuators shall be Figure 632 as manufactured by DeZurick or approved equivalent.

5. **Hose Bibs:** Hose bibs shall be Crane No. 58 or approved equivalent.

C. Hydrants:

1. **Spacing:** Spacing shall be as approved by the Engineer.

2. **Fire Hydrants:** All fire hydrants shall be 5-1/4 inch hydrants with two 2-1/2 inch connections and one pumper connection designed for 150 psi working pressure, and shall conform to the requirements of AWWA C-502. Hydrants shall have mechanical joint inlets, shall be for a 3-foot bury, and shall be breakaway or traffic model, dry barrel type.

The hydrants shall be Mueller Co., Centurian A-423, M&H Style No. 129, or approved equivalent.

The hydrants shall be painted "chrome yellow" (safety yellow) and nozzle caps to be color coded base on the hydrant's flow rating in accordance with National Fire Code NFPA-291 "Fire Flow Testing and Marking of Hydrants". After installation, South Walton Fire District will flow test the hydrant and color code the nozzles as required.

D. Water Services:

1. **Water Meters and Meter Boxes** shall be furnished and installed by S. Walton Utility Co., Inc.

2. **Tapping Saddles** shall be Rockwell Model 311 or approved equivalent.

3. **Corporation Stops** shall be Ford Model No. F-1000; Hays Model 5200, or approved equivalent. Inlets shall have iron pipe threads and outlets shall have compression connections.

4. **Curb Stops** shall be Ford Model No. B-43-232-W with locking wing or approved equivalent. Inlets shall have compression connections and outlet shall have iron pipe threads. Valves shall be equipped with padlock eyes or approved equivalent.

5. **Service Tubing** shall meet the requirements of ASTM D-2666, SDR-9 and shall be listed as having the approval of the National Sanitation Foundation for Water Distribution; and shall have the NSF approval designation stamped on the tubing. Service tubing material shall be polybutylene. It shall be delivered in rolls and cut to required lengths.

6. **Wye Branches** for double services are to be pack joint wye branches, Ford Model No. Y44-243 or approved equivalent.

- E. **Valve boxes:** Cast-iron valve boxes shall be provided for all underground valve installations. They shall consist of a base covering the operating nut and head of the valve, a vertical shaft, at least 5-1/4 inches in diameter, and a top section, extending to a point even with the finished ground surface. Provide a cast-iron cover marked "WATER" or "SEWER" as required and placed concentrically over the operating nut. The valve boxes shall be Clow F-2452 screw type valve box, or an approved equivalent.

- F. **Steel Coating:** All coating used for boring and bridge crossing shall be wrought steel Schedule 40 with a minimum yield strength of 35,000 psi.

Bore casing shall have an exterior protective coating of coal-tar enamel in accordance with AWWA C-204. The casing shall be installed by either jacking or boring at the option of the Contractor. Ends shall be free from splices or other rough edges which might damage the carrier pipes.

Bridge crossing casing exterior shall be painted with two (2) coats of rust inhibitor paint, light gray.

- G. **Backflow Preventer:** Backflow preventers shall be one of the following types as indicated on the drawings:

1. Double check valve assembly shall be a complete assembly including two positive seating check valves, tight closing shut-off valves located upstream and downstream of the check valves, and four suitably placed ball-type test cocks. The entire assembly shall be protected by a strainer. The device shall be bronze construction. The first and second check valves shall be of modular design and interchangeable.
2. Reduced pressure principle backflow preventer assembly shall contain a minimum of two independently acting, approved check valves, together with an automatically operated pressure differential relief valve located between the two check valves. The assembly shall include tightly closing, shutoff valves located at each end of the assembly, and each assembly shall be fitted with properly located test cocks.

The backflow preventers shall be in full conformance with the American Society of Sanitary Engineering Standard for Double Check Valve Assemblies, ASSE Standard 1015 and with the requirements of the U.S.C. Foundation for Cross-Connection Control.

- H. **Submittals:** The Contractor shall submit a minimum of four (4) copies of catalog data for approval by the Engineer for materials to be used. This submittal shall include but not be limited to the following:

1. Pipe and fittings
2. Tubing
3. Valves
4. Hydrants
5. All service materials
6. Casing
7. Backflow preventer

INSTALLATION:

This section covers installation of gravity and pressure pipework. Excavation and backfilling shall be in accordance with the preceding, applicable sections of these specifications.

A. General:

1. All pipe, fittings and valves shall be carefully handled at all times to prevent damage to the pipe or other installations on the job site.

2. At times when pipe installation is not in progress, the open ends of the pipe shall be closed by approved means and shall remain closed until construction on that particular section is resumed, eliminating the possibility of any flow obstructions getting into the pipe.

3. All joints shall be wiped free of all dirt, sand and foreign material and the pipe shall be carefully examined for defects before installation.

4. Cutting of pipe for inserting valves, fittings or closure pieces shall be done in a neat and workmanlike manner without damage to the pipe.

5. Deviations from the piping location, line and grade indicated on the construction plans shall not be made without the prior approval of the Engineer.

B. Pipe Laying Procedures:

1. **Gravity Flow Piping:** Gravity flow piping shall be installed to the line and grade indicated on the construction drawings. Before lowering the pipe into the ditch, the bottom of the ditch shall be graded so that when the pipe rests on the ditch bottom, it will have a uniform bearing for its entire length. Bell holes shall be dug for bell placement. The pipe shall be carefully examined for defects and the inside cleaned. After placing the pipe in the ditch, the ends shall be wiped free from all dirt, sand and foreign material. The joints shall then be made in accordance with the recommendations of the pipe manufacturer.

Installation of pipe shall proceed in a upstream direction with bells facing in the direction of laying. All pipe reaches will be inspected for straightness. No bows or dips, either horizontally or vertically, will be accepted. A full circle of light must be readily seen when looking from one end of a pipe through to the other end.

2. **Pressure Piping:** Pressure piping shall be installed in strict accordance with the manufacturer's printed instructions. Before lowering the pipe into the trench the bottom of the trench shall be graded so that when the pipe rests on the trench bottom it will have a uniform bearing for its entire length. The pipe shall be carefully examined for defects and the inside cleaned. After placing the pipe in the trench, the ends shall be wiped free from all dirt, sand and foreign material. The joints shall be made in accordance with the recommendations of the pipe manufacturer.

Suitable concrete reaction or thrust blocks shall be applied on all lines (except those having screwed or flanged joints), at all tees, plugs, caps and bends deflecting 22-1/2 degrees or more, or movement shall be prevented by attaching metal rods or straps approved by the Engineer. Unless otherwise directed, the pipe shall be laid with bell ends facing in the direction of laying. Whenever it is necessary to deflect the pipe from a straight line, either in the vertical or horizontal plane, to avoid obstruction, to plumb stems, or where long radius curves are permitted, the degree of deflection shall be as recommended by the manufacturer of the pipe.

The minimum cover for pipe will be 30-inches unless otherwise indicated on the plans. The depth of cover shall be measured from the established street grades or the surface of the permanent improvement to the top of the barrel of the pipe. At street intersections or where the new pipe lines cross existing underground lines at the approximate same depth as the new line, the cover shall be increased and the new line laid below existing lines or structures. Where the existing lines or structures are of sufficient depth that the new lines when laid will have 6-inches of separating earth between them and other pipe or structure and 30-inches cover, the new lines may be laid above the existing lines.

3. **Sub-Surface Explorations:** Whenever necessary to determine the location of existing pipes, valves or other underground structures, the Contractor shall examine all available records and shall make all explorations and excavations for such purpose. Where the locations of existing utilities are furnished by the Owner, they should be considered approximate only. The Contractor is responsible for locating and protecting all existing utilities whether shown on the drawings or not shown.

4. **Protecting Underground and Surface Structures:** Temporary support, adequate protection and maintenance of all underground and surface utility structures, drains, sewers and other obstructions encountered in the progress of the work shall be furnished by the Contractor at his own expense under the direction of the Engineer.

5. **Construction Equipment:** Mechanical equipment may be used for trenching and excavating. However, in places where the operation of some will cause damage to trees, shrubbery, pavements or existing structures, above or below ground, hand methods shall be employed.

Where a main is installed along paved streets, only rubber-tired equipment will be allowed for excavation and backfilling; the use of bulldozers or equipment with tracks will not be permitted. The Contractor will be responsible for any damage done to paved streets or lawns. Either air hammers or concrete saws should be used for cutting concrete pavement.

6. **Unsuitable Conditions:** No pipe shall be laid or manholes placed in water or unsuitable soils conditions. Unsuitable soil, as determined by the Engineer, shall be removed or replaced with an approved material.

7. **Trench Water:** At times when pipe laying is not in progress, the open ends of pipe shall be closed by approved means, and no trench water shall be permitted to enter the pipe.

8. Setting Valves and Boxes:

- a. **Valves and Fittings:** Gate valves and pipe fittings shall be set and jointed to new pipe in the manner heretofore specified for cleaning, laying and jointing pipe.

- b. **Valve Boxes:** Cast-iron valve boxes shall be firmly supported and maintained, centered and plumb, over the wrench nut of the gate valve and box cover flush with the surface of the finished pavement or at such other level as may be directed.

9. **Cutting Pipe:** Cutting of pipe for inserting fittings or closure pieces shall be done in a neat and workmanlike manner without damage to the pipe.

10. **Dewatering:** The Contractor shall provide all necessary pumps to dewater the site properly, shall provide all labor and materials required to keep any open excavation dewatered during construction, and shall provide all necessary shoring, bulkheads, drains, etc., so that construction operations may be performed under dry conditions. Discharge from pumps must be led to natural drainage channels, to drains, or to sewer.

11. **Service Pipe:** Service pipe shall have a minimum depth of 30 inches at all highway crossings and 18 inches elsewhere. The requirements for trenching and backfilling shall apply. Removal of pavement or sidewalk will not be permitted for water service lines. They may be installed by jacking, boring or pushing under sidewalks.

12. **Casing:** Steel casing shall be installed by either jacking or boring at the option of the Contractor. Any section damaged by the installation shall be removed from the casing leaving both ends free from splits or other rough edges which might damage the carrier pipe. All steel highway crossings shall require steel casing.

13. **Plugging Dead Ends:** Standard plugs shall be inserted into the bells of all dead ends of pipes, tees or crosses, and spigot ends shall be capped. Plugs or caps shall be jointed to the pipe or fittings in the appropriate manner.

14. **Concrete Encasement and Spawls:** Provide concrete pipe encasements or special pipe supports as shown on the drawings or directed by the Engineer. Various pipe supports shall be worked out in the field to suit local conditions and emergencies. Where, in the opinion of the Engineer, pipe covering is inadequate, concrete encasement for protection shall be provided in accordance with the details on the drawings. Concrete encasements shall be made using concrete with a 28-day strength of 2000 psi and shall be to the dimensions indicated on the construction plans and as required by the applicable Department of Transportation or Public Health regulations. All other concrete needed to build and protect the pipe work shall be used at the direction of the Engineer.

15. **Backfilling:** Backfill material shall be free from shells, rocks or boulders, or any other objectionable material and shall be placed in the trench and compacted simultaneously on both sides of the pipe for the full width of the trench, and to an elevation level with ground on either side to the densities indicated in Section 2 of these specifications.

16. **Reparing:** Pavement removal where required in the construction of this project shall be done by the Contractor in a workmanlike manner. Care must be taken to make the saw cut in a straight line so the patch will be neat.

Asphalt paving shall be replaced as described in the applicable sections of these specifications. Concrete driveways and pavement shall be replaced using concrete with high early strength so that traffic may be resumed quickly. Concrete must be finished to conform with existing pavement.

17. **Clean-Up:** Before final inspection and acceptance, the Contractor shall clean ditches, shape shoulders, and restore all disturbed areas, including street crossings, grass plots, to as good a condition as existed before work started. All trenches shall be leveled, and loose material removed from pavement gutters and sidewalks, employing hand labor, if necessary.

C. Anchorage of Bends, Tees and Plugs:

1. **Thrust Backing Placement:** Reaction or thrust backing shall be placed on all pipe lines two-inches in diameter or larger at all tees, plugs, caps and at bends deflecting 22-1/2 degrees or more. The backing shall be prevented by attaching metal rods or straps as approved by the Engineer.

2. **Materials for Thrust Backing:** Reaction, or thrust backing shall be of concrete that has a 28-day compressive strength of not less than 2000 psi. Reaction backing will be placed in accordance with the details on the construction plans.

Backing shall be places between solid ground and the fitting to be anchored. The backing shall, unless otherwise directed, be so placed that the pipe and fitting joints will be accessible for repairs. No extra payment will be made for this material but shall be included in the unit price bid for the various sizes of pipe.

In some cases, the Engineer may direct the Contractor to provide backing using cables and "deadman" anchors where the soil conditions will not support the normal concrete type as described above.

TESTING AND INSPECTION:

- A. **General:** During construction and at the completion of the work, the Contractor shall make such tests as required in these specifications or as may be directed by the Engineer. The Engineer will observe the tests, but the Contractor shall furnish all apparatus required and shall pay all costs connected therewith unless otherwise stated in these specifications.

Defective work shall be repaired immediately at the Contractor's expense.

In general, tests shall conform to usually accepted testing practices for the specific type and class of test. All data, observations and results will be carefully recorded, and the Engineer will be furnished two signed copies of all data and reports. Project acceptance may be held contingent on receipt of satisfactory test reports.

B. Hydrostatic Tests of Pressure Pipework

1. **Pressure During Tests:** After the pipe has been laid and backfilled as specified, each valved section of newly laid pipe shall, unless otherwise specified, be subjected to a hydrostatic pressure equal to the pressure rating of the pipe being tested. The Contractor shall record the testing by the use of a pressure recording gauge and after all testing is complete, the recordings shall be turned over to the Engineer for his files.

2. **Duration of Pressure Test:** The duration of each pressure test shall be at least 2 hours.

3. **Procedure:** Each section of pipe shall be slowly filled with water and the specified test pressure, measured at the lowest point of elevation, shall be applied by means of a pump connected to the pipe in a satisfactory manner. The pump, pipe connection, gauges, meter and all necessary apparatus shall be furnished by the Contractor.

The test shall be applied to each valved section in order to check the leakage through all valves.

4. **Expelling Air Before Tests:** Before applying the specified test pressure, all air shall be expelled from the pipe. To accomplish this, taps shall be made, if necessary, at points of highest elevation, and afterwards tightly plugged.

5. **Definition of Leakage:** Leakage is defined as the quantity of water to be supplied into the newly laid pipe, or any valved section of it, necessary to maintain the specified leakage test pressure after the pipe has been filled with water and the air expelled.

6. **Permissible Leakage:** Suitable means shall be provided by the Contractor for determining the quantity of water lost by leakage under normal operating pressure. No pipe installation will be accepted until or unless this leakage (evaluated at specific pressure) is less than the figures stated below:

Pipe Size	gal's/1000'/24 hrs.	gal's/1000'/1 hr.
2"	3.8 gal.	0.16 gal.
3"	5.7 gal.	0.24 gal.
4"	7.6 gal.	0.32 gal.
6"	11.4 gal.	0.47 gal.
8"	15.2 gal.	0.63 gal.
10"	18.9 gal.	0.79 gal.
12"	22.7 gal.	0.95 gal.

7. **Variation From Permissible Leakage:** Should any test of combined sections of pipe laid disclose leakage greater than the specified limit, the Contractor shall, at his own expense, locate and repair the defective joints until the leakage is within the specified allowance.

8. **Water for Testing:** Water for testing shall be provided by the Contractor and at his own expense. The Owner shall provide and install a metered connection at no charge.

9. **Time for Making Tests:** Pipe may be subjected to hydrostatic pressure, inspected, and tested for leakage at any convenient time after partial completion of backfill. The Contractor may test the system with joints exposed or will backfilling complete at his option. The Engineer and the Utility Company shall be notified at least 24 hours before beginning testing.

C. Tests of Gravity Pipework

1. **Inspection:** It is imperative that all sewers and manholes be built practically watertight and that the Contractor must adhere rigidly to the specifications for material and workmanship. After completion, the sewers, or sections thereof, will be tested and gauged, and if infiltration is above allowable limits specified, the sewer will be rejected.

On completion of each section of sewer, or such other time as the Engineer may direct, the section of sewer is to be cleaned, tested and inspected. All repairs shown necessary by the tests are to be made, broken or cracked pipe replaced, all deposits removed and the sewers left true to line and grade as herein specified, or shown on the plans, entirely clean and ready for use. Each section of the sewer between manholes is to be shown from either end on examination, a full circle of light. Each manhole or other appurtenance to the system shall be the specified size and form, be watertight, neatly and substantially constructed, with the top set permanently to exact position and grade.

2. **Limits of Infiltration and Methods of Testing:** The allowable limit of groundwater infiltration for the entire system shall be in accordance with ASTM C-425 and shall not exceed a limit of infiltration equal to 0.2 gal./inch diameter/hour/100 linear feet of pipe.

The test will be made by measuring the infiltration flow of water over a measuring weir set up in the invert of known distance from a temporary bulkhead or other limiting point of infiltration. After the sewer or sewers have been pumped out, and normal infiltration conditions prevail, tests shall be started.

Tests shall be run continuously for a period of not less than three (3) hours, with weir readings taken at 15 minute intervals. The test shall be made by the Contractor. The Engineer shall be notified 24 hours in advance. Where infiltration occurs in excess of the specified amount, the defective pipe or joints shall be located and repaired at the expense of the Contractor. If the defective portions cannot be so located, the Contractor, at his own expense, shall remove and reconstruct as much of the original work as necessary to obtain a sewer within the allowable infiltration limits upon such retesting as necessary.

D. Chlorination of Water Distribution Facilities: